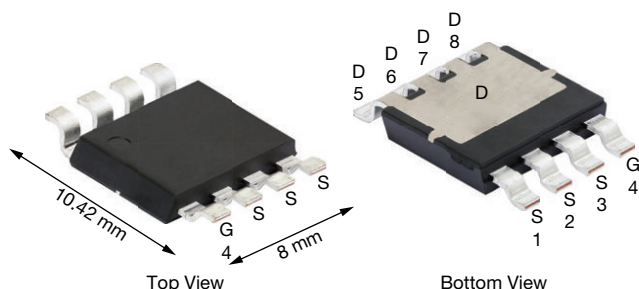


Automotive N-Channel 80 V (D-S) 175 °C MOSFET

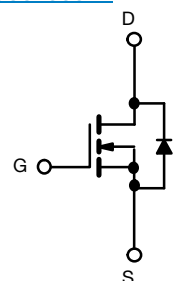
PowerPAK® 8 x 8LR


FEATURES

- TrenchFET® Gen IV power MOSFET
- AEC-Q101 qualified
- 100 % R_g and UIS tested
- Thin 1.6 mm package
- Very low thermal resistance
- Material categorization:
for definitions of compliance please see
www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE



N-Channel MOSFET

PRODUCT SUMMARY

V_{DS} (V)	80
$R_{DS(on)}$ (Ω) at $V_{GS} = 10$ V	0.0023
I_D (A)	329
Configuration	Single

ORDERING INFORMATION

Package	PowerPAK 8 x 8LR
Lead (Pb)-free and halogen-free	SQJQ186ER (for detailed order number please see www.vishay.com/doc?79771)

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-source voltage	V_{DS}	80	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current	I_D	329	A
		189	A
Continuous source current (diode conduction)	I_S	545	A
Pulsed drain current ^a	I_{DM}	770	A
Single pulse avalanche current	I_{AS}	60	A
Single pulse avalanche energy	E_{AS}	180	mJ
Maximum power dissipation	P_D	600	W
		200	W
Operating junction and storage temperature range	T_J, T_{stg}	-55 to +175	°C
Soldering recommendations (peak temperature) ^c		260	°C

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-ambient	R_{thJA}	44	°C/W
Junction-to-case (drain)	R_{thJC}	0.25	°C/W

Notes

- Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %
- When mounted on 1" square PCB (FR4 material)
- See solder profile (www.vishay.com/doc?73257). The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection



SPECIFICATIONS (T _C = 25 °C, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-source breakdown voltage	V _{DS}	V _{GS} = 0, I _D = 250 μA		80	-	-	V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA		2.5	3	3.5	
Gate-source leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V		-	-	± 100	nA
Zero gate voltage drain current	I _{DSS}	V _{GS} = 0 V	V _{DS} = 80 V	-	-	1	μA
		V _{GS} = 0 V	V _{DS} = 80 V, T _J = 125 °C	-	-	50	
		V _{GS} = 0 V	V _{DS} = 80 V, T _J = 175 °C	-	-	150	
On-state drain current ^a	I _{D(on)}	V _{GS} = 10 V	V _{DS} ≥ 5 V	100	-	-	A
Drain-source on-state resistance ^a	R _{DS(on)}	V _{GS} = 10 V	I _D = 20 A	-	0.0017	0.0023	Ω
		V _{GS} = 10 V	I _D = 20 A, T _J = 125 °C	-	-	0.0045	
		V _{GS} = 10 V	I _D = 20 A, T _J = 175 °C	-	-	0.0056	
Forward transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 40 A		-	100	-	S
Dynamic ^b							
Input capacitance	C _{iss}	V _{GS} = 0 V	V _{DS} = 25 V, f = 1 MHz	-	7537	10552	pF
Output capacitance	C _{oss}			-	1182	1655	
Reverse transfer capacitance	C _{rss}			-	55	77	
Total gate charge ^c	Q _g	V _{GS} = 10 V	V _{DS} = 40 V, I _D = 50 A	-	123	185	nC
Gate-source charge ^c	Q _{gs}			-	36	-	
Gate-drain charge ^c	Q _{gd}			-	26	-	
Gate resistance	R _g	f = 1 MHz		0.6	1.3	2.0	Ω
Turn-on delay time ^c	t _{d(on)}	V _{DD} = 40 V, R _L = 4.0 Ω I _D ≅ 10 A, V _{GEN} = 10 V, R _g = 1 Ω		-	22	33	ns
Rise time ^c	t _r			-	21	32	
Turn-off delay time ^c	t _{d(off)}			-	53	80	
Fall time ^c	t _f			-	16	24	
Source-Drain Diode Ratings and Characteristics ^b							
Reverse recovery time	t _{rr}	V _{DD} = 64 V, I _{FM} = 40 A, di/dt = 100 A/μs		-	63	126	ns
Reverse recovery charge	Q _{rr}			-	105	210	nC
Reverse recovery current	I _{RM}			-	3.0	-	A
Pulsed current ^a	I _{SM}			-	-	1600	A
Forward voltage	V _{SD}	I _F = 50 A, V _{GS} = 0		-	0.8	1.1	V

