



Vishay Intertechnology, Inc.



Automotive



GEARED TOWARDS AUTOMOTIVE





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車両エンジン制御装置 12 V / 24 V



エンジン冷却装置
(BLDC)



車の排気
コントロール装置



THE VISHAY ADVANTAGE

- AEC準拠
- 高温動作対応
- 高信頼性
- 薄型
- 長寿命
- 高い耐振動性能



エンジン冷却装置 (BLDC)



ALUMINUM CAPACITORS

SMD Aluminum Capacitors, High Temperature Up to 150 °C, Low ESR

[260 CLA-V](#)

- High ripple current up to 1400 mA at 150 °C, capacitance up to 3300 μ F
- Useful life up to 2000 h at 150 °C, high vibration capability

NON-LINEAR RESISTORS

SMD Glass-Protected NTC Thermistors

[NTCS...e3](#)

- Standard series, AEC-Q200 compliant
- Glass-protected with soft terminations

MOSFETs

N-Channel MOSFETs in 8 mm x 8 mm PowerPAK®, 40 V, 200 A, 1.7 m Ω

[SQJQ402E](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Low $R_{DS(on)}$, logic level MOSFET, PowerPak® 8x8L replaces D²PAK in less than half of the area

MOSFETs

N-Channel MOSFETs in 8 mm x 8 mm PowerPAK®, 40 V, 160 A, 1.2 m Ω

[SQJQ100EL](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Ultra-low $R_{DS(on)}$, thermally enhanced PowerPAK® 8x8L replaces D²PAK in less than half of the area

INDUCTORS

Low-Profile, High-Current IHLP® Inductors

[IHLP-6767GZ-5A](#)

- Lowest DCR/ μ H in this package size
- High temperature up to 155 °C, shielded construction

CERAMIC CAPACITORS

High Operating Temperature, Automotive Grade Leaded MLCC Capacitors

[HOTcap® K...H, A...R, K...R](#)

- High-reliability MLCC insert with wet build process
- High operating temperature (up to 175 °C for K...H and up to 160 °C for A...R and K...R), rated voltages: 50 V, 100 V, 200 V

RESISTORS

Power Metal Strip® SMD Resistors, High Power (7 W), Low Value (Down to 0.001 Ω)

[WSHM2818](#)

- Very high power rating of 7 W in small 2818 package
- Very low resistance values, 0.001 Ω to 0.10 Ω , with tolerance of 1 %

CERAMIC CAPACITORS

AEC-Q200 Qualified, Broad Range of Sizes and Working Voltages, C0G (NPO), X7R, and X8R

[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding



車の排気 コントロール装置

MOSFETs

N-Channel MOSFETs as Known Good Die (KGD) Rated at 60 V, 71 mΩ



[SQC462BKGD](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Efficient KGD packaging allows high power density and reduced parasitics

MOSFETs

P-Channel MOSFETs as Known Good Die (KGD) Rated at -60 V, 14 mΩ



[SQC461KGD](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Efficient KGD packaging allows high power density and reduced parasitics

RECTIFIERS

Schottky Diode Chips, 15 V to 150 V, Up to 3 A



[SC036H100S6B](#)

- Wafers in box, sawn on film, Al or Ag top metal

DIODES

Surface Mount PAR® TVS, 11 V to 48 V Breakdown Voltage



[SM8S10](#)

- AEC-Q101 qualified and high power up to 6600 W (10 x 1000 μs)
- Meet ISO7637-2 surge specification (varied by test conditions)

RESISTORS

Power Metal Strip® SMD Resistors, High Temperature (275 °C), High Power (1 W)

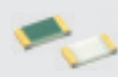


[WSLT2010...18](#)

- High temperature for harsh environments, resistance values down to 0.01 Ω
- Power Metal Strip® construction offers high reliability in critical applications

RESISTORS

Precision High-Temperature (215 °C) Thin Film Resistors, Low TCR with ± 5 ppm/°C



[PLTT0603](#)

- Gold terminations, Special Passivation Method (SPM)

NON-LINEAR RESISTORS

Platinum SMD Flat Chip Temperature Sensors



[PTS AT Series](#)

- Standard characteristics according to IEC 60751
- Short reaction times down to 2 s (in air)

NON-LINEAR RESISTORS

AEC-Q200 Qualified, Broad Range of Sizes and Working Voltages, C0G (NPO), X7R, and X8R



[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding

CERAMIC CAPACITORS

High Operating Temperature, Automotive Grade Leaded MLCC Capacitors



[HOTcap® K...H, A...R, K...R](#)

- High-reliability MLCC insert with wet build process
- High operating temperature (up to 175 °C for K...H and up to 160 °C for A...R and K...R), rated voltages: 50 V, 100 V, 200 V

車載MOSFET SQ Ruggedシリーズの特長

専用の車載プロセスフローを使い高品質を実現

ビシェイSiliconixブランドのパワーMOSFETのSQシリーズは、AEC-Q101に準拠しています。車載向けの優れた性能を実現するために車載専用のプロセスを採用しています。シリーズには低オン抵抗のTrenchFET® 技術を採用したNチャネル、Pチャネルの両製品があり、最大定格ジャンクション温度は175 °Cです。

パッケージはD2PAK (TO-263)、DPAK (TO-252)、SO-8、TSOP-6、SOT-23、SC-70等の従来からのパッケージに加え、省スペースが実現できる革新的なPowerPAK® も8 mm x 8 mmから2 mm x 2 mmのサイズまで揃っています。PowerPAK® 8x8L (8 mm x 8 mm) は1.2 mΩの低オン抵抗、D2PAKと比べて半分以上のサイズで大電流性能を提供し、ボードスペースを大幅に削減できます。PowerPAK® SO-8L (5 mm x 6 mm) はD2PAKと比べて半分以上のサイズで3 mΩの低オン抵抗、1.5 °C/Wの熱抵抗を提供します。デュアルの対称・非対称型が選べ、用途に応じてハイサイドとローサイド用に最適なMOSFETを選べます。PowerPAK® 1212-8 (3 mm x 3 mm) は3分の1のサイズでSO-8と同等のオン抵抗と電流性能を提供します。デュアル構成の製品ラインアップもある上、端子は側面の濡れ性を配慮しAOIに対応します。

PowerPAK® SC-70 (2 mm x 2 mm) は更に小さいパッケージながら、TSOP-6 とSOT-23と同等の低オン抵抗と電流性能を提供します。、ビシェイ社のMOSFETはKGD (Known Good Die) での提供も可能です。個片化したチップを全数テストした後にテープ & リールにて納入いたします。

車載アプリケーション向けのその他MOSFETについては下記をご参照ください。

<http://www.vishay.com/mosfets/automotive-mosfets/>

D ² PAK	DPAK / Reverse DPAK	PowerPAK® 8x8L	PowerPAK® SO-8L	SO-8
				
15.88 x 10.41 x 4.83	10.41 x 6.73 x 2.38	8.0 x 8.0 x 1.9	6.15 x 5.13 x 1.14	5.0 x 6.2 x 1.75

PowerPAK® 1212	TSOP-6	SOT-23	SC-70	PowerPAK® SC-70
				
3.3 x 3.3 x 1.2	3.1 x 2.98 x 1.1	3.04 x 2.64 x 1.12	2.2 x 2.4 x 1.1	2.15 x 2.15 x 0.8

Length x Width x Height (mm)

パワートレイン 噴射制御と燃料ポンプ向けの主要部品



直接噴射制御



圧電注入制御



燃料ポンプ制御
(BLDC)



THE VISHAY ADVANTAGE

- AEC準拠
- 高温動作対応
- 高信頼性
- 薄型
- 長寿命
- 高電圧対応SMD構成部品



直接噴射制御



ALUMINUM CAPACITORS

**SMD Aluminum Capacitors,
High Temperature Up to
150 °C, Low ESR**

[260 CLA-V](#)

- High ripple current up to 1400 mA at 150 °C, capacitance up to 3300 μ F
- Useful life up to 2000 h at 150 °C, high vibration capability

RESISTORS

**Precision Thin Film Chip
Resistor Arrays, Superior
Moisture Resistivity**

[ACAS0612 AT Precision](#)

- Resistance ratio up to 1:20, superior tracking stability over lifetime
- Relative TCR to ± 5 ppm/K (tracking), AEC-Q200 qualified, sulfur-resistant

MOSFETs

**Dual N-Channel MOSFETs
in 5 mm x 6 mm PowerPAK®
SO-8L Rated at 60 V, 12 m Ω**

[SQJB60EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Dual configuration in thermally enhanced PowerPAK® SO-8L saves board space

RECTIFIERS

**200 V, 2 x 3 A Fred Pt®
Hyperfast Rectifiers**

[VS-6CSH02HM3](#)

- Hyperfast recovery time, $t_{rr} = 27$ ns, reduced Q_{rr} , and soft recovery
- Low forward voltage drop and low leakage current

RECTIFIERS

**200 V, 2 x 3 A Fred Pt®
Hyperfast Rectifiers**

[VS-8DKH02](#)

- Dual 5x6 (FlatPAK™) package
- $T_j = 175$ °C

DIODES

**Surface-Mount PAR® TVS,
600 W, 6.8 V to 51 V**

[TA6Fxx](#)

- Very low-profile DO-221AC (SlimSMA™) package - typical height of 0.95 mm
- $T_j = 185$ °C

RESISTORS

**Power Metal Strip® SMD
Resistors, Wide Terminal,
1 m Ω to 3 m Ω , 1 W**

[WSL0612](#)

- Low EMF, high temperature up to 170 °C

INDUCTORS

**Low-Profile, High-Current
IHLP® Inductors**

[IHLP-5050FD-5A](#)

- Excellent high-temperature performance and noise filtering

CERAMIC CAPACITORS

**AEC-Q200 Qualified, Broad
Range of Sizes and Working
Voltages, C0G (NPO), X7R,
and X8R**

[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding

MOSFETs

**N-Channel MOSFETs in
5 mm x 6 mm PowerPAK®
SO-8L Rated at 80 V, 7 m Ω**

[SQJA80EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Ultra-low $R_{DS(on)}$, thermally enhanced PowerPAK® 8x8L replaces D²PAK in less than half of the area

NON-LINEAR RESISTORS

**SMD Glass-Protected NTC
Thermistors**

[NTCS...e3](#)

- Standard series, AEC-Q200 compliant
- Glass-protected with soft terminations

MOSFETs

**Dual N-Channel MOSFETs
in 5 mm x 6 mm PowerPAK®
SO-8L Rated at 40 V, 9.66 m Ω**

[SQJB42EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Dual configuration in thermally enhanced PowerPAK® SO-8L saves board space



圧電注入制御



RESISTORS

Professional High-Temperature Mini-MELF Resistors[MMA 0204 HT](#)

- Operating temperature up to 175°C, power handling of 500 mW
- AEC-Q200 qualified, high overall stability $|\Delta R/R| \leq 0.1\%$, intrinsically sulfur-resistant

RESISTORS

Power Metal Strip® SMD Resistors, 0.5 mΩ to 500 mΩ, 1 W[WSL2512](#)

- 2512 package size, also available in 2816 with 2 W

NON-LINEAR RESISTORS

SMD Glass-Protected NTC Thermistors[NTCS...e3](#)

- Standard series, AEC-Q200 compliant
- Glass-protected with soft terminations

DIODES

Unidirectional and Bidirectional Power SMD TVS Diodes, SMA Package, Up to 400 W[SMAJxx](#)

- DO-214AC (SMA) package, high-voltage clamping
- 6.4 V to 231 V

MOSFETs

N-Channel MOSFETs in DPAK Package Rated at 300 V, 10 A, 330 mΩ[SQD10N30-330H](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Up to 300 V operation in DPAK package

INDUCTORS

High-Isolation Flyback Transformers in Press-Fit and SMD Versions[Customized Transformers](#)

- Customized solutions up to kW ranges

INDUCTORS

Low-Profile, High-Current IHLP® Inductors[IHLP-2525CZ-5A](#)

