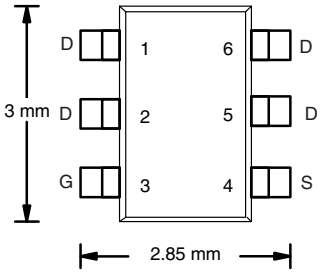
P-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω) Max.	I_D (A)[d,e]	Q_g (Typ.)
-30	0.0192 at V_{GS} = -10 V	-8	21 nC
	0.0232 at V_{GS} = -6 V	-8	
	0.0270 at V_{GS} = -4.5 V	-8	

TSOP-6
Top View



Ordering Information:
Si3421DV-T1-GE3 (Lead (Pb)-free and Halogen-free)

FEATURES

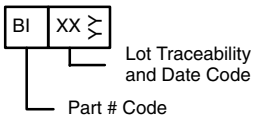
- TrenchFET® Power MOSFET
- 100 % R_g and UIS Tested
- Material categorization:
  For definitions of compliance please see
  www.vishay.com/doc?99912

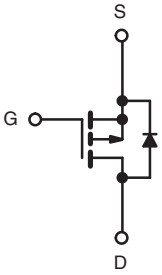
Pb-free
RoHS COMPLIANT
HALOGEN FREE Available

APPLICATIONS

- Load Switches
- Adaptor Switch
- DC/DC Converter
- For Mobile Computing/Consumer

Marking Code





P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	-8[e]	A
	T_C = 70 °C		-8[e]	
	T_A = 25 °C		-8.3[a, b]	
	T_A = 70 °C		-6.7[a, b]	
Pulsed Drain Current (t = 100 µs)		I_{DM}	-50	
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	-3.5	
	T_A = 25 °C		-1.7[a, b]	
Avalanche Current	L = 0.1 mH	I_{AS}	-15	
Single-Pulse Avalanche Energy		E_{AS}	11.25	mJ
Maximum Power Dissipation	T_C = 25 °C	P_D	4.2	W
	T_C = 70 °C		2.7	
	T_A = 25 °C		2[a, b]	
	T_A = 70 °C		1.3[a, b]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS					
Parameter		**Symbol**	**Typical**	**Maximum**	**Unit**
Maximum Junction-to-Ambient[a, c]	t ≤ 10 s	R_{thJA}	40	62.5	°C/W
Maximum Junction-to-Foot	Steady State	R_{thJF}	25	30	

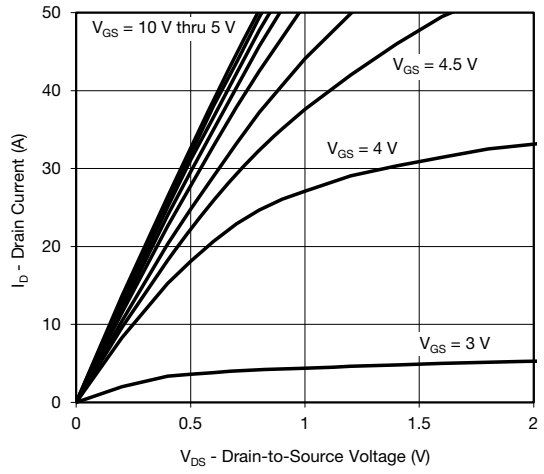
Notes:
a. Surface mounted on 1" x 1" FR4 board.
b. t = 10 s.
c. Maximum under steady state conditions is 110 °C/W.
d. Based on T_C = 25 °C.
e. Package limited.

