

P-Channel 30 V (D-S) MOSFET

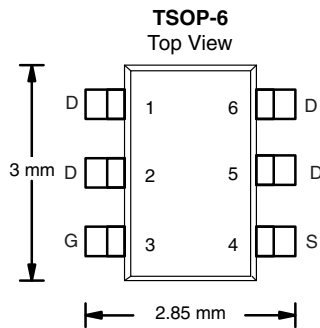
PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω) Max.	I _D (A) ^{d,e}	Q _g (Typ.)
-30	0.0192 at V _{GS} = -10 V	-8	21 nC
	0.0232 at V _{GS} = -6 V	-8	
	0.0270 at V _{GS} = -4.5 V	-8	

FEATURES

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



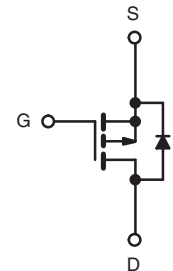
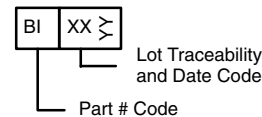
RoHS
COMPLIANT
HALOGEN
FREE
Available



APPLICATIONS

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

Marking Code



P-Channel MOSFET

Ordering Information:

Si3421DV-T1-GE3 (Lead (Pb)-free and Halogen-free)

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)	I _D	T _C = 25 °C	-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	I _S	T _C = 25 °C	-3.5	
		T _A = 25 °C	-1.7 ^{a, b}	
Avalanche Current	I _{AS}	-15		
Single-Pulse Avalanche Energy	E _{AS}	11.25	mJ	
Maximum Power Dissipation	P _D	T _C = 25 °C	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:

- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- Maximum under steady state conditions is 110 °C/W.
- Based on T_C = 25 °C.
- Package limited.

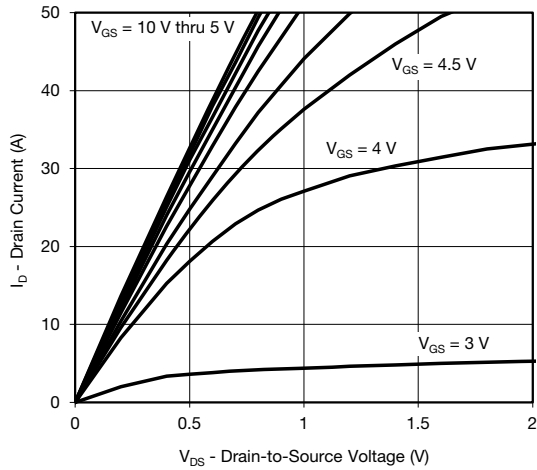
SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = -250\text{ }\mu\text{A}$	-30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D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

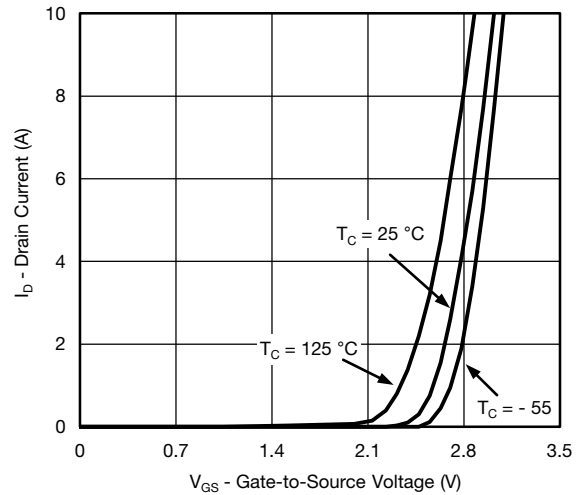
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.

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.