- Excellent high-temperature performance for DC/DC converter input and output filters

ALUMINUM CAPACITORS

Radial Miniature, High-Voltage, Up to 450 V with CR Up to 220 μF[152RMH](#)

- High voltage applications, 105 °C long life
- Miniaturized, ultra-high CV product per unit volume

RECTIFIERS

600 V, 2 A FRED Pt® Ultrafast Rectifiers[VS-2EFU06HM3](#)

- SMF (DO-219AB) package, operating temperature up to 175 °C
- Pulse current up to 30 A (6 ms)

INDUCTORS

Low-Profile, High-Current IHLP® Inductors[IHLP-5050FD-5A](#)

- Excellent high-temperature performance and noise filtering

CERAMIC CAPACITORS

AEC-Q200 Qualified, Broad Range of Sizes and Working Voltages, C0G (NPO), X7R, and X8R[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding

MOSFETs

N-Channel MOSFETs in 5 mm x 6 mm PowerPAK®, 100 V, 32 A, 11 mΩ[SQJ402EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- 100 V MOSFETs for use in low-side flyback converters



燃料ポンプ制御 (BLDC)

ALUMINUM CAPACITORS

**SMD Aluminum Capacitors,
High Temperature Up to
150 °C, Low ESR**

[260 CLA-V](#)

- High ripple current up to 1400 mA at 150 °C, capacitance up to 3300 μ F
- Useful life up to 2000 h at 150 °C, high vibration capability

MOSFETs

**N-Channel MOSFETs in
5 mm x 6 mm PowerPAK®
SO-8L Rated at 40 V, 3.2 m Ω**

[SQJ444EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Logic level V_{th} , low $R_{DS(on)}$, thermally enhanced PowerPAK® SO-8L replaces DPAK in less than half of the area

MOSFETs

**N-Channel MOSFETs in
5 mm x 6 mm PowerPAK®
SO-8L Rated at 40 V, 3.0 m Ω**

[SQJA46EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Thermally enhanced PowerPAK® SO-8L replaces DPAK in less than half of the area

RESISTORS

**Power Metal Strip® SMD
Resistors, Very High Power
(3 W), Low Value (to 0.0005 Ω)**

[WSLP2512](#)

- Very high power rating of 3 W in 2512 package
- Extremely low resistance values from 0.0005 Ω to 0.01 Ω and tolerance of 1 %

RECTIFIERS

**1 A, 200 V FRED Pt®
Hyperfast Rectifiers**

[VS-1EFH02HM3](#)

- Hyperfast recovery time, $t_{rr} = 25$ ns, reduced Q_{rr} , and soft recovery
- DO-219AB (SMF) package, high T_j of 175 °C

RESISTORS

**Power Metal Strip® SMD
Resistors, Wide Terminal,
1 m Ω to 6 m Ω , 6 W**

[WSL1020](#)

- TCR < 20 ppm/K, high-temperature performance up to 170 °C

MOSFETs

**Dual N-Channel MOSFETs in
8 mm x 8 mm PowerPAK®,
40 V, 100 A, 3.4 m Ω**

[SQJQ904E](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- High power density dual PowerPAK® 8x8L offers significant reduction in PCB area

NON-LINEAR RESISTORS

**SMD Glass-Protected NTC
Thermistors**

[NTCS...e3](#)

- Standard series, AEC-Q200 compliant
- Glass-protected with soft terminations

INDUCTORS

**Power SMD IHLP® Storage
Inductors, E-Field Shielded,
Inductance of 0.22 μ H to
22 μ H**

[IHLE-4040DD-5A](#)

- Shielded housing provides excellent protection against EMI (B and E fields)
- Optimized for high frequency

CERAMIC CAPACITORS

**AEC-Q200 Qualified, Broad
Range of Sizes and Working
Voltages, C0G (NPO), X7R,
and X8R**

[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding

CERAMIC CAPACITORS

**High Operating Temperature,
Automotive Grade Leaded
MLCC Capacitors**

[HOTcap® K...H, A...R, K...R](#)

- High-reliability MLCC insert with wet build process
- High operating temperature (up to 175 °C for K...H and up to 160 °C for A...R and K...R), rated voltages: 50 V, 100 V, 200 V

シャーシ制御



電気式パワーステアリング
(BLDC モータードライブ)



トランスミッションECU、
ダブルクラッチBLDC



THE VISHAY ADVANTAGE

- AEC準拠
- 高電力密度
- 高パルス電流耐性
- 薄型
- 長寿命
- 小型



電気式パワーステアリング (BLDC モータードライブ)



ALUMINUM CAPACITORS

**SMD Aluminum Capacitors,
High Temperature Up to
150 °C, Low ESR**

[260 CLA-V](#)

- High ripple current up to 1400 mA at 150 °C, capacitance up to 3300 µF
- Useful life up to 2000 h at 150 °C, high vibration capability

MOSFETs

**N-Channel MOSFETs as
Known Good Die (KGD) Rated
at 40 V, 0.72 mΩ**

[SQC200N04-0m72KGD](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Efficient KGD packaging allows high power density and reduced parasitics

OPTOELECTRONICS

**3-Channel SMD Transmissive
Sensors for "Turn and Push"
Optical Encoding**

[TCUT1630X01](#)

- Wide operating temperature range of -40 °C to +110 °C, 3 output channels
- Sensing of motion, speed, and direction; third channel for trigger signal

RESISTORS

**Power Metal Strip® SMD
Resistors**

[WSLP2726](#)

- Very high power (7 W)
- Resistance = 0.3 mΩ to 4 mΩ

RESISTORS

**Thin Film Resistors, 4.7 Ω to
3.01 MΩ, 0402 to 1210 Case
Sizes, 50 V to 200 V**

[TNPW e3](#)

- Excellent stability $|\Delta R/R| \leq 0.05$ % after 1000 h at 70 °C, 0402 to 1210 case sizes

RESISTORS

**Precision Thin Film Chip
Resistor Arrays, Superior
Moisture Resistivity**

[ACAS0612 AT Precision](#)

- Resistance ratio up to 1:20, superior tracking stability over lifetime
- Relative TCR to ± 5 ppm/K (tracking), AEC-Q200 qualified, sulfur-resistant

NON-LINEAR RESISTORS

**SMD Glass-Protected NTC
Thermistors**

[NTCS...e3](#)

- Standard series, AEC-Q200 compliant
- Glass-protected with soft terminations

INDUCTORS

**Shielded EMI Filters Up to
190 A I_{DCR} , 2.2 µH, Ultra-Low
DCR (0.22 mΩ)**

[IHXL-2000VZ-5A](#)

- Very high-current and high-temperature operation for filters and energy storage

MOSFETs

**N-Channel MOSFETs in
8 mm x 8 mm PowerPAK®,
40 V, 160 A, 1.2 mΩ**

[SQJQ100EL](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Ultra-low $R_{DS(on)}$, thermally enhanced PowerPAK® 8x8L replaces D²PAK in less than half of the area

RESISTORS

**Power Metal Strip® SMD
Resistors, 4-Terminal, Low
Value (Down to 0.0001 Ω)**

[WSK1216](#)

- High power rating of 3 W to 5 W with TCR = 20 ppm/K
- Very low resistance values, 0.0001 Ω to 0.004 Ω, with tolerance of 1%

INDUCTORS

**Shielded SMD Low-Profile,
High-Current IHLP® Inductors,
EMI Filters, 155 °C, Low DCR**

[IHLP-6767GZ-5A](#)

- Very high-current and high-temperature operation for filters

CERAMIC CAPACITORS

**AEC-Q200 Qualified, Broad
Range of Sizes and Working
Voltages, C0G (NPO), X7R,
and X8R**

[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding



トランスミッションECU、 ダブルクラッチBLDC



MOSFETs

N-Channel MOSFETs as Known Good Die (KGD) Rated at 40 V, 0.72 mΩ



[SQC200N04-0m72KGD](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Efficient KGD packaging allows high power density and reduced parasitics

MOSFETs

N-Channel MOSFETs in 5 mm x 6 mm PowerPAK® SO-8L Rated at 40 V, 3.0 mΩ



[SQJA46EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Thermally enhanced PowerPAK® SO-8L replaces DPAK in less than half of the area

MOSFETs

Dual N-Channel MOSFETs in 8 mm x 8 mm PowerPAK®, 40 V, 100 A, 3.4 mΩ



[SQJQ904E](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- High power density dual PowerPAK® 8x8L offers significant reduction in PCB area

CERAMIC CAPACITORS

AEC-Q200 Qualified, Broad Range of Sizes and Working Voltages, C0G (NPO), X7R, and X8R



[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding

RECTIFIERS

High Current Density Surface-Mount Schottky Barrier Rectifiers



[SS3P4L](#)

- AEC-Q101 qualified
- Very low profile - typical height of 1.0 mm

INDUCTORS

Coupled Inductors for SEPIC Converter



[IHCL-3232DZ-5A](#)

- High-temperature operation up to 155 °C
- Frequency range up to 5.0 MHz

DIODES

600 W, 6.8 V to 51 V SMD PAR® TVS Diodes



[TA6Fxx](#)

- $T_j = 185\text{ °C}$
- Very low profile - typical height of 0.95 mm

RESISTORS

Power Metal Strip® SMD Resistors, Wide Terminal, 1 mΩ to 30 mΩ, 2 W



[WSLP2010](#)

- Very high power to footprint size ratio (2 W in 2010)
- Construction is impervious to high-sulfur environments

RESISTORS

SMD Thick Film Resistors, High Stability



[RCA0603](#)

- TCR = 50 to 200 ppm/K
- Sulfur-resistant

NON-LINEAR RESISTORS

SMD Glass-Protected NTC Thermistors



[NTCS...e3](#)

- Standard series, AEC-Q200 compliant
- Glass-protected with soft terminations

INDUCTORS

Low-Profile, High-Current IHLP® Inductors



[IHLP-2525CZ-5A](#)

- Excellent high-temperature performance for DC/DC converter input and output filters

RESISTORS

Precision Gold Terminated Thin Film Chip Resistor Arrays for Conductive Gluing



[ACAS 0606 ATAU Precision](#)

- Glueable gold terminations, resistance ratio up to 1:20, tolerance $\pm 0.05\%$
- AEC-Q200 qualified, extreme sulfur resistance, superior tracking stability

Power Metal Strip® 抵抗器の特長

30 ppm/°C以下の低TCR、0.2 mΩまでの低いΩ値、厳しい許容差、高温性能

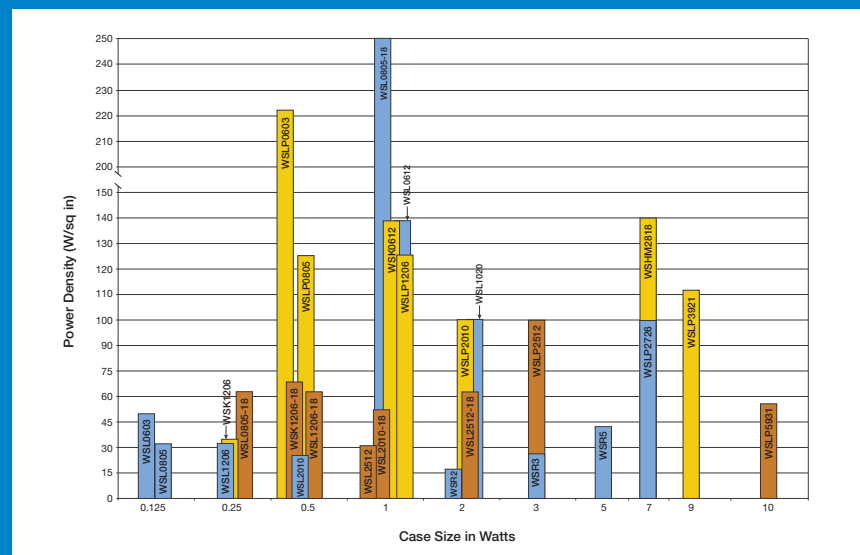
ビシェイ社のPower Metal Strip® 電流検出抵抗器は、高温用途での優れた性能、幅広いパッケージサイズ、0.0002 Ω ~ 1 Ω の抵抗値を兼ね備えます。特許取得済みの最先端デバイスは、巻線デバイスと同等の過負荷性能と30 ppm/°Cまでの低い抵抗温度係数を提供します。