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = -250 µA	-30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = -250 µA		-18		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			4.6		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250 µA	-1		-3	V
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -30 V, V_{GS} = 0 V			-1	µA
		V_{DS} = -30 V, V_{GS} = 0 V, T_J = 55 °C			-5	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq$ -10 V, V_{GS} = -10 V	-30			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = -10 V, I_D = -7 A		0.0160	0.0192	Ω
		V_{GS} = -6 V, I_D = -5 A		0.0193	0.0232	
		V_{GS} = -4.5 V, I_D = -3 A		0.0225	0.0270	
Forward Transconductance[a]	g_{fs}	V_{DS} = -10 V, I_D = -7 A		30		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = -15 V, V_{GS} = 0 V, f = 1 MHz		2580		pF
Output Capacitance	C_{oss}			256		
Reverse Transfer Capacitance	C_{rss}			225		
Total Gate Charge	Q_g	V_{DS} = -15 V, V_{GS} = -10 V, I_D = -8.3 A		46	69	nC
		V_{DS} = -15 V, V_{GS} = -4.5 V, I_D = -8.3 A		21	32	
Gate-Source Charge	Q_{gs}			7		
Gate-Drain Charge	Q_{gd}			6.1		
Gate Resistance	R_g	f = 1 MHz	1.6	8	16	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = -15 V, R_L = 2.24 Ω, $I_D \cong$ -6.7 A, V_{GEN} = -10 V, R_g = 1 Ω		7	14	ns
Rise Time	t_r			9	18	
Turn-Off DelayTime	$t_{d(off)}$			55	83	
Fall Time	t_f			13	20	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = -15 V, R_L = 2.24 Ω, $I_D \cong$ -6.7 A, V_{GEN} = -4.5 V, R_g = 1 Ω		58	87	
Rise Time	t_r			40	60	
Turn-Off DelayTime	$t_{d(off)}$			36	54	
Fall Time	t_f			17	26	
Drain-Source Body Diode Characteristics						
Continous Source-Drain Diode Current	I_S	T_C = 25 °C			-3.5	A
Pulse Diode Forward Current (t = 100 µs)	I_{SM}				-50	
Body Diode Voltage	V_{SD}	I_S = -6.7 A, V_{GS} = 0 V		-0.85	-1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = -6.7 A, dI/dt = 100 A/µs, T_J = 25 °C		21.5	33	ns
Body Diode Reverse Recovery Charge	Q_{rr}			12	20	nC
Reverse Recovery Fall Time	t_a			10.5		ns
Reverse Recovery Rise Time	t_b			11		

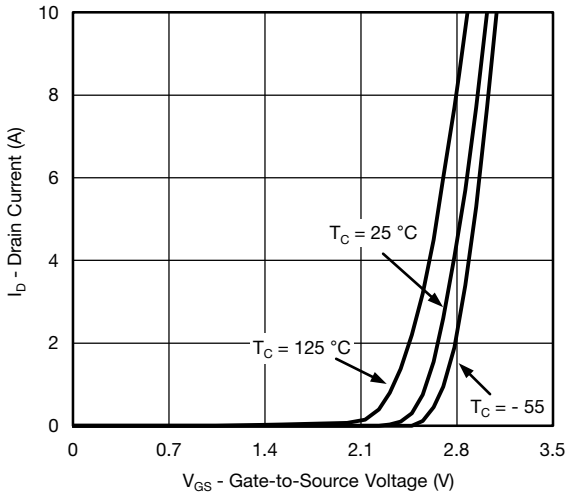
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.

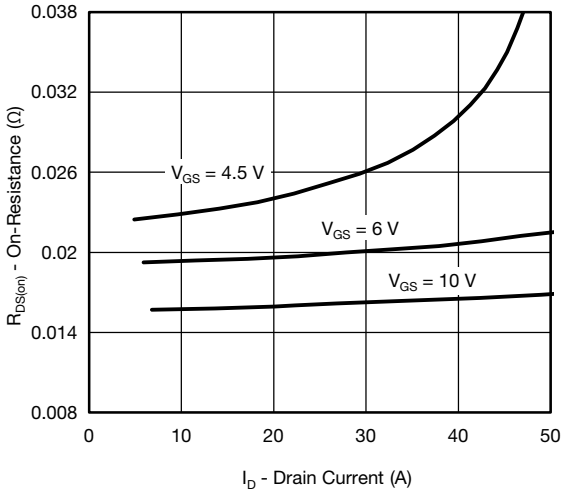
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