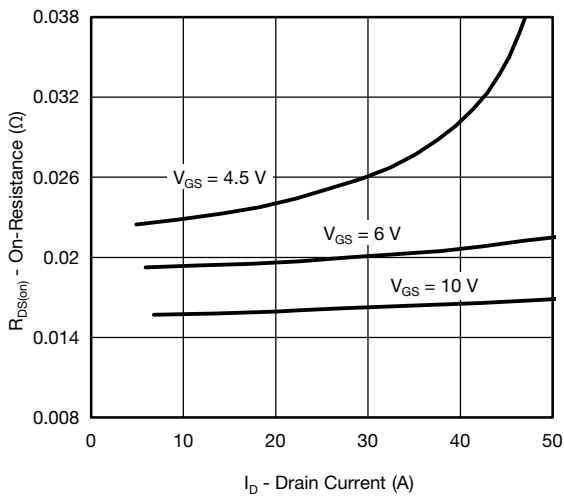
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



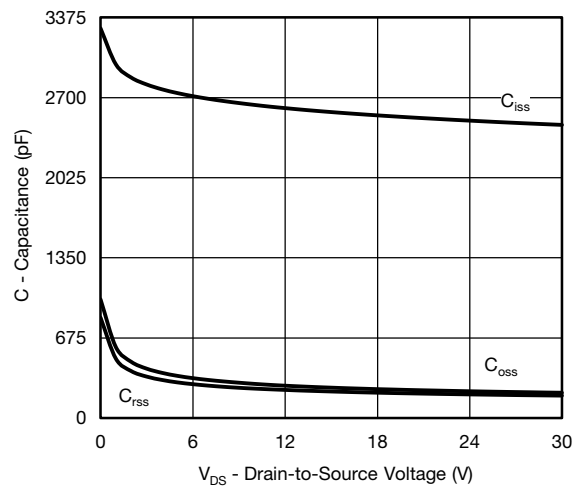
Output Characteristics



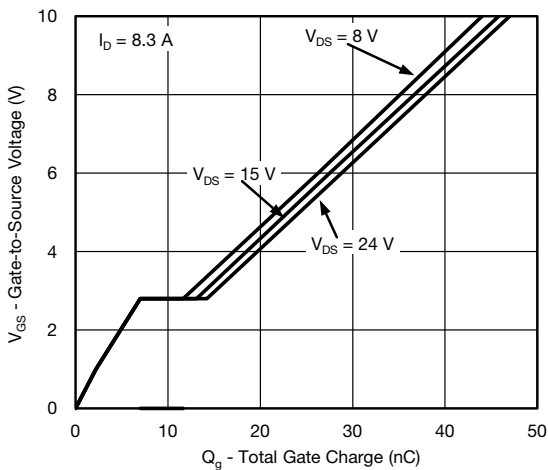
Transfer Characteristics



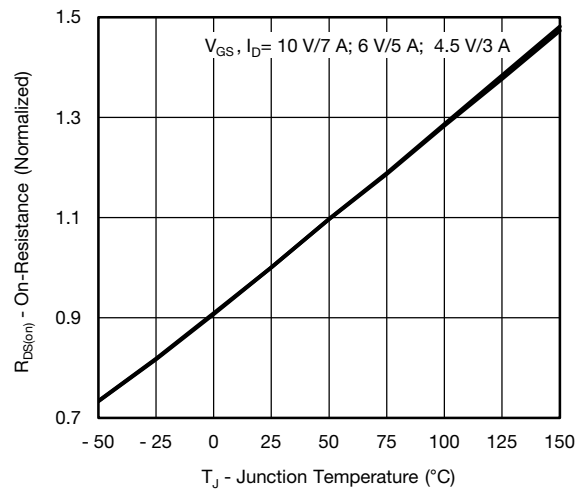
On-Resistance vs. Drain Current



Capacitance

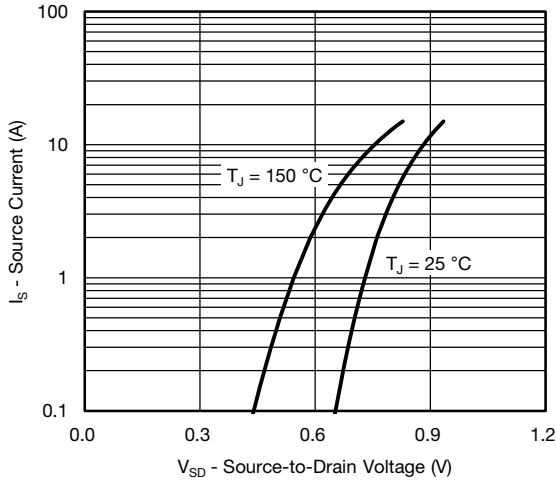