電流検出Power Metal Strip抵抗器は、モニタリングが容易な電圧を電流に変換することで制御回路による回路の電流レベル監視を実現します。回路の電流フローに抵抗し、その測定値から制御回路が電圧降下を検出し、監視を可能にします。Power Metal Strip抵抗器の低い抵抗値がこの機能を高い効率で実現させます。

高電力密度 (最大222 W/in², 34.4 W/cm²)

ビシェイ社のPower Metal Strip抵抗器は、WSL...-18、WSLP、WSR3、WSR5、WSHM2818タイプの“高電力”抵抗器に進化し、目的に応じた材料やプロセスにより10 Wまでの高定格電力を実現します。

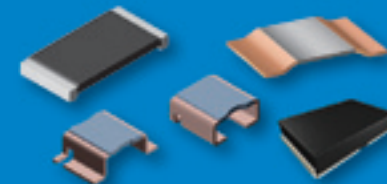
WSL...-18、WSLP、WSR3、WSR5、WSHM2818タイプの抵抗器は、優れた電気的特性を維持しながら、高い電力/パッケージサイズ比を提供します。高定格電力により設計者は、製品を小さいボードで実現可能で、生産時間の短縮と原材料コストの削減に貢献します。



超高電力、表面実装Power Metal Strip 電流検出抵抗器

FEATURES

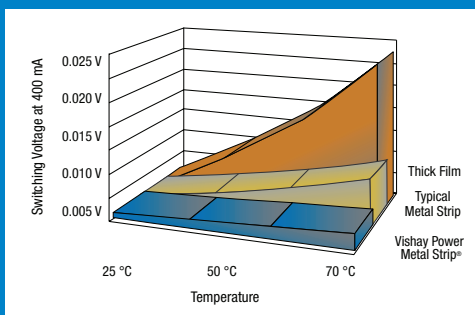
- 小型ケースサイズで高電力を提供: 最大10 W
- 極めて低い抵抗値: 0.0002 Ω ~ 1.0 Ω
- 厳しい抵抗許容差: ± 0.1 % まで



低い抵抗温度係数 (TCR) (30 ppm/°Cまで)

Power Metal Strip抵抗器の低TCRは、自己発熱や、高温環境による抵抗値変化を最小限に抑えます。

下記の表は、標準100 ppm/°C metal strip、700 ppm/°C厚膜チップ抵抗器と比較した30 ppm/°C Power Metal Strip抵抗器の電圧を表しています。



ボディ電子機器の主要部品



快適性、ドア
ウィンドウ制御



インフォテインメント、
ナビ、オーディオ



内装
LED照明



THE VISHAY ADVANTAGE

- AEC準拠
- 高電力密度
- 薄型
- 耐久性
- カスタム対応



快適性、ドア ウィンドウ制御

MOSFETs

**N-Channel MOSFETs in
5 mm x 6 mm PowerPAK®,
40 V, 58 A, 6.3m Ω**



[SQJ868EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Thermally enhanced PowerPAK SO-8L replaces DPAK in less than half of the area

RECTIFIERS

**Surface-Mount Schottky
Barrier Rectifiers**



[MSS1P4](#)

- Very low profile - typical height of 0.65 mm
- AEC-Q101 qualified

DIODES

**SMD Power ESD Diodes, Up
to ± 30 kV, I_{FSM} = 50 A**



[SMFxx](#)

- SMF package: 3.5 mm x 1.9 mm
- Breakdown voltage = 6.4 V to 64.4 V

RESISTORS

**Thick Film Surface-Mount
Chip Resistors, Wraparound,
Extremely Low Value**



[RCWE](#)

- Low resistance values from 0.01 Ω to 0.99 Ω and tolerance of 1 %
- Thick film construction with 2x power capacity

OPTOELECTRONICS

**Ambient Light PIN
Photodiode Sensors**



[TEMD6200FX01](#)

- SMD 0805 package, low profile of 0.85 mm, wide viewing angle of ± 60 °
- Spectral sensitivity close to human eye, high signal output linearity

OPTOELECTRONICS

**Silicon PIN Photodiode with
Excellent Output Linearity
Characteristics**



[VEMD6160X01](#)

- SMD 1206 package, daylight blocking filter, wide viewing angle of ±70°
- Low capacitance of 4.6pF, ideal for noisy environments and small signal detection

INDUCTORS

**Low-Profile, High-Current
IHLP® Inductors**



[IHLP-4040DZ-5A](#)

- Excellent high-current performance for noise filters
- High-temperature operation up to 155 °C

TANTALUM CAPACITORS

**Solid Tantalum Chip
Capacitors, High CV
Leadframeless Molded,
Automotive Grade**



[TP3 / TP8](#)

- TP3 - AEC-Q200 qualified; low ESR; A, B, C, D and E cases
- TP8 - AEC-Q200 qualified

ALUMINUM CAPACITORS

**Aluminum Capacitors,
Increased Vibration
Resistance**



[246 CTI-V](#)

- High temperature, low impedance, high vibration capability
- High ripple current, long useful life

OPTOELECTRONICS

**SMD Silicon PIN Photodiodes
with Large Active Area for
High Photo Currents**



[VEMD5110X01](#)

- QFN package with wettable flanks, reduced noise sensitivity
- Wide operating temperature range of -40 ° to +110 °C, wide viewing angle of ± 65°

OPTOELECTRONICS

850 nm SMD Infrared Emitters



[VSMY1850ITX01](#)

- SMD 0805 package, low profile of 0.85 mm, high radiant intensity of 10 mW/sr
- Wide operating temperature range of -40 ° to +105 °C, wide viewing angle of ± 60°

CERAMIC CAPACITORS

**High Operating Temperature,
Automotive Grade Leaded
MLCC Capacitors**



[HOTcap® K...H, A...R, K...R](#)

- High-reliability MLCC insert with wet build process
- High operating temperature (up to 175 °C for K...H and up to 160 °C for A...R and K...R), rated voltages: 50 V, 100 V, 200 V



インフォテインメント、 ナビ、オーディオ

MOSFETs

Dual N-Channel MOSFETs in 5 mm x 6 mm PowerPAK®, 40 V, 11 mΩ / 22 mΩ



[SQJ942EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Optimized for high-frequency DC/DC applications, lower switching losses

RESISTORS

Thick Film Surface-Mount Chip Resistors, Wraparound, Extremely Low Value



[RCWE0603](#)

- Low resistance values from 0.01 Ω to 0.99 Ω and tolerance of 1 %
- Thick film construction with 2x power capacity

RECTIFIERS

Surface-Mount Schottky Barrier Rectifiers



[MSS1P4](#)

- Very low profile - typical height of 0.65 mm
- AEC-Q101 qualified

TANTALUM CAPACITORS

Solid Tantalum Chip Capacitors, High CV Leadframeless Molded, Automotive Grade



[TP8](#)

- Smallest AEC-Q200 qualified tantalum capacitors with case sizes as small as 0603

OPTOELECTRONICS

890 nm SMD Infrared Emitters



[VSMF970011X01](#)

- Low-profile PLCC² package, wavelength matched to sensitivity of proximity sensor
- External emitter to enable gesture function of proximity sensor

OPTOELECTRONICS

Integrated Proximity and Ambient Light Sensors with I²C Interface



[VCNL4020X01](#)

- Low-profile QFN SMD package, 16 bit resolution, proximity distance up to 200 mm
- Suitable for extended detection range, gesture function with external emitters

INDUCTORS

Low-Profile, High-Current IHLP® Inductors



[IHLP-2525CZ-5A](#)

- Excellent high-temperature performance for DC/DC converter input and output filters

CERAMIC CAPACITORS

AEC-Q200 Qualified, Broad Range of Sizes and Working Voltages, C0G (NPO), X7R, and X8R



[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding

INDUCTORS

IHLP® High-Temperature (155 °C) Parts in Double Inductor Package



[IHLD-4032KB-5A](#)

- Optimal design provides high quality sound and low distortion
- Low coupling for minimal cross-talk between inductors

MOSFETs

Dual N-Channel MOSFETs in 5 mm x 6 mm PowerPAK®, 12 V, 2.7 mΩ / 7.4 mΩ



[SQJ202EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Low-voltage, high-frequency synchronous buck applications, lower switching losses

RESISTORS

Precision Thin Film Resistor Arrays, Superior Moisture Resistivity, TCR ± 0.05



[ACAS 0606 AT](#)

- Arbitrary resistance ratio up to 1:20, superior tracking stability over lifetime
- Relative TCR down to ± 5 ppm/K (tracking), AEC-Q200 qualified

INDUCTORS

High-Current SMD Inductors with E-Field Shielding and 155 °C Operating Temperature



[IHLE-3232DD-5A](#)

- Excellent EMI protection, double-shielded



内装 LED照明

RESISTORS

Pulse-Proof, High-Power Thick Film Chip Resistors



[CRCW-HP e3](#)

- Excellent pulse load capability
- Enhanced power rating

MOSFETs

P-Channel MOSFETs in 3 mm x 3 mm PowerPAK® 1212, -60 V, -16 A, 65 mΩ



[SQ7415AENW](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- High power density PowerPAK® 1212 with wettable flanks for AOI

RECTIFIERS

Surface-Mount Schottky Barrier Rectifiers



[MSS1P6](#)

- Low-profile MicroSMP package for low-voltage, high-frequency inverters; DC/DC converters; and polarity protection applications

MOSFETs

N-Channel MOSFETs in 3 mm x 3 mm PowerPAK® 1212, 60 V, 18 A, 23 mΩ



[SQ7414AENW](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- High power density PowerPAK® 1212 with wettable flanks for AOI

RECTIFIERS

100 V, 2 A High-Voltage Schottky Diodes, T_j = 175 °C



[SS2PH10](#)

- SMP(DO-220AA) package, 3.7 mm x 2.18 mm

RESISTORS

Power Metal Strip® SMD Resistors, Wide Terminal, 1 mΩ to 3 mΩ, 1 W



[WSL0612](#)

- Low EMF, high temperature up to 170 °C

RESISTORS

Thick Film Surface-Mount Chip Resistors, Wraparound, Extremely Low Values



[RCWE0603](#)

- Low resistance values from 0.01 Ω to 0.99 Ω and tolerance of 1 %
- Thick film construction with 2x power capacity

NON-LINEAR RESISTORS

SMD Glass-Protected NTC Thermistors



[NTCS...e3](#)

- Standard series, AEC-Q200 compliant
- Glass-protected with soft terminations

INDUCTORS

Low-Profile, High-Current IHLP® Inductors



[IHLP-1616BZ-A1](#)

- Shielded construction, lowest DCR/μH in this package size
- Excellent DC/DC energy storage up to 5 MHz

TANTALUM CAPACITORS

Solid Tantalum Molded Chip Capacitors, Automotive Grade



[TP3](#)

- AEC-Q200 qualified, low ESR
- A, B, C, D, and E cases

アクティブセーフティ用主部品

強化された
電気ブレーキ (EEB)



電子スタビリティ
プログラム (ESP)
ビークルスタビリティ
コントロール (VSC)



電気式駐車ブレーキ
(EPB)
統合駐車ブレーキ
(IPB)



運転者支援システム
(ADAS)



THE VISHAY ADVANTAGE

AEC準拠
高温動作性能
薄型
高信頼性
長寿命



最先端電気式ブレーキ (EEB)



RESISTORS

Thin Film Resistors, 4.7 Ω to 3.01 M Ω , 0402 to 1210 Case Sizes, 50 V to 200 V

[TNPW e3](#)