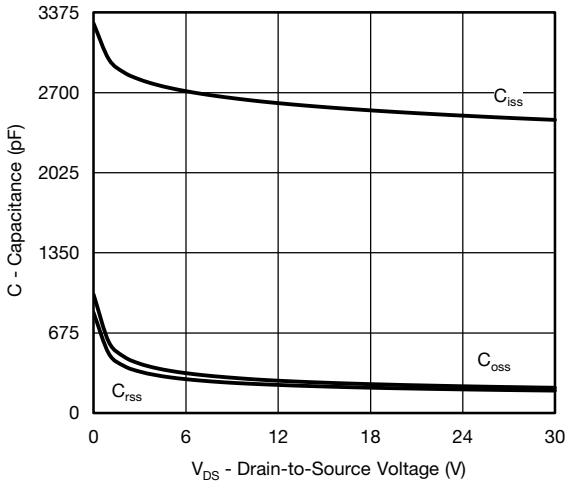
Output Characteristics



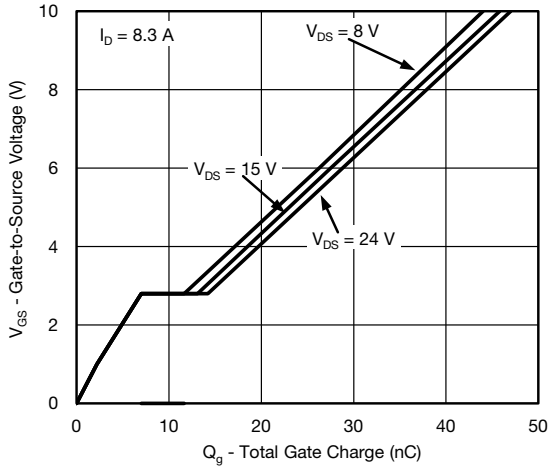
Transfer Characteristics



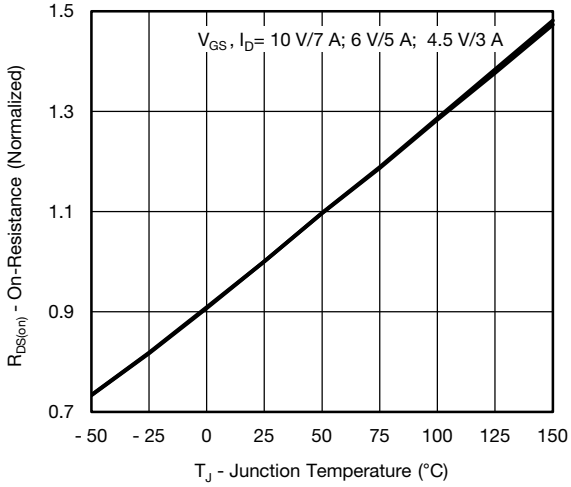
On-Resistance vs. Drain Current



Capacitance

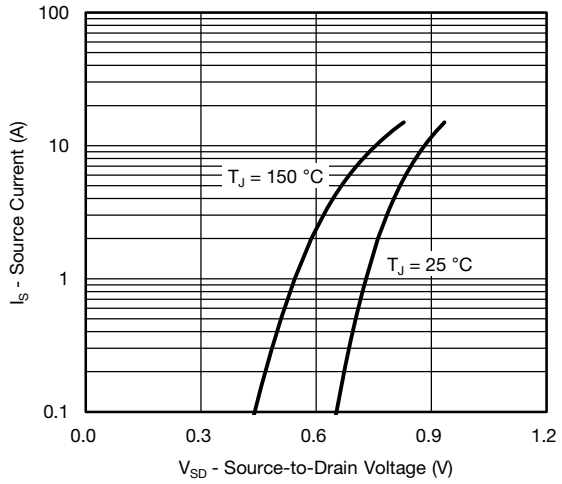


Gate Charge

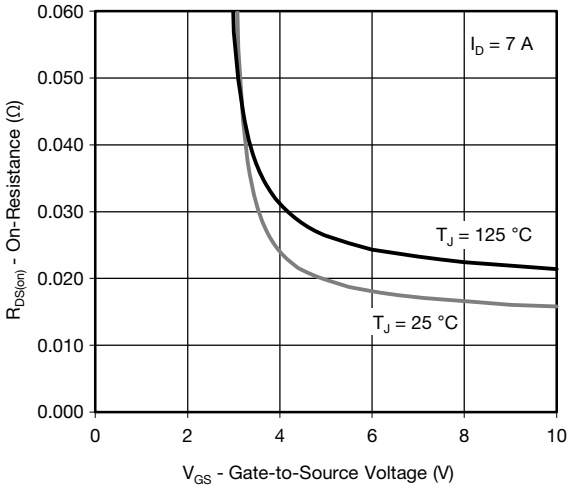