Gate Charge

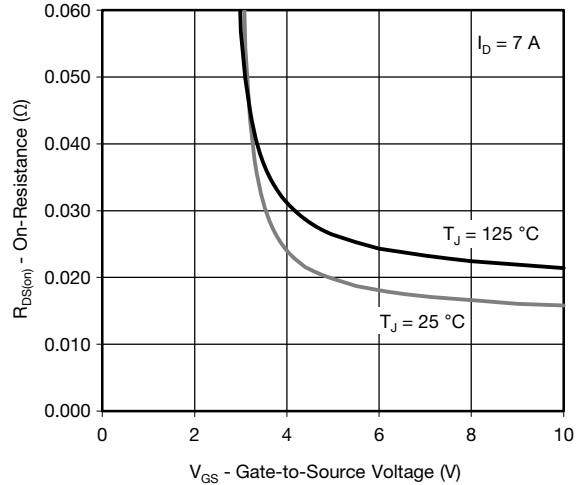


On-Resistance vs. Junction Temperature

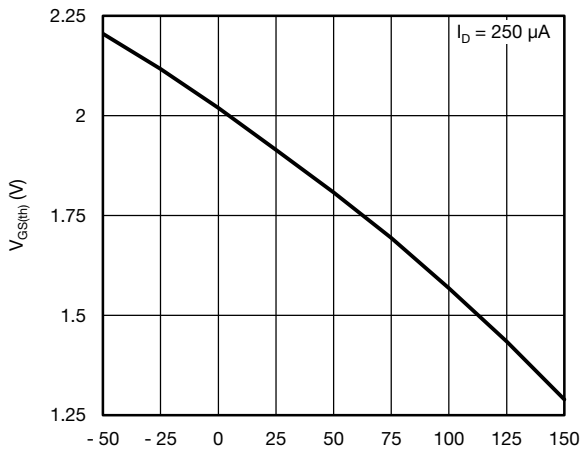
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



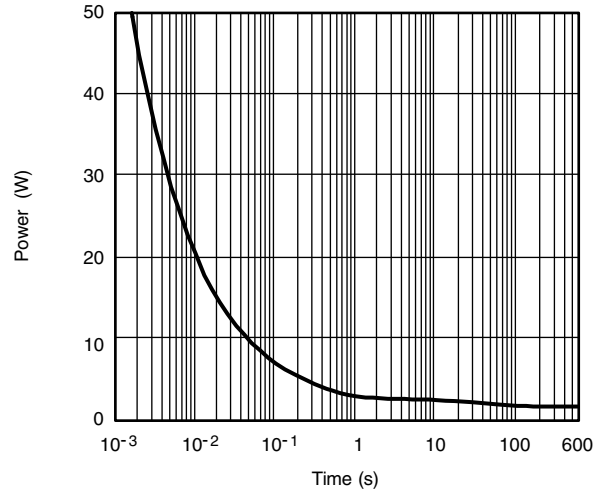
Source-Drain Diode Forward Voltage



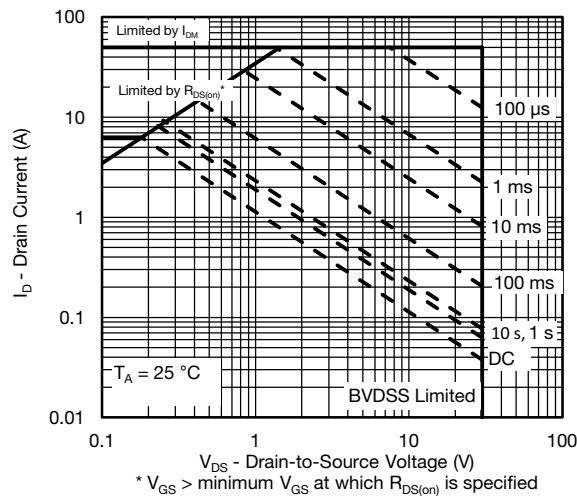
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