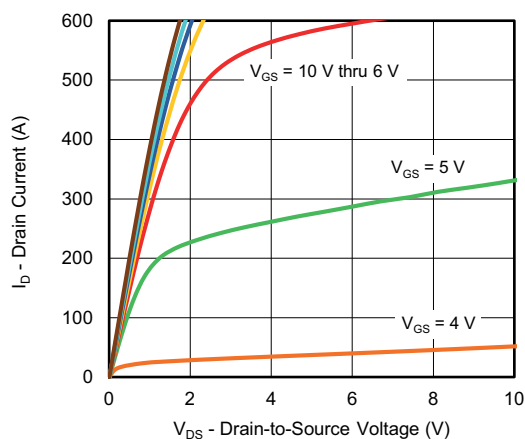
Notes

- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
b. Guaranteed by design, not subject to production testing
c. Independent of operating temperature

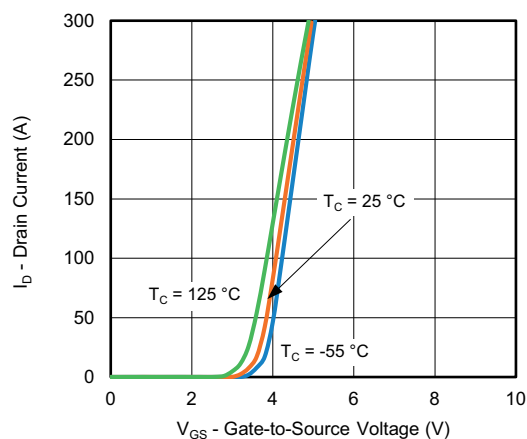
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



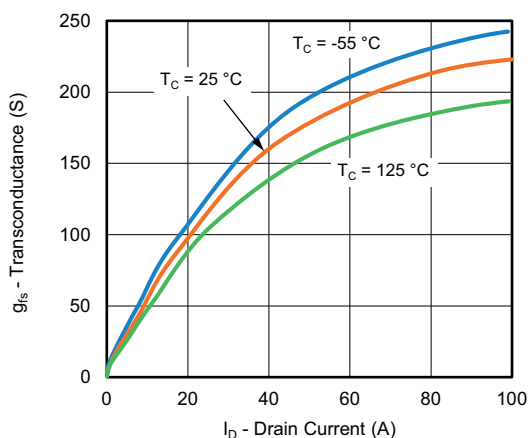
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)