On-Resistance vs. Junction Temperature

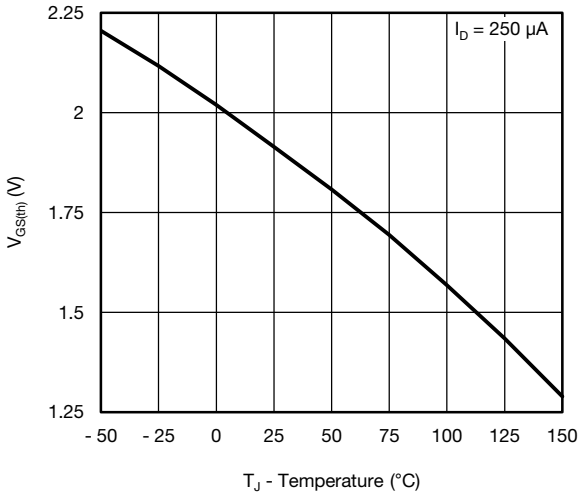
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



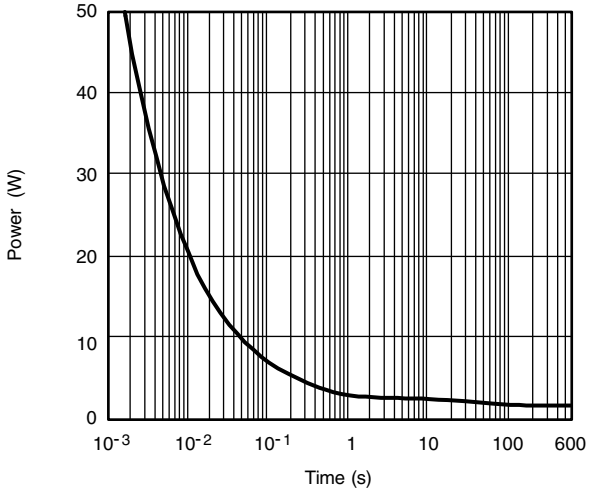
Source-Drain Diode Forward Voltage



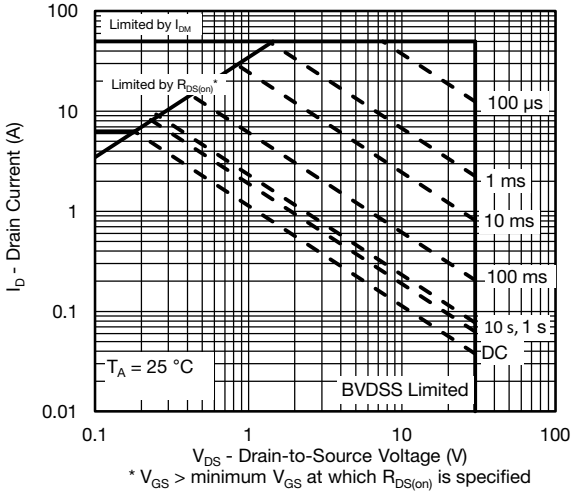
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