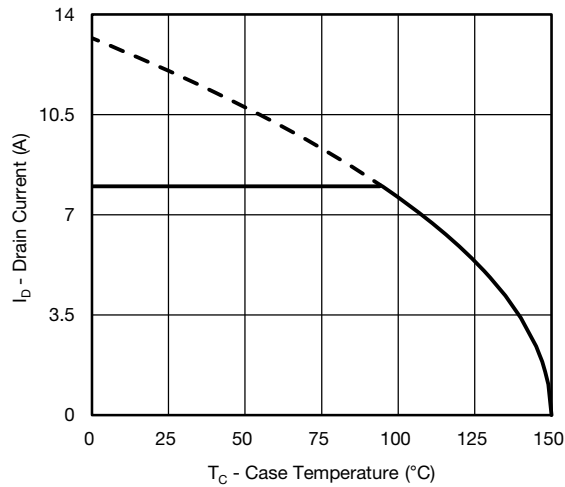


Single Pulse Power, Junction-to-Ambient

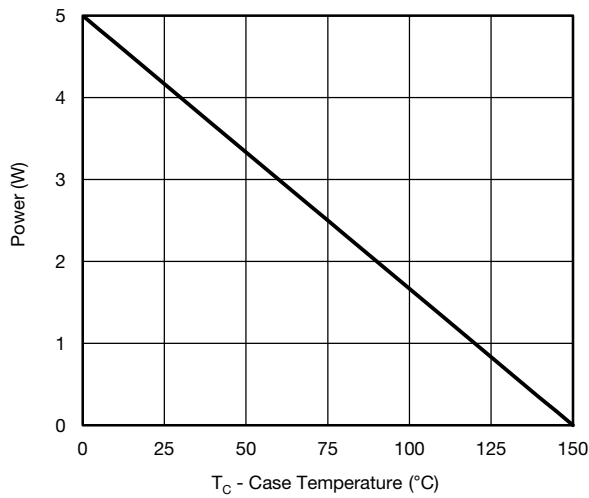


Safe Operating Area

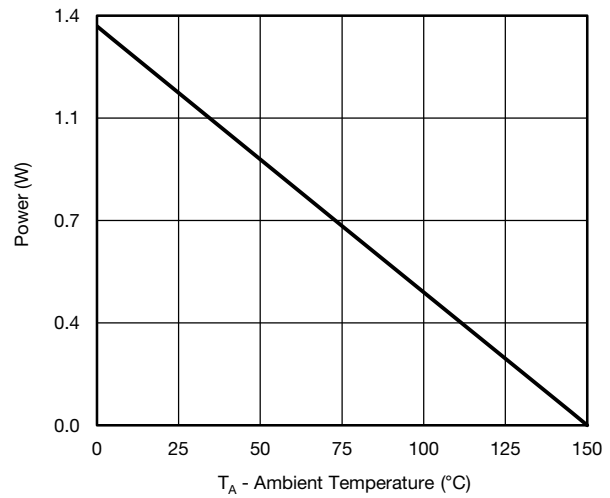
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating*