- Excellent stability $|\Delta R/R| \leq 0.05\%$ after 1000 h at 70 °C, 0402 to 1210 case sizes

MOSFETs

N-Channel MOSFETs in 8 mm x 8 mm PowerPAK®, 40 V, 160 A, 1.2 m Ω

[SQJQ100EL](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Ultra-low $R_{DS(on)}$, thermally enhanced PowerPAK® 8x8L replaces D²PAK in less than half of the area

INDUCTORS

Power SMD IHLP® Storage Inductors, 0.22 μ H to 22 μ H

[IHLP5050FD-5A](#)

- Soft saturation, high rated current, temperature up to 155 °C

RESISTORS

Power Metal Strip® SMD Resistors, 4-Terminal, Low Value (Down to 0.0001 Ω)

[WSK1216](#)

- High power rating of 3 W to 5 W with TCR of 20 ppm/K
- Very low resistance values, 0.0001 Ω to 0.004 Ω , with tolerance of 1 %

NON-LINEAR RESISTORS

SMD Glass-Protected NTC Thermistors

[NTCS...e3](#)

- Standard series, AEC-Q200 compliant
- Glass-protected with soft terminations

INDUCTORS

SMD Low-Profile, High-Current IHLP® Inductors, 0.22 μ H to 33 μ H

[IHLP-3232DZ-5A](#)

- High-temperature (up to +155 °C), high-current shielded inductors

INDUCTORS

Low-Profile, High-Current IHLP® Inductors

[IHLP-4040DZ-5A](#)

- Excellent high-current performance for noise filters
- High-temperature operation up to 155 °C

CERAMIC CAPACITORS

AEC-Q200 Qualified, Broad Range of Sizes and Working Voltages, C0G (NPO), X7R, and X8R

[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding

ALUMINUM CAPACITORS

SMD Aluminum Capacitors, High Temperature Up to 150 °C, Low ESR

[260 CLA-V](#)

- High ripple current up to 1400 mA at 150 °C, capacitance up to 3300 μ F
- Useful life up to 2000 h at 150 °C, high vibration capability

MOSFETs

N-channel MOSFET in Reverse DPAK Rated at 40 V, 3.8 m Ω

[SQR50N04-3m8 GE3](#)

- AEC-Q101 Qualified, 100 % UIS & RG tested with up to 175 °C operation
- Reverse DPAK package allows excellent heat transfer and is good for high current application such as park brake



電子スタビリティ プログラム(ESP) ビークルスタビリティ コントロール(VSC)

ALUMINUM CAPACITORS

**SMD Aluminum Capacitors,
High Temperature Up to
150 °C, Low ESR**

[260 CLA-V](#)

- High ripple current up to 1400 mA at 150 °C, capacitance up to 3300 μ F
- Useful life up to 2000 h at 150 °C, high vibration capability

RESISTORS

**SMD Thick Film
Resistors, High Stability,
Sulfur-Resistant**

[RCA0603](#)

- TCR = 50 ppm/K to 200 ppm/K

MOSFETS

**N-Channel MOSFETs in
8 mm x 8 mm PowerPAK®,
40 V, 160 A, 1.2 m Ω**

[SQJQ100EL](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Ultra-low $R_{DS(on)}$, thermally enhanced PowerPAK® 8x8L replaces D²PAK in less than half of the area

MOSFETS

**Dual N-Channel MOSFETs in
8 mm x 8 mm PowerPAK®,
40 V, 100 A, 3.9 m Ω**

[SQJQ900E](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- High power density dual PowerPAK® 8x8L offers significant reduction in PCB area

MOSFETS

**N-Channel MOSFETs in
5 mm x 6 mm PowerPAK®
SO-8L Rated at 40 V, 3.0 m Ω**

[SQJA46EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Thermally enhanced PowerPAK® SO-8L replaces DPAK in less than half of the area

INDUCTORS

**Low-Profile, High-Current
IHL® Inductors**

[IHL-2525CZ-5A](#)

- Excellent high-temperature performance for DC/DC converter input and output filters

RESISTORS

**Power Metal Strip® SMD
Resistors, Wide Terminal,
1 m Ω to 3 m Ω , 1 W**

[WSL0612](#)

- Low EMF, high temperature up to 170 °C

RECTIFIERS

**1A, 200 V FRED Pt® Hyperfast
Rectifiers**

[VS-1EFH02HM3](#)

- Hyperfast recovery time, t_{rr} = 25 ns, reduced Q_{rr} , and soft recovery
- DO-219AB (SMF) package, high T_j of 175 °C

INDUCTORS

**Low-Profile, High-Current
IHL® Inductors**

[IHL-4040DZ-5A](#)

- Excellent high-current performance for noise filters
- High-temperature operation up to 155 °C

CERAMIC CAPACITORS

**AEC-Q200 Qualified, Broad
Range of Sizes and Working
Voltages, C0G (NPO), X7R,
and X8R**

[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding

TANTALUM CAPACITORS

**Solid Tantalum
Surface-Mount Chip
Capacitors, Molded Case,
Automotive Grade**

[TH3 / TH4](#)

- High-temperature molded tantalum capacitors, HI-TMP®, TH4 = up to 175 °C, TH3 = up to 150 °C



電気式駐車ブレーキ(EPB) 統合駐車ブレーキ(IPB)



ALUMINUM CAPACITORS

**SMD Aluminum Capacitors,
High Temperature Up to
150 °C, Low ESR**

[260 CLA-V](#)

- High ripple current up to 1400 mA at 150 °C, capacitance up to 3300 μ F
- Useful life up to 2000 h at 150 °C, high vibration capability

MOSFETs

**Dual N-Channel MOSFETs in
8 mm x 8 mm PowerPAK®,
40 V, 100 A, 3.9 m Ω**

[SQJQ900E](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- High power density dual PowerPAK® 8x8L offers significant reduction in PCB area

INDUCTORS

**Shielded EMI Filter Up to
190 A I_{DCR}, 2.2 μ H, Ultra-Low
DCR (0.22 m Ω)**

[IHXL-2000VZ-5A](#)

- Very high-current and high-temperature operation for filters and energy storage

RESISTORS

**Power Metal Strip® SMD
Resistors, 4-Terminal, Low
Value (Down to 0.0001 Ω)**

[WSK1216](#)

- High power rating of 3 W to 5 W with TCR of 20 ppm/K
- Very low resistance values, 0.0001 Ω to 0.004 Ω , with tolerance of 1 %

MOSFETs

**N-Channel MOSFETs in
5 mm x 6 mm PowerPAK®
SO-8L Rated at 40 V, 3.0 m Ω**

[SQJA46EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Thermally enhanced PowerPAK® SO-8L replaces DPAK in less than half of the area

CERAMIC CAPACITORS

**AEC-Q200 Qualified, Broad
Range of Sizes and Working
Voltages, C0G (NPO), X7R,
and X8R**

[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding

MOSFETs

**N-Channel MOSFETs in
8 mm x 8 mm PowerPAK®,
40 V, 160 A, 1.2 m Ω**

[SQJQ100EL](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Ultra-low R_{DS(on)}, thermally enhanced PowerPAK® 8x8L replaces D²PAK in less than half of the area

INDUCTORS

**Low-Profile, High-Current
IHL® Inductors**

[IHL-6767GZ-5A](#)

- Lowest DCR/ μ H in this package size
- High temperature up to 155 °C, shielded construction

TANTALUM CAPACITORS

**Solid Tantalum
Surface-Mount Chip
Capacitors, Molded Case,
Automotive Grade**

[TH3 / TH4](#)

- High-temperature molded tantalum capacitors, HI-TMP®, TH4 = up to 175 °C, TH3 = up to 150 °C



運転者支援システム(ADAS)

MOSFETs

Dual N-Channel MOSFETs in 5 mm x 6 mm PowerPAK®, 40 V, 11 mΩ / 22 mΩ

[SQJ942EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Optimized for high-frequency DC/DC applications, lower switching losses

INDUCTORS

Low-Profile, High-Current IHL® Inductors

[IHL-1616BZ-A1](#)

- Shielded construction, lowest DCR/μH in this package size
- Excellent DC/DC energy storage up to 5 MHz

DIODES

SMD Power ESD Diodes, Up to ± 30 kV, I_{FSM} = 50 A

[SMFxx](#)

- SMF package: 3.5 mm x 1.9 mm
- Breakdown voltage = 6.4 V to 64.4 V

OPTOELECTRONICS

Integrated Proximity and Ambient Light Sensors with I²C Interface

[VCNL4020X01](#)

- Low-profile QFN SMD package, 16 bit resolution, proximity distance up to 200 mm
- Suitable for extended detection range, gesture function with external emitters

MOSFETs

Dual N-Channel MOSFETs in 5 mm x 6 mm PowerPAK®, 12 V, 2.7 mΩ / 7.4 mΩ

[SQJ202EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Low-voltage, high-frequency synchronous buck applications, lower switching losses

RECTIFIERS

Surface-Mount Schottky Barrier Rectifiers

[MSS1P4](#)

- Very low profile - typical height of 0.65 mm
- AEC-Q101 qualified

INDUCTORS

Low-Profile, High-Current IHL® Inductors

[IHL-2525CZ-5A](#)

- Excellent high-temperature performance for DC/DC converter input and output filters

RESISTORS

Precision Thin Film Resistor Arrays, Superior Moisture Resistivity, TCR ± 0.05

[ACAS 0606 AT](#)

- Arbitrary resistance ratio up to 1:20, superior tracking stability over lifetime
- Relative TCR down to ± 5 ppm/K (tracking), AEC-Q200 qualified

TANTALUM CAPACITORS

Solid Tantalum Chip Capacitors, High CV Leadframeless Molded, Automotive Grade

[TP8](#)

- Smallest AEC-Q200 qualified tantalum capacitors with case sizes as small as 0603

CERAMIC CAPACITORS

AEC-Q200 Qualified, Broad Range of Sizes and Working Voltages, C0G (NPO), X7R, and X8R

[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding

INDUCTORS

High-Current SMD Inductors with E-Field Shielding and 155 °C Operating Temperature

[IHL-3232DD-5A](#)

- Excellent EMI protection, double-shielded

MOSFETs

Dual N-channel MOSFET in Small 2 mm x 2 mm SC-70 Package Rated at 20 V, 28 mΩ

[SQ1912AEEH-T1 GE3](#)

- AEC-Q101 Qualified, 100 % UIS & RG tested with up to 175 °C operation
- Compact part for use in sync buck power supply for camera system

IHLP®インダクタ損失計算ツールの特長

ビシェイ社のIHLP損失計算ツールは、回路の動作条件に応じて設計者が最適なIHLPの選択を支援する無料ツールです。このツールは、コア(鉄損)およびACとDCの銅損を含む、インダクタ損失のシミュレーションを提供します。温度上昇や最終温度も、推定損失に基づき算出されます。設計者はこのツールで複数のインダクタをサイズ、インダクタンス値などの項目で比較することができるため選定作業が容易になります。

この計算ツールはバック、ブースト、バック/ブースト式コンバータに対応します。

計算ツールには10個の入力項目(入力電圧、出力電圧、スイッチ(FET)電圧降下、ダイオード(またはsync FET)電圧降下、出力電流、周波数、周囲温度、インダクタンス値)があり、これらの入力値を基に計算を行います。インダクタンス値は左側のラジオボタンから選ぶことができます。