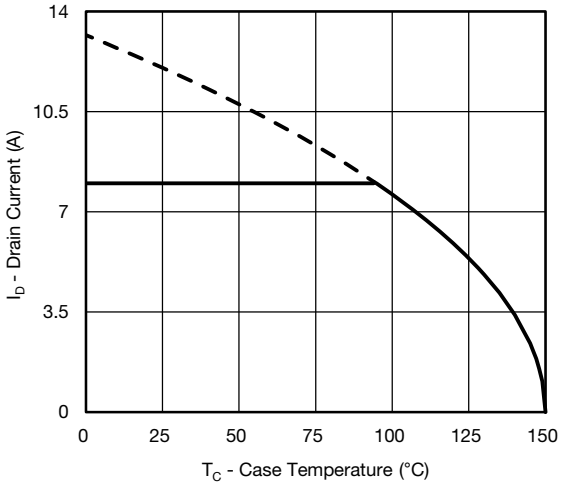
Single Pulse Power, Junction-to-Ambient



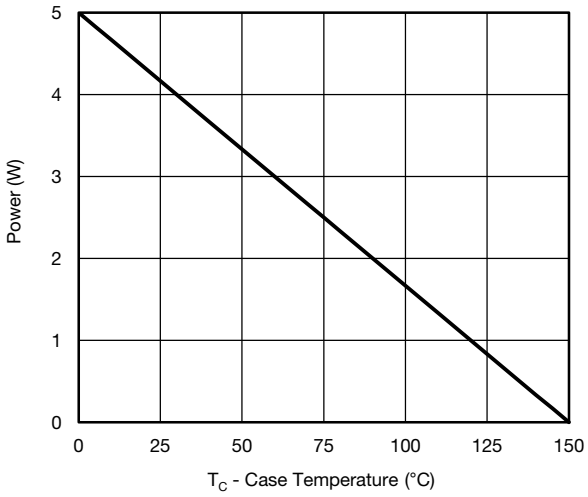
Safe Operating Area

For technical questions, contact: pmostechsupport@vishay.com
Document Number: 62921
S13-2289-Rev. A, 04-Nov-13

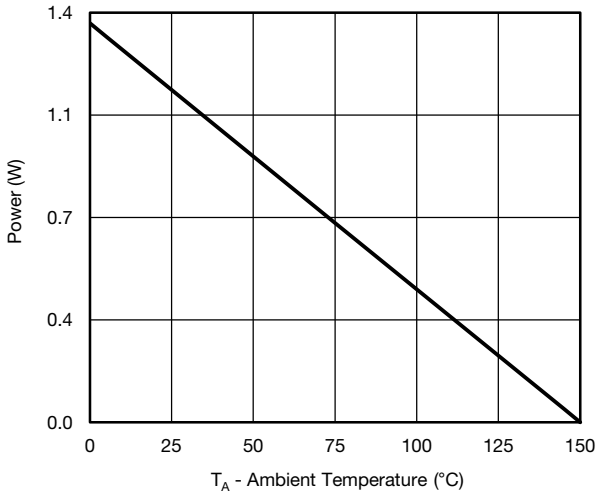
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating*