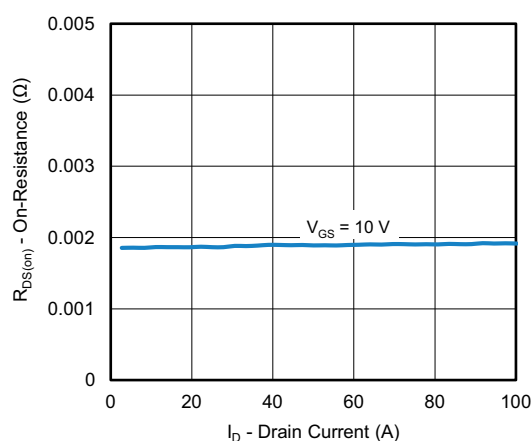
Output Characteristics



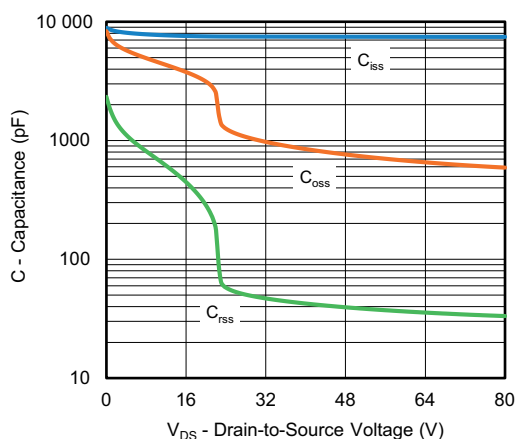
Transfer Characteristics



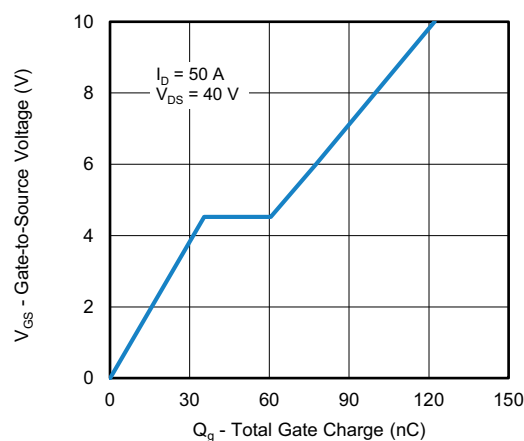
Transconductance



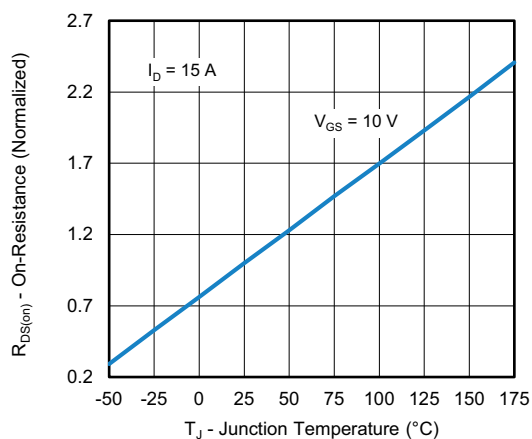
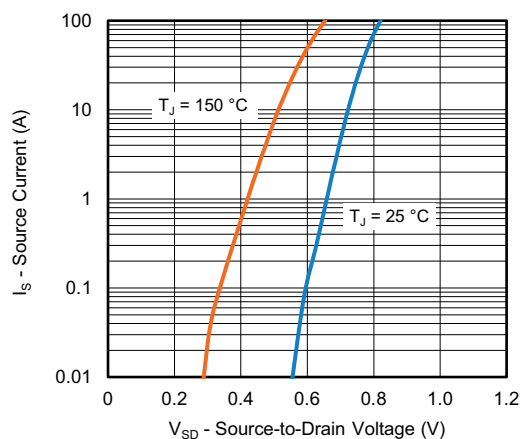
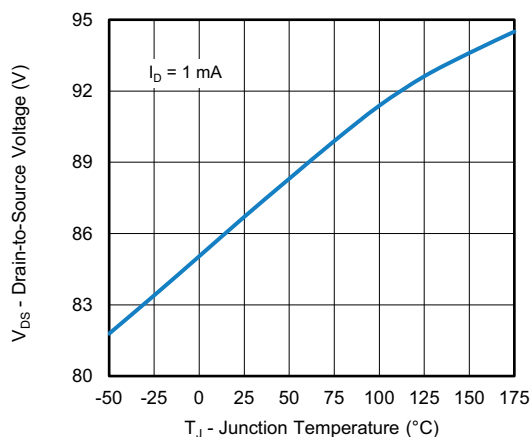
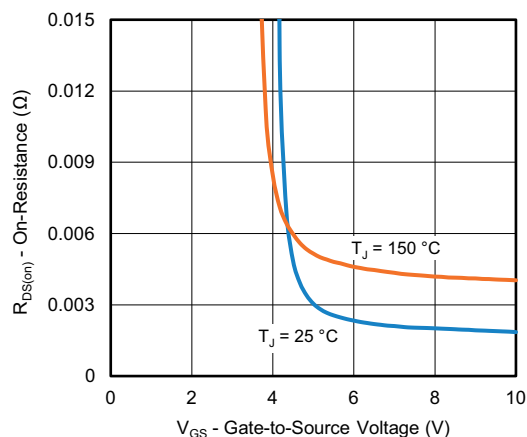
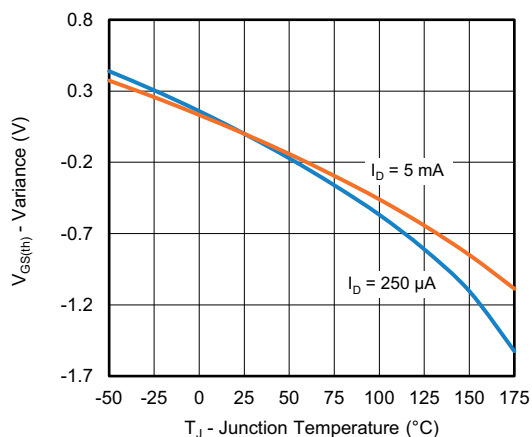
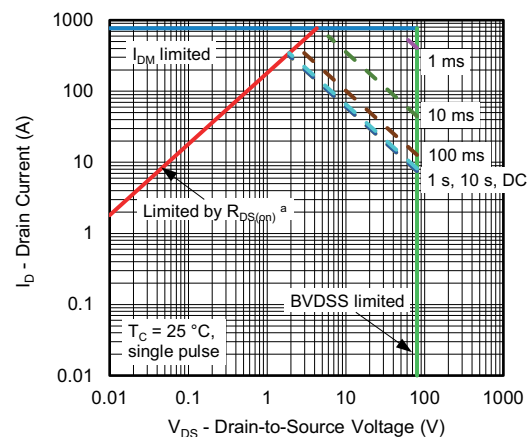
On-Resistance vs. Drain Current



