

P-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY

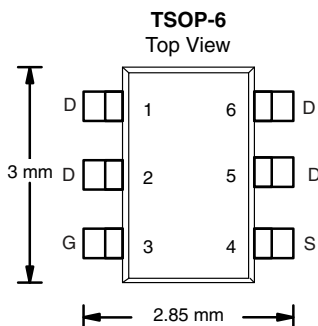
V_{DS} (V)	$R_{DS(on)}$ (Ω) Max.	I_D (A) ^{d,e}	Q_g (Typ.)
-30	0.0192 at $V_{GS} = -10$ V	-8	21 nC
	0.0232 at $V_{GS} = -6$ V	-8	
	0.0270 at $V_{GS} = -4.5$ V	-8	

FEATURES

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



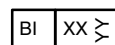
RoHS
COMPLIANT
HALOGEN
FREE
Available



APPLICATIONS

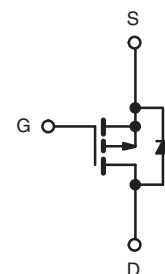
- Load Switches
- Adaptor Switch
- DC/DC Converter
- For Mobile Computing/Consumer

Marking Code



Lot Traceability
and Date Code

Part # 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	A
		$T_C = 70$ °C	
		$T_A = 25$ °C	
		$T_A = 70$ °C	
Pulsed Drain Current ($t = 100$ μ s)	I_{DM}	-50	A
Continuous Source-Drain Diode Current	I_S	$T_C = 25$ °C	
		$T_A = 25$ °C	
Avalanche Current	I_{AS}	-15	mJ
Single-Pulse Avalanche Energy	E_{AS}	11.25	
Maximum Power Dissipation	P_D	$T_C = 25$ °C	W
		$T_C = 70$ °C	
		$T_A = 25$ °C	
		$T_A = 70$ °C	
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}	R_{thJA}	40	62.5	°C/W
Maximum Junction-to-Foot	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 °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	ΔV _{DS} /T _J	I _D = -250 μA		-18		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{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} ≥ -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 ≡ -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 ≡ -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		

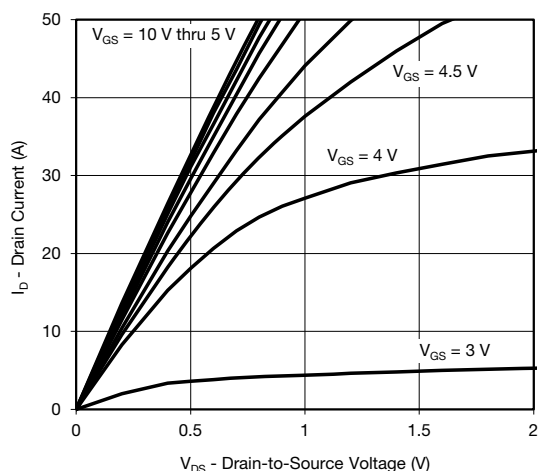
Notes:

a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

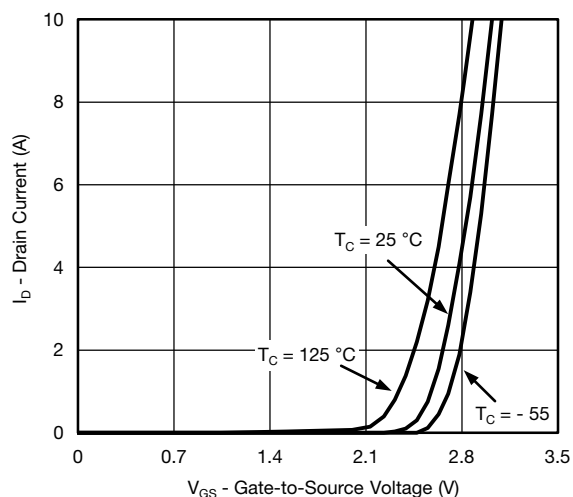
b. Guaranteed by design, not subject to production testing.