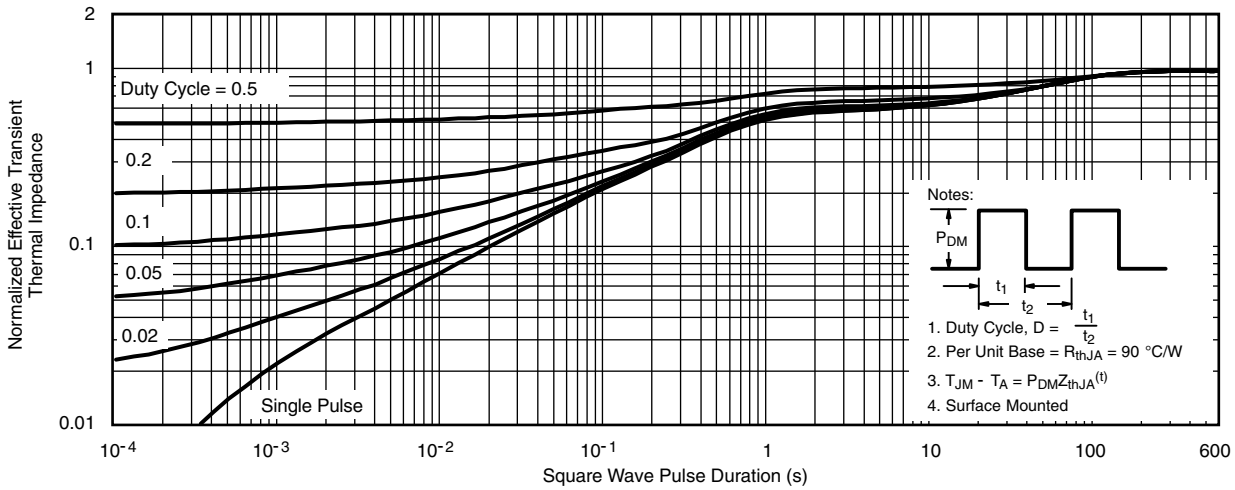
Power, Junction-to-Foot



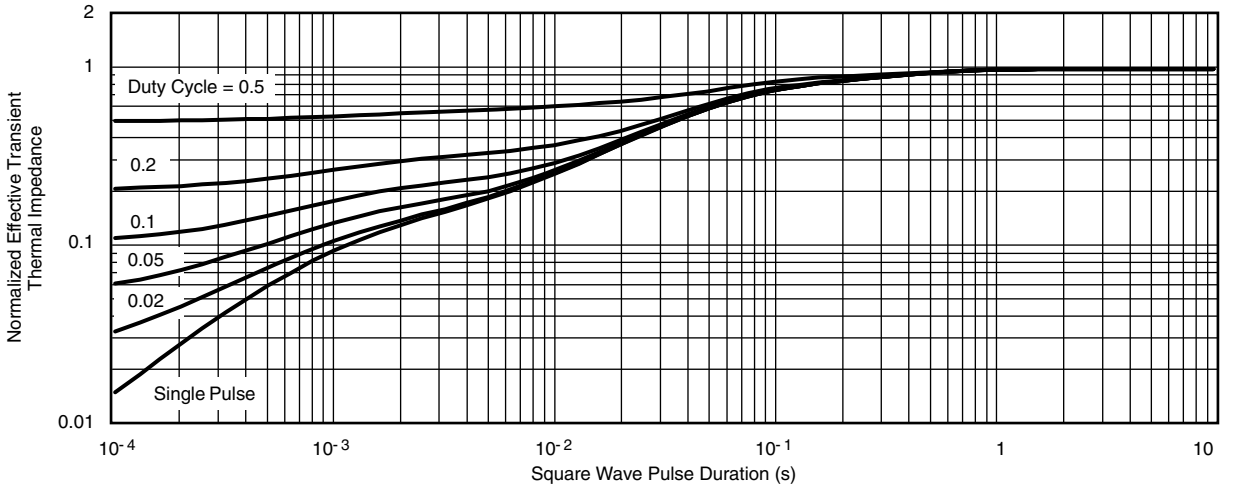
Power Derating, Junction-to-Ambient

* The power dissipation P_D is based on $T_{J(max.)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

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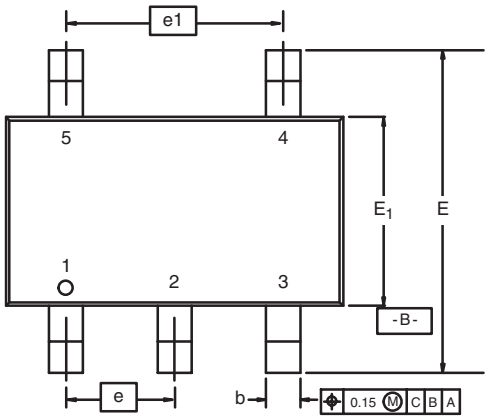
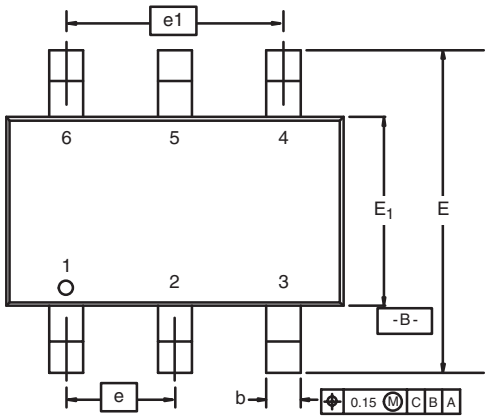
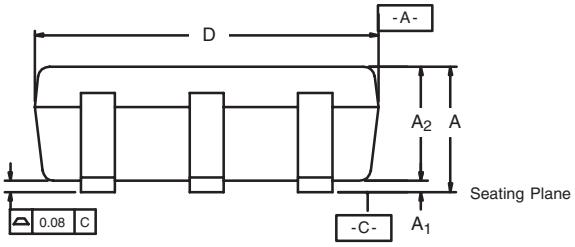
TSOP: 5/6–LEAD
JEDEC Part Number: MO-193C