Capacitance



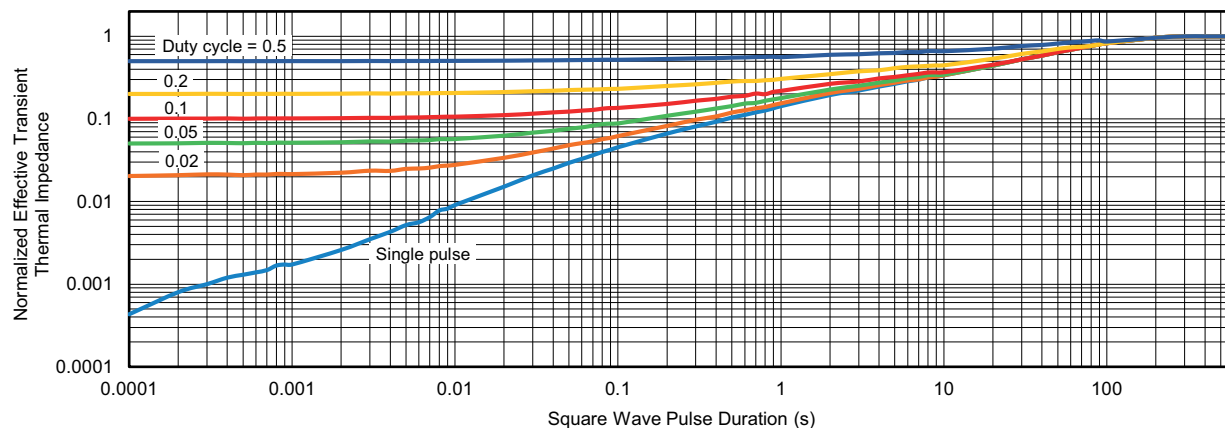
Gate Charge

TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

On-Resistance vs. Junction Temperature

Source Drain Diode Forward Voltage

Drain Source Breakdown vs. Junction Temperature

On-Resistance vs. Gate-to-Source Voltage

Threshold Voltage

Safe Operating Area
Note

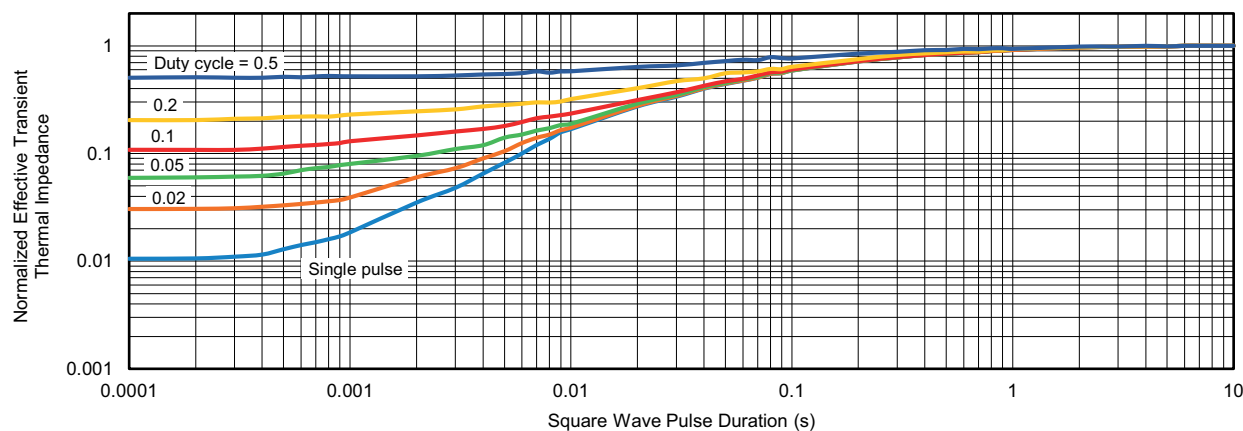
- $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified