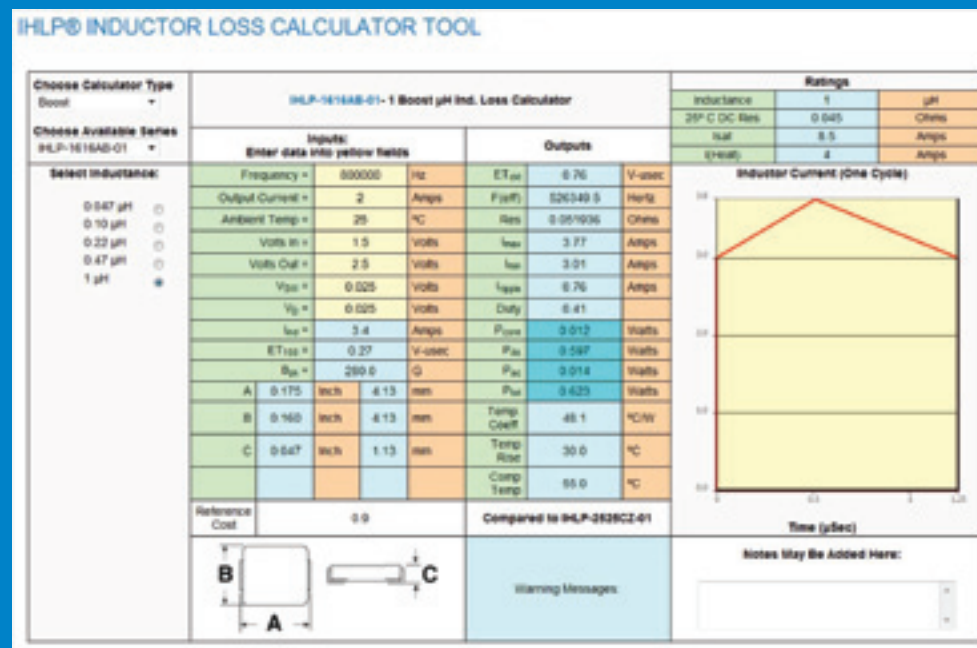
注:本ツールはシミュレーションのみですので、必ず実際の回路で設計を検証をしてください。

アクセスはこちらから:www.vishay.com/inductors/calculator-home-list/

ユーザーガイドはこちらから:www.vishay.com/doc?49421

重要な設計基準

IHLPインダクタの推奨最大部品温度は125 °Cです。周辺温度を除算することで、部品の最大許容温度上昇が算出できます。この数値が40 °C以上であれば、許容上昇温度を40 °Cに設定することを推奨します。リップル電流の推奨範囲はインダクタ電流に対して30 % ~ 50 %です。これは、インダクタのサイズとコスト、コンデンサのサイズとコストのトレードオフに基づきます。最大ピーク電流は選択したインダクタの最大値以下で設定することを推奨しますが、鉄粉材料のソフトな飽和特性を考えると最大値以上での設定も可能ですが慎重に行う必要があります。計算ツールは連続の伝導モードのみに対応します。非連続の伝導モードで提供される情報は、信頼性が低いいため、ユーザの判断を必要とします。



パッシブセーフティ用主要部品

エアバック
コントロール装置



SRSシステム用
パワーサプライ



歩行者保護装置



THE VISHAY ADVANTAGE

AEC準拠
高信頼性
実証済み性能
実証済み耐用年



エアバック コントロール装置

RESISTORS

Thin Film Resistors, 4.7 Ω to 3.01 M Ω , 0402 to 1210 Case Sizes, 50 V to 200 V

[TNPW e3](#)

- Excellent stability $|\Delta R/R| \leq 0.05\%$ after 1000 h at 70 °C, 0402 to 1210 case sizes

RESISTORS

Massive Electro-Pyrotechnic Initiator Chip Resistors

[MEPIC](#)

- Low firing energy down to 1.5 mJ, fast firing time down to 250 μ s
- Standard 0805 SMD case, alternative to bridge wire technology

MOSFETs

Dual N- and P-Channel MOSFETs in 5 mm x 6 mm PowerPAK[®] SO-8L, 40/-40 V, 11/30 m Ω

[SQJ500AEP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Package saves board space

MOSFETs

N-Channel MOSFETs in 5 mm x 6 mm PowerPAK[®], 40 V, 58 A, 6.3m Ω

[SQJ868EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Thermally enhanced PowerPAK SO-8L replaces DPAK in less than half of the area

RECTIFIERS

High Current Density Surface-Mount Schottky Barrier Rectifiers

[SS3P4L](#)

- AEC-Q101 qualified
- Very low profile - typical height of 1.0 mm

INDUCTORS

Low-Profile, High-Current IHLP[®] Inductors

[IHLP-4040DZ-5A](#)

- Excellent high-current performance for noise filters
- High-temperature operation up to 155 °C

DIODES

High-Power TVS, Up to 6.6 kW, Standoff with 24 V, 700 A Peak Current

[SM8S24AT](#)

- PAR[®] TVS in DO-218AC package for automotive load dump protection applications

TANTALUM CAPACITORS

Solid Tantalum Chip Capacitors, High CV Leadframeless Molded, Automotive Grade

[TP8](#)

- Smallest AEC-Q200 qualified tantalum capacitors with case sizes as small as 0603

ALUMINUM CAPACITORS

Aluminum Capacitors, Increased Vibration Resistance

[246CTI-V](#)

- High temperature, low impedance, high vibration capability
- High ripple current, long useful life

CERAMIC CAPACITORS

High Operating Temperature, Automotive Grade Leaded MLCC Capacitors

[HOTcap[®] K...H, A...R, K...R](#)

- High-reliability MLCC insert with wet build process
- High operating temperature (up to 175 °C for K...H and up to 160 °C for A...R and K...R), rated voltages: 50 V, 100 V, 200 V

TANTALUM CAPACITORS

Solid Tantalum Surface-Mount Chip Capacitors, Tantamount[®] Molded Case, Automotive Grade

[TH3](#)

- High-temperature molded tantalum capacitors, HI-TMP[®], up to 150 °C



SRSシステム用 パワーサプライ

RESISTORS

Thick Film Resistors, Pulse-Proof, Excellent Stability



[CRCW-IF e3](#)

- High pulse performance up to 10 kW
- Stability $|\Delta R/R| \leq 1\%$ after 1000 h at 70 °C

ALUMINUM CAPACITORS

Aluminum Capacitors, Increased Vibration Resistance



[246CTI-V](#)

- High temperature, low impedance, high vibration capability
- High ripple current, long useful life

MOSFETs

P-Channel MOSFETs in 5 mm x 6 mm PowerPAK® SO-8L, -60 V, 52 A, 18 mΩ



[SQJ459EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Thermally enhanced package replaces DPAK in less than half the area

RECTIFIERS

Ultrafast Rectifiers, 200 V, 1.2 A



[ES07D](#)

- AEC-Q101 qualified low-profile DO-219AB (SMF) package for surface-mount applications

RESISTORS

Power Metal Strip® SMD Resistors, 4-Terminal, Low Values (Down to 0.0001 Ω)



[WSK1216](#)

- High power rating of 3 W to 5 W with TCR = 20 ppm/K
- Very low resistance values, 0.0001 Ω to 0.004 Ω, with tolerance of 1 %

INDUCTORS

Low-Profile, High-Current IHLP® Inductors



[IHLP-5050FD-5A](#)

- Excellent high-temperature performance and noise filtering

MOSFETs

N-Channel MOSFETs in 5 mm x 6 mm PowerPAK® SO-8L Rated at 40 V, 3.0 mΩ



[SQJA46EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Thermally enhanced PowerPAK® SO-8L replaces DPAK in less than half of the area

CERAMIC CAPACITORS

AEC-Q200 Qualified, Broad Range of Sizes and Working Voltages, C0G (NPO), X7R, and X8R



[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding

DIODES

Surface-Mount PAR® TVS



[TPSMA](#)

- AEC-Q101 qualified, $T_j = 185\text{ °C}$ capability, suitable for automotive applications
- 400 W peak pulse power capability with 10/1000 μs waveform

CERAMIC CAPACITORS

High Operating Temperature, Automotive Grade Leaded MLCC Capacitors



[HOTcap® K...H, A...R, K...R](#)

- High-reliability MLCC insert with wet build process
- High operating temperature (up to 175 °C for K...H and up to 160 °C for A...R and K...R), rated voltages: 50 V, 100 V, 200 V



歩行者保護装置



RESISTORS

Thin Film Resistors, 4.7 Ω to 3.01 M Ω , 0402 to 1210 Case Sizes, 50 V to 200 V

[TNPW e3](#)

- Excellent stability $|\Delta R/R| \leq 0.05\%$ after 1000 h at 70 °C, 0402 to 1210 case sizes

MOSFETs

Dual N-Channel MOSFETs in 5 mm x 6 mm PowerPAK®, 12 V, 2.7 m Ω / 7.4 m Ω

[SQJ202EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Low-voltage, high-frequency synchronous buck applications, lower switching losses

INDUCTORS

Low-Profile, High-Current IHLP® Inductors

[IHLP-2525CZ-5A](#)

- Excellent high-temperature performance for DC/DC converter input and output filters

INDUCTORS

Low-Profile, High-Current Inductors with E-Field Shield

[IHLE-2525CD-5A](#)

- High temperature operation up to 155 °C
- Integrated e-field shield eliminates need for separate shielding

MOSFETs

Dual N-Channel MOSFETs in 5 mm x 6 mm PowerPAK®, 40 V, 11 m Ω / 22 m Ω

[SQJ942EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Optimized for high-frequency DC/DC applications, lower switching losses

RECTIFIERS

Surface-Mount Schottky Barrier Rectifiers

[MSS1P4](#)

- Very low profile - typical height of 0.65 mm
- AEC-Q101 qualified

RECTIFIERS

Schottky Diodes, 30 V, 8 A, $I_{FSM} = 150$ A

[SS8P3LHM3](#)

- Low-profile TO-277A (SMPC) package for use in low-voltage, high-frequency inverters; DC/DC converters; and polarity protection applications

MOSFETs

Dual N-Channel MOSFETs in 5 mm x 6 mm PowerPAK®, 12 V, 2.7 m Ω / 7.4 m Ω

[SQJ202EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Low-voltage, high-frequency synchronous buck applications, lower switching losses

INDUCTORS

Low-Profile, High-Current IHLP® Inductors

[IHLP-4040DZ-5A](#)

- Excellent high-current performance for noise filters
- High-temperature operation up to 155 °C

INDUCTORS

Low-Profile, High-Current IHLP® Inductors

[IHLP-1616BZ-A1](#)

- Shielded construction, lowest DCR/ μ H in this package size
- Excellent DC/DC energy storage up to 5 MHz

CERAMIC CAPACITORS

AEC-Q200 Qualified, Broad Range of Sizes and Working Voltages, C0G (NPO), X7R, and X8R

[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding

DIODES

Trench Schottky Rectifiers in SMPC (TO-277A), High Pulse Current up to 220 A, 150 V

[V15P15HM3](#)

- Low-profile TO-277A (SMPC) package for use in low-voltage, high-frequency inverters; DC/DC converters; and polarity protection applications

外部照明装置用主要部品



THE VISHAY ADVANTAGE

車載品質
高SFR部品
EMIが向上した部品
高温動作対応の受動部品($\geq 155^{\circ}\text{C}$)

LEDヘッドライト
ユニット



DRL



LEDフォグランプ



テールランプ、シグナル
LEDランプ





LEDヘッドライトユニット

MOSFETs

**Dual N-Channel MOSFETs
in 5 mm x 6 mm PowerPAK®
SO-8L, 60 V, 12 mΩ**



[SQJB60EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Dual configuration in thermally enhanced PowerPAK® SO-8L saves board space

INDUCTORS

**Low Profile, High Current
Inductors with E-Field Shield**



[IHLE-3232DD-5A](#)

- High temperature operation up to 155 °C
- Integrated e-field shield eliminates need for separate shielding

DIODES

**Surface-Mount TRANSZORB®
TVS**



[P6SMB36CA](#)

- AEC-Q101 qualified
- 600 W peak pulse power capability with 10/1000 μs waveform

RESISTORS

**Professional Thin Film MELF
Resistors**



[MMB 0207](#)

- Unrivalled surge handling capability, ultimate stability over lifetime
- AEC-Q200 qualified, approved according to EN 140401-803, intrinsically sulfur-resistant, Green product