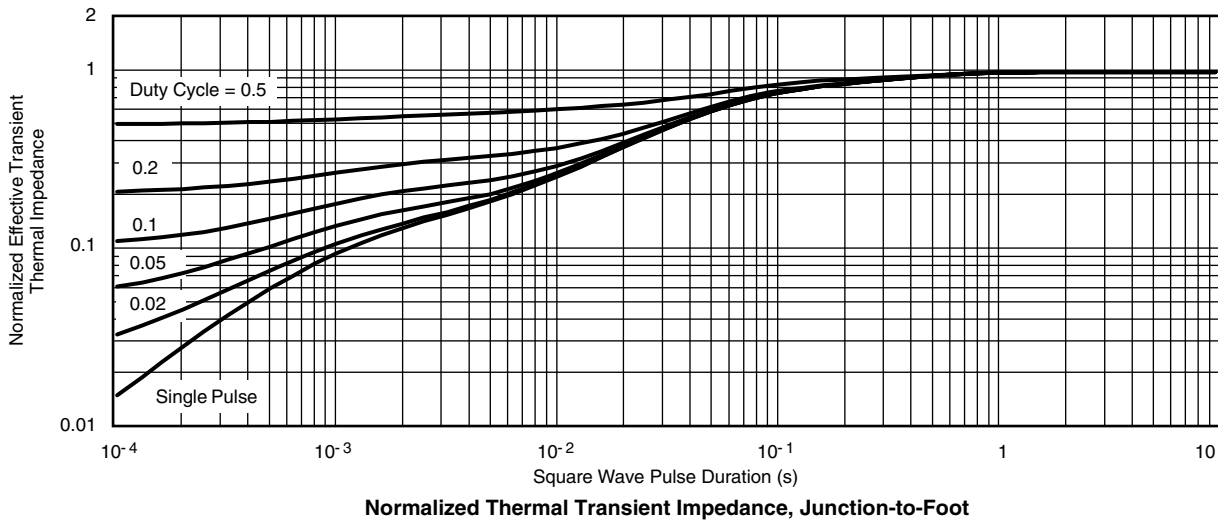
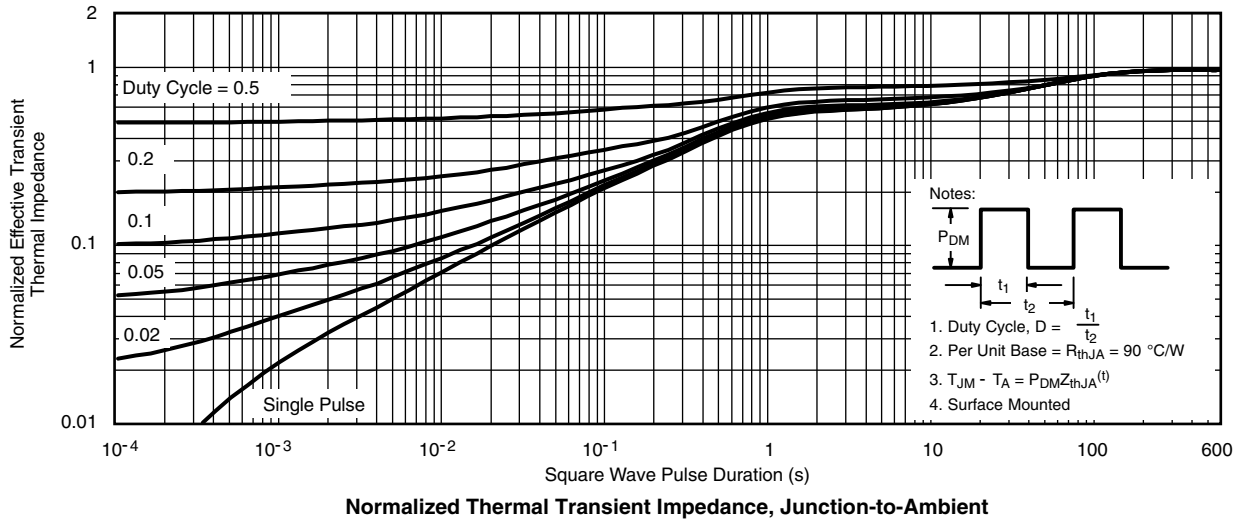
Power, Junction-to-Foot



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)