THERMAL RATINGS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)



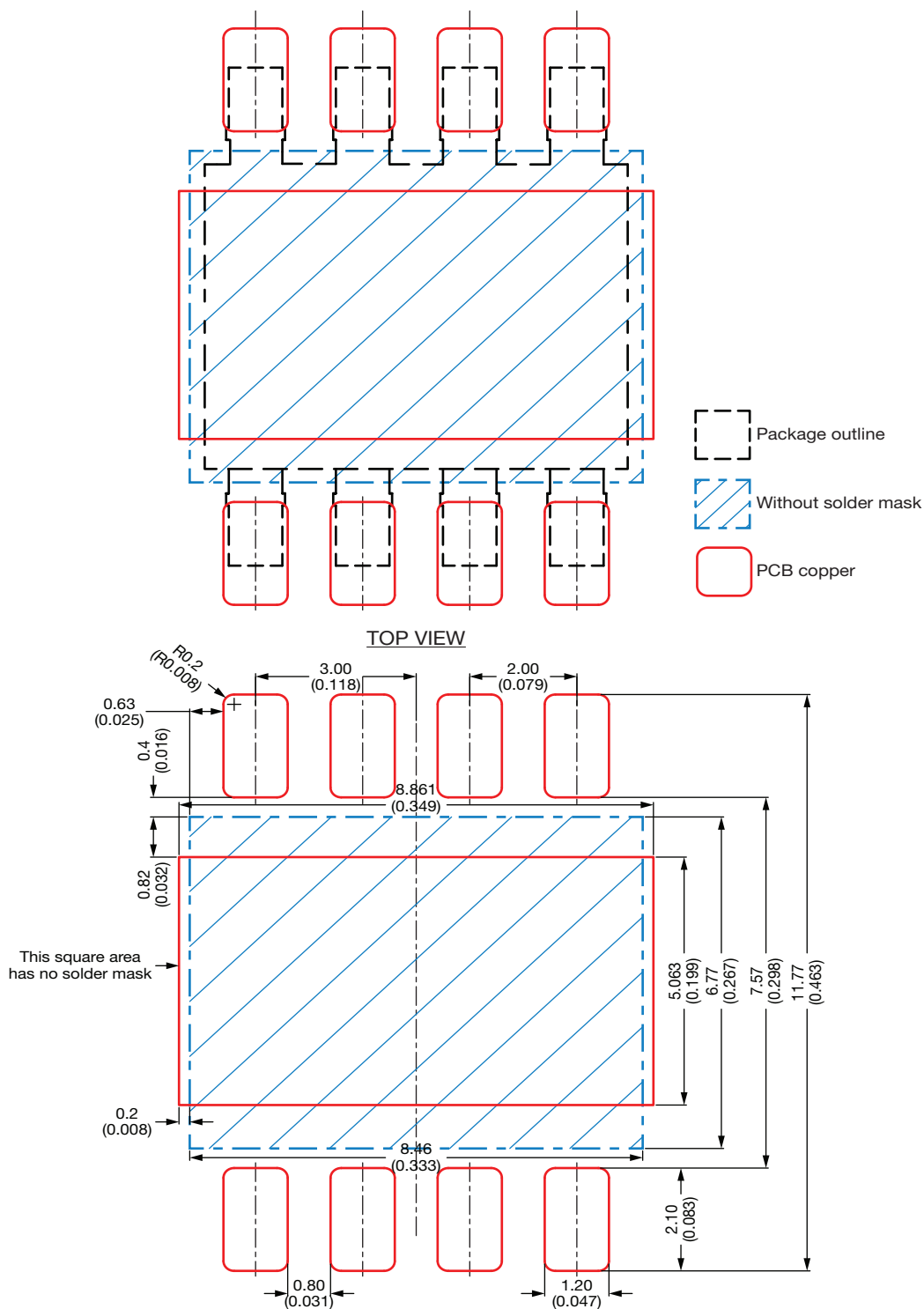
Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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Recommended Land Pattern PowerPAK® 8 x 8LR



Notes

- This land pattern is for reference
- Proposed stencil thickness 200 µm
- All dimensions are in millimeter (inches)

ECN: C23-0461-Rev. B, 17-Apr-2023

DWG: 3002



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