RESISTORS

**Power Metal Strip® SMD
Resistors, Very High Power
(to 3 W), Extremely Low
Resistance (to 0.0005 Ω)**



[WSLP](#)

- Very high power rating, to 3 W
- Extremely low resistance values from 0.0005 Ω to 0.1 Ω and tolerance of 1 %

NON-LINEAR RESISTORS

**SMD Glass-Protected NTC
Thermistors**



[NTCS...e3](#)

- Standard series, AEC-Q200 compliant
- Glass-protected with soft terminations

RECTIFIERS

**High Current Density,
Surface-Mount Trench MOS
Barrier Schottky Rectifiers**



[V8P10HM3](#)

- Ultra-low $V_F = 0.466$ V at $I_F = 4$ A
- Very low profile - typical height of 1.1 mm

INDUCTORS

**Low-Profile, High-Current
Coupled Inductor**



[IHCL-4040DZ-5A](#)

- High-temperature operation up to 155 °C
- Shielded construction

INDUCTORS

**Low-Profile, High-Current
IHL® Inductors**



[IHLP-5050EZ-5A](#)

- High saturation current
- High-temperature operation up to 155 °C

INDUCTORS

**Low-Profile, High-Current
IHL® Inductors**



[IHLP-4040DZ-5A](#)

- Excellent high-current performance for noise filters
- High-temperature operation up to 155 °C

CERAMIC CAPACITORS

**AEC-Q200 Qualified, Broad
Range of Sizes and Working
Voltages, C0G (NPO), X7R,
and X8R**



[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding

TANTALUM CAPACITORS

**Solid Tantalum
Surface-Mount Chip
Capacitors, Tantamount®
Molded Case, Automotive
Grade**



[TH3](#)

- High-temperature molded tantalum capacitors, HI-TMP®, up to 150 °C



DRL



RESISTORS

Pulse-Proof, High-Power Thick Film Chip Resistors[CRCW-HP e3](#)

- Excellent pulse load capability
- Enhanced power rating

MOSFETs

Dual N-Channel MOSFETs in 5 mm x 6 mm PowerPAK SO-8L, 40 V, 33 mΩ[SQJ946EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Optimized for high-frequency DC/DC applications, lower switching losses

MOSFETs

N-Channel MOSFETs in 3 mm x 3 mm PowerPAK® 1212 with Wettable Flanks, 80 V, 25 mΩ[SQSA80ENW](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- For higher currents

MOSFETs

N-Channel MOSFETs in Small 3 mm x 3 mm SOT-23, 100 V, 1.6 A, 300 mΩ[SQ2398ES](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- 100 V MOSFETs for switching low currents in small packages

RECTIFIERS

High Current Density, Surface-Mount Trench MOS Barrier Schottky Rectifier[V8P10HM3](#)

- Ultra-low $V_F = 0.466$ V at $I_F = 4$ A
- Very low profile - typical height of 1.1 mm

RECTIFIERS

High-Voltage Schottky Diode, 100 V, 2 A, $T_j = 175$ °C[SS2PH10](#)

- Very low profile - typical height of 1.0 mm
- Low forward voltage drop, low power losses

DIODES

High Power Density Surface-Mount PAR® TVS[TPSMP](#)

- AEC-Q101 qualified, $T_j = 185$ °C capability, suitable for automotive applications
- Very low profile - typical height of 1.0 mm

RESISTORS

Thick Film Surface-Mount Chip Resistors, Wraparound, Extremely Low Value[RCWE](#)

- Low resistance values from 0.01 Ω to 0.976 Ω and tolerance of 1 %
- Thick film construction with 2x power capacity

RESISTORS

Professional Thin Film MELF Resistors[MMB 0207](#)

- Unrivaled surge handling capability, ultimate stability over lifetime
- AEC-Q200 qualified, approved according to EN 140401-803, intrinsically sulfur-resistant, Green product

OPTOELECTRONICS

SMD PLCC-2 Plus 0.5 W White LEDs[VLMW51Q2R3](#)

- Luminous intensity up to 51 lm in compact 3.5 x 3.5 x 1.2 mm surface-mount package
- White color coordinates of 0.33 (X) and 0.33 (Y) with 120° viewing angle

NON-LINEAR RESISTORS

SMD Glass-Protected NTC Thermistors[NTCS...e3](#)

- Standard series, AEC-Q200 compliant
- Glass-protected with soft terminations

CERAMIC CAPACITORS

AEC-Q200 Qualified, Broad Range of Sizes and Working Voltages, C0G (NPO), X7R, and X8R[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding



LEDフォグランプ

RESISTORS

Pulse-Proof, High-Power Thick Film Chip Resistors[CRCW-HP e3](#)

- Excellent pulse load capability
- Enhanced power rating

MOSFETs

Dual N-Channel MOSFETs in 5 mm x 6 mm PowerPAK®, 40 V, 11 mΩ / 22 mΩ[SQJ942EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Optimized for high-frequency DC/DC applications, lower switching losses

RECTIFIERS

2 A, 40 V Schottky Diodes[SS2P4](#)

- Low-profile DO-220AA (SMP) package for low-voltage, high-frequency DC/DC converters; switching power supplies; free-wheeling diodes; and polarity protection

RECTIFIERS

45 V, 3 A Trench Schottky Diodes, Ultra-Low V_F [V3PAL45](#)

- Low-profile DO-221BC (SMPA) package for low-voltage, high-frequency DC/DC converters; switching power supplies; freewheeling diodes; and polarity protection

RESISTORS

Professional Thin Film MELF Resistors[MMB 0207](#)

- Unrivaled surge handling capability, ultimate stability over lifetime
- AEC-Q200 qualified, approved according to EN 140401-803, intrinsically sulfur-resistant, Green product

RESISTORS

Thick Film Surface Mount Chip Resistors, Wraparound, Extremely Low Values[RCWE](#)

- Low resistance values from 0.01 Ω to 0.976 Ω and tolerance of 1 %
- Thick film construction with 2x power capacity

DIODES

Surface-Mount PAR® TVS[TPSMA](#)

- 400 W peak pulse power capability with a 10/1000 μ s waveform

NON-LINEAR RESISTORS

SMD Glass-Protected NTC Thermistors[NTCS...e3](#)

- Standard series, AEC-Q200 compliant
- Glass-protected with soft terminations

INDUCTORS

Low-Profile, High-Current IHLP® Inductors[IHLP-2525CZ-5A](#)

- Excellent high-temperature performance for DC/DC converter input and output filters

CERAMIC CAPACITORS

AEC-Q200 Qualified, Broad Range of Sizes and Working Voltages, C0G (NPO), X7R, and X8R[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding

INDUCTORS

Low-Profile, High-Current IHLP® Inductors[IHLP-2020CZ-5A](#)

- Compact size and high current, low saturation for noise filtering
- Up to 155 °C continuous operation



テールランプ、 シグナルLEDランプ

RESISTORS Pulse-Proof, High-Power Thick Film Chip Resistors  CRCW-HP e3 • Excellent pulse load capability • Enhanced power rating	RESISTORS Professional Thin Film MELF Resistors  MMB 0207 • Unrivaled surge handling capability, ultimate stability over lifetime • AEC-Q200 qualified, approved according to EN 140401-803, intrinsically sulfur-resistant, Green product	MOSFETs N-Channel MOSFETs in 3 mm x 3 mm PowerPAK® 1212 with Wettable Flanks Rated at 40 V, 9 mΩ  SQS484ENW • AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
RECTIFIERS Surface-Mount Schottky Barrier Rectifiers  MSS1P6HM3 • Low-profile MicroSMP package for low-voltage, high-frequency inverters; DC/DC converters; and polarity protection applications • AEC-Q101 qualified	INDUCTORS Low-Profile, High-Current IHL® Inductors  IHL-1616BZ-A1 • Shielded construction, lowest DCR/μH in this package size • Excellent DC/DC energy storage up to 5 MHz	RESISTORS Thick Film Surface Mount Chip Resistors, Wraparound, Extremely Low Value  RCWE • Low resistance values from 0.01 Ω to 0.976 Ω and tolerance of 1 % • Thick film construction with 2x power capacity
RESISTORS Power Metal Strip® SMD Resistors, Wide Terminal, 1 mΩ to 3 mΩ, 1 W  WSL0612 • Low EMF, high temperature up to 170 °C	OPTOELECTRONICS SMD High-Power, 1 W Visible LEDs (Red, Amber, and Yellow)  VLMR71AAAC • Compact, high-power SMD package: 6 x 6 x 1.5 mm • Wide viewing angle of 120°	NON-LINEAR RESISTORS SMD Glass-Protected NTC Thermistors  NTCS...e3 • Standard series, AEC-Q200 compliant • Glass-protected with soft terminations
CERAMIC CAPACITORS AEC-Q200 Qualified, Broad Range of Sizes and Working Voltages, C0G (NPO), X7R, and X8R  VJ...31X RoHS Automotive MLCCs • RoHS and Green compliant parts available • AgPd termination available for epoxy bonding	INDUCTORS Low-Profile, High-Current IHL® Inductors  IHL-2020CZ-5A • Compact size and high current, low saturation for noise filtering • Up to 155 °C continuous operation	

車載品質タンタルコンデンサの特長



TP8 MICROTAN® 薄型高CVリードフレームレスコンデンサ

TP8シリーズは、スペース制限のある設計に最適で、100 μF までの容量、0805(2012mm)と0603(1608mm)までの小型ケースサイズで提供されます。下記表は従来のモールドタンタルデバイスと比較したMICROTANシリーズの利点を示しています。



TH4高耐圧モールドタンタルチップコンデンサ

TP8次世代タンタルチップコンデンサ

ADVANTAGES

業界最高の体積効率	→	通常より小さいサイズで高い電圧、容量を提供
リードフレーム無し	→	信頼性の向上、低ESR、コストの削減
L字形状の端子	→	優れた固着性、半田フィレットの目視確認可能
タンタルコンデンサの強み	→	MLCCのようなピエゾノイズ(鳴き)の心配不要
RoHS準拠、ハロゲンフリー	→	環境に配慮

タンタルコンデンサの使用例

電力管理・変換

ビシェイの車載用タンタルコンデンサには幅広いケースサイズだけではなく、高い定格温度のオプションもあります。スイッチモード電源で効果的なフィルタリングを実現し、長寿命、高温(エンジンルーム内)環境にて非常に安定した高容量性能を提供します。

エネルギーストレージ

今日の車載回路は、様々な負荷とピーク電力要件に応じた安定性が求められます。ビシェイ社のタンタルコンデンサは、パワーバスの電圧維持用途に、低コストで大容量のエネルギーストレージソリューションを提供します。

カップリング

オーディオ、センサー、テレマティクスなどの車載アナログ回路は、二つの回路を接続するカップリングコンデンサにより、AC信号のみが回路間を流れるように制御する必要があります。ブロッキングコンデンサとも称されるこのコンデンサは、回路間のDCバイアスを絶縁することでDC信号をブロックします。ビシェイ社のタンタルコンデンサは車載アナログカップリング向けに、十分な容量、低DCリーク電流性能を、使用される全温度範囲、時間にわたり安定的に提供します。

機能概要

シリーズ	TP3	TP8	TH3	TH4
特徴	低ESR SMD	MICROTAN リードフレーム無し SMD	高温(+150 °C) SMD	高温(+175 °C) SMD
静電容量範囲	0.1 μF to 470 μF	1 μF to 100 μF	0.33 μF to 220 μF	10 μF to 47 μF
定格電圧範囲	4 V to 50 V	6.3 V to 40 V	6.3 V to 50 V	6.3 V to 35 V
容量許容差	$\pm 10 \%$, $\pm 20 \%$	$\pm 10 \%$, $\pm 20 \%$	$\pm 10 \%$, $\pm 20 \%$	$\pm 10 \%$, $\pm 20 \%$
ケースコード	A, B, C, D, E	M, W, R, P, A, N, T, B	A, B, C, D, E	B, C, D