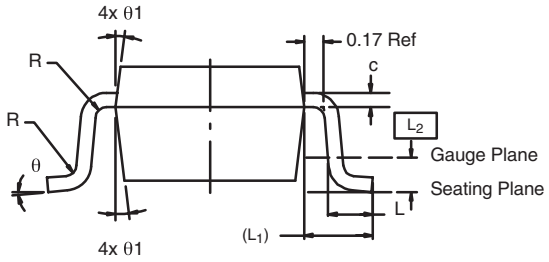


5-LEAD TSOP



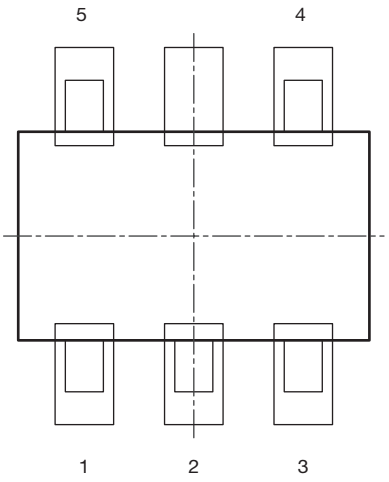
6-LEAD TSOP



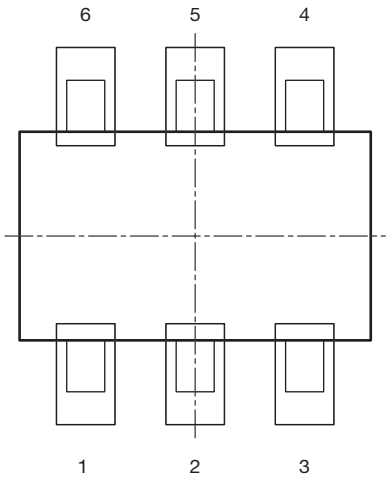


Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	0.91	-	1.10	0.036	-	0.043
A_1	0.01	-	0.10	0.0004	-	0.004
A_2	0.90	-	1.00	0.035	0.038	0.039
b	0.30	0.32	0.45	0.012	0.013	0.018
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.95	3.05	3.10	0.116	0.120	0.122
E	2.70	2.85	2.98	0.106	0.112	0.117
E_1	1.55	1.65	1.70	0.061	0.065	0.067
e	0.95 BSC			0.0374 BSC		
e_1	1.80	1.90	2.00	0.071	0.075	0.079
L	0.32	-	0.50	0.012	-	0.020
L_1	0.60 Ref			0.024 Ref		
L_2	0.25 BSC			0.010 BSC		
R	0.10	-	-	0.004	-	-
θ	0°	4°	8°	0°	4°	8°
θ_1	7° Nom			7° Nom		
ECN: C-06593-Rev. I, 18-Dec-06 DWG: 5540						

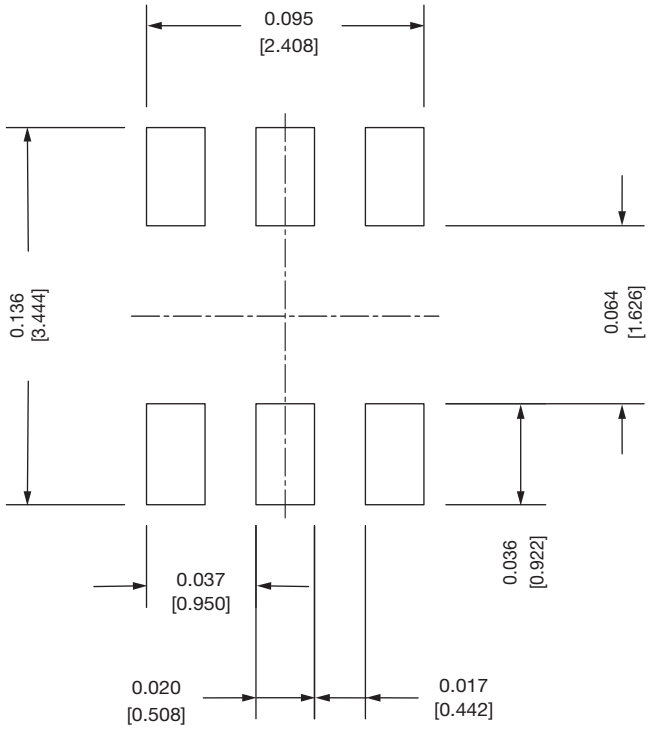
Recommended Land Pattern For TSOP-5L / TSOP-6L



TSOP 5L



TSOP 6L



Note

- All dimensions are in inches (millimeter)

ECN: C22-0860-Rev. B, 24-Oct-2022 DWG: 3010

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