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TSOP: 5/6-LEAD

JEDEC Part Number: MO-193C



5-LEAD TSOP

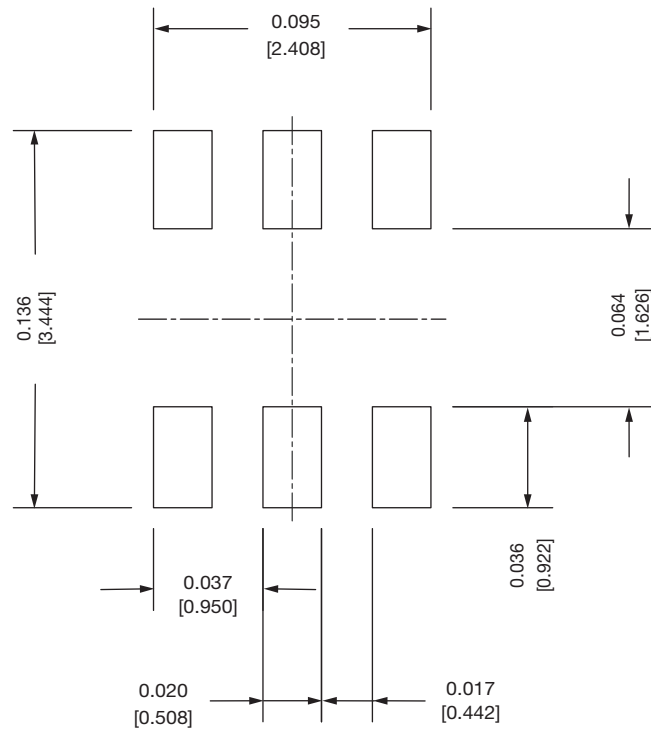
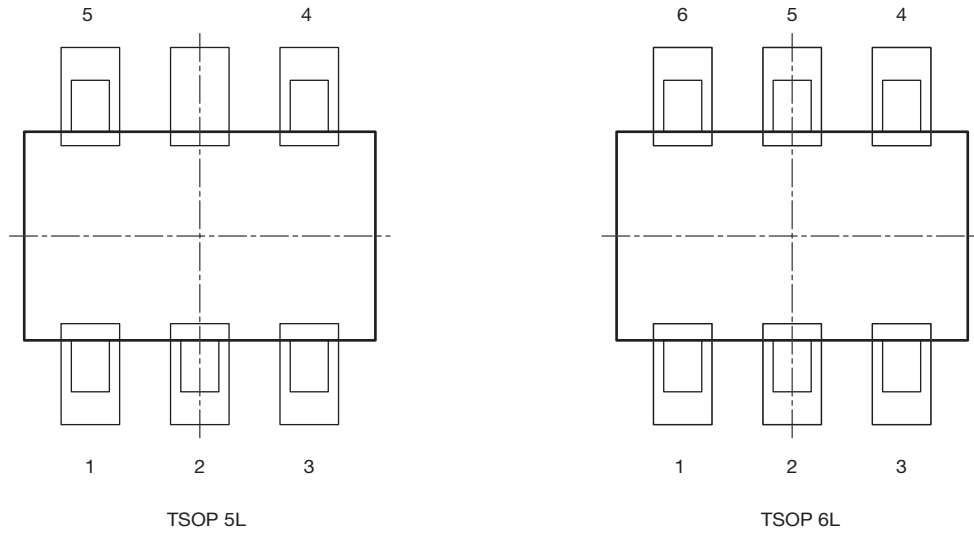


6-LEAD TSOP



Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	0.91	-	1.10	0.036	-	0.043
A₁	0.01	-	0.10	0.0004	-	0.004
A₂	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
E₁	1.55	1.65	1.70	0.061	0.065	0.067
e	0.95 BSC			0.0374 BSC		
e₁	1.80	1.90	2.00	0.071	0.075	0.079
L	0.32	-	0.50	0.012	-	0.020
L₁	0.60 Ref			0.024 Ref		
L₂	0.25 BSC			0.010 BSC		
R	0.10	-	-	0.004	-	-
θ	0°	4°	8°	0°	4°	8°
θ₁	7° Nom			7° Nom		
ECN: C-06593-Rev. I, 18-Dec-06						
DWG: 5540						

Recommended Land Pattern For 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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