48 V_{DC} ボードネット用主要部品



統合型スタータ
ジェネレーター
(48 V_{DC})



DC/DCコンバータ、
双方向
(48 V_{DC})



HVAC (E-Compressor for
48 V_{DC}用Eコンプレッサ)



THE VISHAY ADVANTAGE

最新の高耐圧技術、80 V ~ 150 V

EMIが向上した半導体

業界最小リンギング電圧のダイオード

175 °Cまでの高温動作

最大240 A対応の最先端SO-8 パッケージ



統合型スタータ ジェネレーター (48 V_{DC})



MOSFETs

N-Channel MOSFETs in
5 mm x 6 mm PowerPAK®
SO-8L Rated at 80 V, 7 mΩ



[SQJA80EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Ultra-low R_{DS(on)}, thermally enhanced PowerPAK® 8x8L replaces D²PAK in less than half of the area

MOSFETs

N-Channel MOSFETs as
Known Good Die, 100 V, 3.6
mΩ



[SQC260N10_3m6KDG](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Efficient KGD packaging allows high power density and reduced parasitics

RESISTORS

Power Metal Strip® Meter
Shunt Resistor, Very Low
Value (Down to 100 μΩ)



[WSMS2908](#)

- Extremely low resistance values: 100 μΩ to 1000 μΩ
- 3 W power capability with sensing terminals to mount on PCB

NON-LINEAR RESISTORS

SMD Glass-Protected NTC
Thermistors



[NTCS...e3](#)

- Standard series, AEC-Q200 compliant
- Glass-protected with soft terminations

INDUCTORS

EMI Filters with Flat Copper
Wire, SMD or Leaded Up to
260 A



[Customized EMI Filters](#)

- Customized solutions for 48 V applications, low DCR, high current

CERAMIC CAPACITORS

AEC-Q200 Qualified, Broad
Range of Sizes and Working
Voltages, C0G (NPO), X7R,
and X8R



[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding

MODULES

MOSFET H Bridges or B6
Bridges Based on Customer
Specifications



[EMIPAK 1B/2B Customized](#)

- 80 V to 100 V MOSFET power modules

FILM CAPACITORS

DC-Link Polyester Film
Capacitors, Operating
Temperature Up to 150 °C,
High Ripple Current



[MKT1820S](#)

- Low voltage DC-link capacitors with high-temperature capabilities
- Customized solutions for 48 V applications

RECTIFIERS

TVS Clamping Diodes, Up to
1.5 kW



[1.5 SMC Series](#)

- DO-214AB (SMCJ) package to protect ICs, MOSFETs, and signal lines of sensor units against voltage transients induced by inductive load switching and lightning

CERAMIC CAPACITORS

High Operating Temperature,
Automotive Grade Leaded
MLCC Capacitors



[HOTcap® K...H, A...R, K...R](#)

- High-reliability MLCC insert with wet build process
- High operating temperature (up to 175 °C for K...H and up to 160 °C for A...R and K...R), rated voltages: 50 V, 100 V, 200 V



DC/DCコンバータ、 双方向 (48 V_{DC})



RESISTORS

**Professional
High-Temperature Mini-MELF
Resistors**



[MMA 0204 HT](#)

- Operating temperature up to 175 °C, power handling of 500 mW, high surge capability
- AEC-Q200 qualified, high overall stability $|\Delta R/R| \leq 0.1 \%$, intrinsically sulfur-resistant

RESISTORS

**Thin Film Resistors, 4.7 Ω to
3.01 M Ω , 0402 to 1210 Case
Sizes, 50 V to 200 V**



[TNPW e3](#)

- Excellent stability $|\Delta R/R| \leq 0.05 \%$ after 1000 h at 70 °C, 0402 to 1210 case sizes

INDUCTORS

**Low-Profile, High-Current
IHLP® Inductors**



[IHLP-8787MZ-5A](#)

- Highest current composite inductor available
- High temperature operation up to 155 °C, shielded construction

MOSFETs

**N-Channel MOSFETs in
8 mm x 8 mm PowerPAK®
8x8L, 80 V, 150 A, 2.7 m Ω**



[SQJQ480E](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Ultra-low $R_{DS(on)}$, thermally enhanced package reduces board area

MOSFETs

**N-Channel MOSFETs in
8 mm x 8 mm PowerPAK®,
40 V, 160 A, 1.2 m Ω**



[SQJQ100EL](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Ultra-low $R_{DS(on)}$, thermally enhanced PowerPAK® 8x8L replaces D²PAK in less than half of the area

RESISTORS

**Power Metal Strip® SMD
Resistors, 4-Terminal, Low
Values (Down to 0.0001 Ω)**



[WSK1216](#)

- High power rating of 3 W to 5 W with TCR = 20 ppm/K
- Very low resistance values, 0.0001 Ω to 0.004 Ω , with tolerance of 1 %

INDUCTORS

**Shielded SMD Low-Profile,
High-Current IHLP® Inductors,
EMI Filter, 155 °C, Low DCR**



[IHLP-6767GZ-5A](#)

- Very high-current and high-temperature operation for filters

INDUCTORS

**Coupled Inductors for SEPIC
Converter**



[IHCL-3232DZ-5A](#)

- High-temperature operation up to 155 °C
- Frequency range up to 5.0 MHz

INDUCTORS

**EMI Filters with Flat Copper
Wire as SMD or Leaded, Up
to 260 A**



[Customized EMI Filters](#)

- Customized solutions for 48 V applications, low DCR, high current

FILM CAPACITORS

**DC-Link Polyester Film
Capacitors, Operating
Temperature Up to 150 °C,
High Ripple Current**



[MKT1820S](#)

- Low voltage DC-link capacitors with high-temperature capabilities
- Customized solutions for 48 V applications

FILM CAPACITORS

**SMD Aluminum Capacitors,
High Temperature Up to
150 °C, Low ESR**



[260 CLA-V](#)

- High ripple current up to 1400 mA at 150 °C, capacitance up to 3300 μ F
- Useful life up to 2000 h at 150 °C, high vibration capability

CERAMIC CAPACITORS

**X1/Y2 AC Line Rated
Ceramic Disc Capacitors for
Automotive Applications**



[AY2](#)

- AEC-Q200 qualified, X1/Y2 safety rating according to IEC 60384-14, 3rd edition
- Proven to withstand 3000 temperature cycles from -55 °C to +125 °C



HVAC (48 V_{DC} 用Eコンプレッサ)



CERAMIC CAPACITORS

**High Operating Temperature,
Automotive Grade Leaded
MLCC Capacitors**



[HOTcap® K...H, A...R, K...R](#)

- High-reliability MLCC insert with wet build process
- High operating temperature (up to 175 °C for K...H and up to 160 °C for A...R and K...R), rated voltages: 50 V, 100 V, 200 V

NON-LINEAR RESISTORS

**SMD Glass-Protected NTC
Thermistors**



[NTCS...e3](#)

- Standard series, AEC-Q200 compliant
- Glass-protected with soft terminations

CAPACITORS MLCC

**AEC-Q200 Qualified, Broad
Range of Sizes and Working
Voltages, C0G (NPO), X7R,
and X8R**



[VJ...31X RoHS Automotive MLCCs](#)

- RoHS and Green compliant parts available
- AgPd termination available for epoxy bonding

CERAMIC CAPACITORS

**High Operating Temperature,
Automotive Grade Leaded
MLCC Capacitors**



[HOTcap® K...H, A...R, K...R](#)

- High-reliability MLCC insert with wet build process
- High operating temperature (up to 175 °C for K...H and up to 160 °C for A...R and K...R), rated voltages: 50 V, 100 V, 200 V

MOSFETs

**N-Channel MOSFETs in
8 mm x 8 mm PowerPAK®
8x8L, 80 V, 150 A, 2.7 mΩ**



[SQJQ480E](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Ultra-low R_{DS(on)}, thermally enhanced package reduces board area

INDUCTORS

**Low Profile, High Current
IHL® Inductors**



[IHL-8787MZ-5A](#)

- Highest current composite inductor available
- High temperature operation up to 155 °C, shielded construction

FILM CAPACITORS

**DC-Link Polyester Film
Capacitors, Operating
Temperature Up to 150 °C,
High Ripple Current**



[MKT1820](#)

- Automotive general purpose capacitors with high temperature capabilities
- Capacitance up to 560 µF

RESISTORS

**Power Metal Strip® SMD
Resistors, 4-Terminal; Low
Value (Down to 0.0001 Ω)**



[WSK1216](#)

- High power rating of 3 W to 5 W with TCR = 20 ppm/K
- Very low resistance values, 0.0001 Ω to 0.004 Ω, with tolerance of 1 %

INDUCTORS

**Shielded EMI Filters Up to
190 A I_{DCR}, 2.2µH, Ultra-Low
DCR (0.22 mΩ)**



[IHL-2000VZ-5A](#)

- Very high-current and high-temperature operation for filters and energy storage

ALUMINUM CAPACITORS

**SMD Aluminum Capacitors,
High Temperature Up to
150 °C, Low ESR**



[260 CLA-V](#)

- High ripple current up to 1400 mA at 150 °C, capacitance up to 3300 µF
- Useful life up to 2000 h at 150 °C, high vibration capability

フルハイブリッド (HEVs) 用主要部品



電気モータードライブ
(DC/AC)



THE VISHAY ADVANTAGE

- AEC準拠
- 高温動作対応
- 高信頼性
- SMDパッケージの高電圧受動部品
- 高耐圧半導体
- 優れた過渡電圧性能



電気モータードライブ (DC/AC)



CERAMIC CAPACITORS

High Operating Temperature, Automotive Grade Leaded MLCC Capacitors

[HOTcap® K...H, A...R, K...R](#)

- High-reliability MLCC insert with wet build process
- High operating temperature (up to 175 °C for K...H and up to 160 °C for A...R and K...R), rated voltages: 50 V, 100 V, 200 V



RESISTORS

High-Voltage Thin Film Flat Chip Resistors, Up to 1 kV Operating Voltage, Range = 121 kΩ to 3.01 MΩ

[TNPV1210 e3](#)

- 0.1 %, 0.5 %, and 1 % tolerances
- Excellent stability $|\Delta R/R| \leq 0.05$ % after 1000 h at 70 °C



RECTIFIERS

600 V, 30 A Hyperfast Rectifiers

[VS-ETH3006SHM3](#)

- TO-263AB (D²PAK) power package optimized for fast battery charging systems and main inverter applications up to 20 kW



RESISTORS

Surface-Mount Molded Dividers, High-Voltage

[CDMx](#)

- High voltage up to 3000 V, sulfur-resistant
- Automotive compliant terminations, wide range of resistance values and ratios

*Preliminary



NON-LINEAR RESISTORS

NTC Thermistors, Low Thermal Gradient Lug Sensors

[NTCALUG02A](#)

- Low thermal gradient surface temperature sensors
- High insulation voltage



INDUCTORS

EMI Filters with Flat Copper Wire as SMD or Leaded Up to 260 A

[Customized EMI Filters](#)

- Customized solutions for 48 V applications, low DCR, high current



MODULES

Trench FS IGBT Modules

[VS-GC30C065TB](#)

- Optimized for use with FRED Pt® Gen 4 ultrafast diodes
- Low collector-to-emitter voltages, extremely low conduction losses



FILM CAPACITORS

High-Performance DC-Link Capacitors for Automotive Traction Applications (EV/HEV)

[MKP1849](#)

- High voltage, high capacitance, high ripple current
- Customized upon request



FILM CAPACITORS

Metallized Polypropylene DC-Link Film Capacitors, 450 V_{DC} to 1200 V_{DC}

[MKP1848](#)

- OBC and HEV inverter DC link
- High ripple current, capacitance up to 400 μF



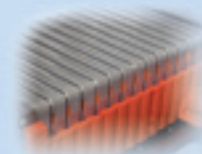
電気自動車 (FEVs) 用主要部品



電気モータードライブ
(DC/AC)



バッテリーマネジメントと
DC/DC



車載充電器



THE VISHAY ADVANTAGE

AEC準拠

高温動作対応

高信頼性

SMDパッケージの高電圧受動部品

高耐圧半導体

優れた過渡電圧性能



電気モータードライブ (DC/AC)



CERAMIC CAPACITORS

High Operating Temperature, Automotive Grade Leaded MLCC Capacitors



[HOTcap® K...H, A...R, K...R](#)

- High-reliability MLCC insert with wet build process
- High operating temperature (up to 175 °C for K...H and up to 160 °C for A...R and K...R), rated voltages: 50 V, 100 V, 200 V

NON-LINEAR RESISTORS

NTC Thermistors, Low Thermal Gradient Lug Sensors



[NTCALUG02A](#)

- Low thermal gradient surface temperature sensor
- High insulation voltage

MODULES

Trench FS IGBT Modules



[VS-GC30C065TB](#)

- Optimized for use with FRED Pt® Gen 4 ultrafast diodes
- Low collector-to-emitter voltages, extremely low conduction losses

RESISTORS

Surface-Mount Molded Dividers, High-Voltage



[CDMx](#)

- High voltage up to 3000 V, sulfur-resistant
- Automotive compliant terminations, wide range of resistance values and ratios

*Preliminary

INDUCTORS

EMI Filters with Flat Copper Wire as SMD or Leaded Up to 260 A



[Customized EMI Filters](#)

- Customized solutions for 48 V applications, low DCR, high current

RESISTORS

Wirebondable Gate Resistors for IGBT Applications



[IGBR](#)

- Back-contact resistors for single wirebond assembly with power ratings up to 4 W
- Available case sizes from 0202 to 2010

FILM CAPACITORS

Metallized Polypropylene DC-Link Film Capacitors, 450 V_{DC} to 1000 V_{DC}



[MKP1848S](#)

- OBC and HEV inverter DC link
- High ripple current and high capacitance up to 100 µF

FILM CAPACITORS

High Performance DC-Link Capacitors for Automotive Traction Applications (EV/HEV)



[MKP1849](#)

- High voltage, high capacitance, high ripple current

RECTIFIERS

600 V, 30 A Hyperfast Rectifiers



[VS-ETH3006SHM3](#)

- TO-263AB (D²PAK) power package optimized for fast battery charging systems and main inverter applications up to 20 kW



バッテリーマネージメントと DC/DC

CERAMIC CAPACITORS

**X1/Y2 AC Line Rated
Ceramic Disc Capacitors for
Automotive Applications**



[AY2](#)

- AEC-Q200 qualified, X1/Y2 safety rating according to IEC 60384-14, 3rd edition
- Proven to withstand 3000 temperature cycles from -55 °C to +125 °C

RESISTORS

**Long-Side Termination Thick
Film Resistors, 250 mW to
2 W in 0406 to 1225 sizes,
1 Ω - 1 mΩ**



[RCL e3](#)

- Operating temperature up to 155 °C, TCR = 100 ppm/K to 200 ppm/K

MOSFETs

**Dual N-Channel MOSFETs
in 5 mm x 6 mm PowerPAK
SO-8L, 40 V, 33 mΩ**



[SQJ946EP](#)

- AEC-Q101 qualified, 100 % UIS and RG tested with up to 175 °C operation
- Optimized for high-frequency DC/DC applications, lower switching losses

RESISTORS

**High Pulse Load Carbon
Film MELF Resistors, Pulse
Handling Up to 3 kW, ESD Up
to 16 kV**



[CMB 0207](#)

- 1.0 W rated dissipation in MELF 0207 package
- Resistance from 2.2 Ω to 1.5 MΩ

RESISTORS

**Thin Film Chip Resistors,
Resistance = 1 Ω to 10 mΩ,
TCR = 25 ppm/K to 50 ppm/K**



[MCT 0603 AT](#)

- Tolerance = 0.5 % to 1 %
- Power rating 125 mW

RESISTORS

**SMD Power Resistors,
35 W, 10 mΩ to 550 KΩ,
Non-Inductive**



[D2TO35](#)

- TO-263 package, TCR = 150 ppm/K
- AEC-Q200 qualified

DIODES

**400 W PAR® TVS Diodes,
Voltage = 6.8 V to 43 V,
T_j = 185 °C**



[TPSMA6.8](#)

- DO-214AC (SMA) package to protect ICs, MOSFETs, and signal lines of sensor units against voltage transients induced by inductive load switching and lightning

RESISTORS

**Power Metal Strip® Battery
Shunt Resistors, Very Low
Values (100 μΩ, 125 μΩ, and
250 μΩ)**



[WSBS8518](#)

- High power to resistor size ratio
- Low thermal EMF, < 3 μV / °C, for accurate current sensing

NON-LINEAR RESISTORS

**NTC Thermistors, Mini Lug
Sensors**



[NTCALUG03](#)

- Robust surface temperature sensors
- AEC-Q200 compliant, UL recognized

DIODES

**500 mW Zener diodes in
< 0.6 mm low-profile Mi-
croSMF package**



[PLZ Series Zener Diode](#)

- Excellent stability for voltage stabilization and reference voltage generation
- AEC-Q101 qualified versions available



車載充電器



CERAMIC CAPACITORS

**X1/Y2 AC Line Rated
Ceramic Disc Capacitors for
Automotive Applications**

[AY2](#)

- AEC-Q200 qualified, X1/Y2 safety rating according to IEC 60384-14, 3rd edition
- Proven to withstand 3000 temperature cycles from -55 °C to +125 °C

RESISTORS

**Power Resistors, 100
W, 15 mΩ to 1 MΩ,
Non-Inductive**

[LTO100](#)

- TO-247 package, TCR = 150 ppm/K
- AEC-Q200 qualified

RESISTORS

**Wirebondable Gate Resistor
for IGBT Applications**

[IGBR](#)

- Back-contact resistors for single wirebond assembly with power rating up to 4 W
- Available case sizes from 0202 to 2010

INDUCTORS

**High Isolation as Press-Fit
or SMD Version Flyback
Transformers**

[Customized Transformers](#)

- Customized solutions up to kW ranges

RESISTORS

**High Pulse Load Carbon
Film MELF Resistors, Pulse
Handling Up to 3 kW, ESD Up
to 16 kV**

[CMB 0207](#)

- 1.0 W rated dissipation in MELF 0207 package
- Resistance from 2.2 Ω to 1.5 MΩ

RECTIFIERS

**15 A, 1200 V FRED Pt®
Hyperfast Rectifiers**

[VS-15ETU12HN3](#)

- AEC-Q101 qualified, hyperfast and soft recovery time with reduced Q_{rr} in TO-220AC package
- 175 °C maximum operating temperature

NON-LINEAR RESISTORS

**NTCALUG, Custom
Capabilities NTC LUG Ring
Tongue**

[NTCALUG](#)

- Minimum breakdown voltages: 500 V_{AC} Up to 3000 V_{AC}

MODULES

**Press-Fit Semiconductor
Power Modules for IGBT or
MOSFET Drives**

[EMIPAK-1B / 2B](#)

- 600 V to 650 V, or lower voltages upon customer request

RESISTORS

**SMD Power Resistors,
35 W, 10 mΩ to 550 kΩ,
Non-Inductive**

[D2TO35](#)

- TO-263 package, TCR = 150 ppm/K
- AEC-Q200 qualified

RESISTORS

**Surface-Mount Molded
Dividers, High-Voltage**

[CDMx](#)

- High voltage up to 3000 V, sulfur-resistant
- Automotive compliant terminations, wide range of resistance values and ratios

***Preliminary**

INDUCTORS

**1 kW to 3 kW Standard Power
Planar Transformers and Custom
Power Planar Inductors**

[Planar Series](#)

- Planar and flat wire designs available for improved efficiency

FILM CAPACITORS

**Interference Suppression
Film Capacitors, MKP Radial
Potted Type**

[MKP339](#)

- RFI X2 capacitor for standard across-the-line applications
- Automotive grade, AEC-Q200 compliant



世界一の信頼性、高性能MELF薄膜抵抗器



ビシェイ社は車載市場向けに、優れた精度、安定性、信頼性、パルス負荷耐量等の厳しい要件を満たしたMELF抵抗器を25年以上に亘り供給しています。円筒形のMELFは、実装面積に対して最適化された定格電力とパルス負荷耐量を提供します。継続的な開発によって、より改善された長期的安定性と耐湿性、+ 175 °Cの高温動作を実現しています。

主な製品の特徴:

- 予測可能な部品性能
- ゼロデфекトを目指す品質活動
- 厳しい動作環境に対応
- 長期安定性
- 湿耐性
- MM_HVシリーズは1 kVまでの動作電圧
- 鉛フリーアセンブリプロセスでの温度サイクル
- 500 Vまでの絶縁電圧

認証

- EN 140401-803
- AEC-Q200

すべての製品は完全に鉛フリーで、RoHS への完全準拠を含むGlobal Automotive Declarable 物質リスト (GADSL) に対応します。

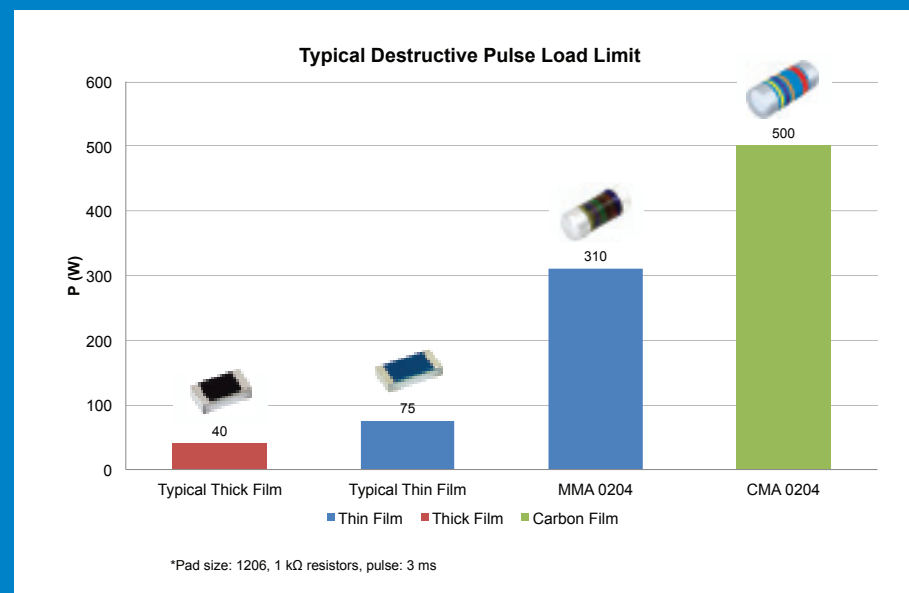
温度係数、許容差、および安定性

±5ppm/Kまでの抵抗温度係数、± 0.02 %までの許容差での製品の提供が可能です。長期安定性を特長とする高精度 MELF抵抗器の最大抵抗値変化 ($\Delta R/R$) は、8000時間で< ± 0.05 %です。

パルス負荷耐量

MELF抵抗器のもう一つの特徴としては、様々な過負荷状況に対する信頼性です。薄膜技術を使った円筒形構造が、標準的な薄膜・厚膜チップ抵抗器と比べて優れたパルス負荷耐性を実現します。先端炭素皮膜技術で生産されたMELF抵抗器も供給可能で、1206/パッドサイズで6 kVまでのESD耐量、2512パッドサイズで10 kVのサージ耐量を実現します。次の図が示すように、薄膜やカーボンフィルムMELF抵抗器は、厚膜チップ抵抗器、薄膜チップ抵抗器よりも遥かに優れたパルス負荷耐量を提供します。

技術的な質問に関してはmelf@vishay.comまでご連絡下さい。





Vishay Intertechnology, Inc.



A **WORLD OF**
SOLUTIONS