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.

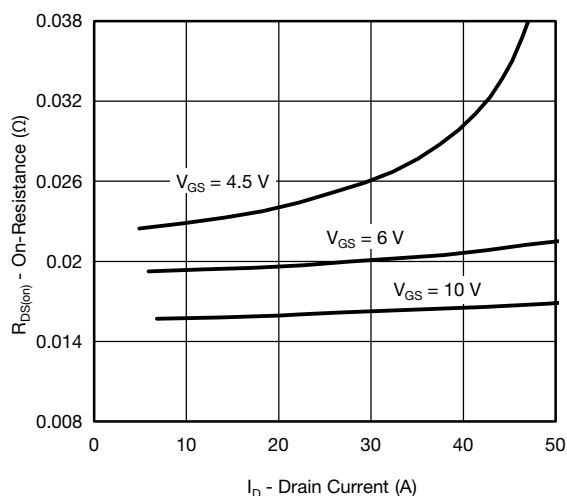
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



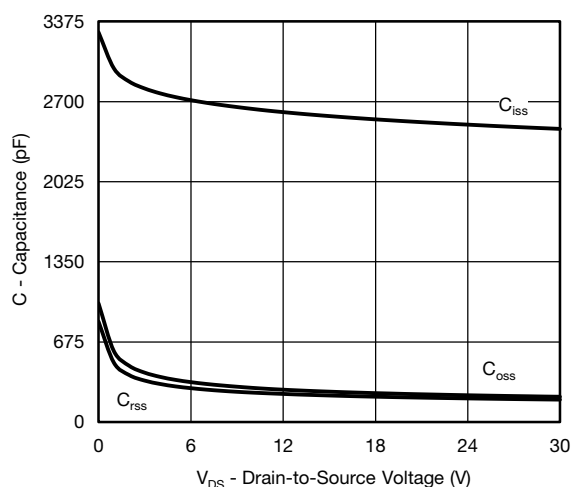
Output Characteristics



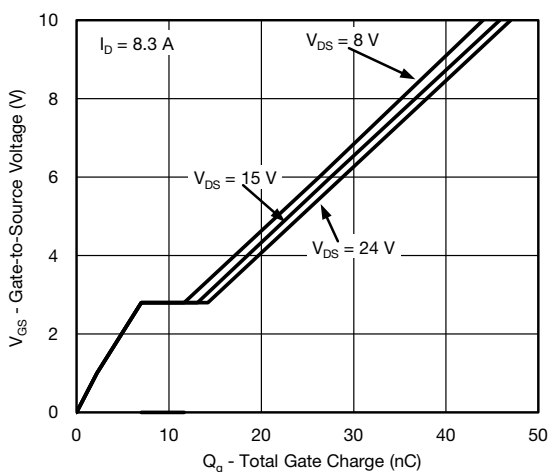
Transfer Characteristics



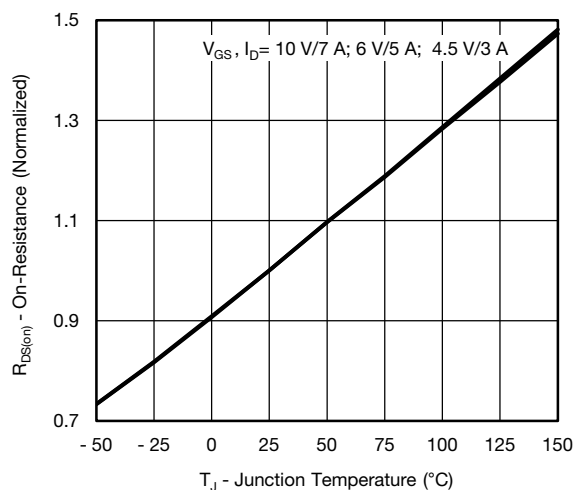
On-Resistance vs. Drain Current



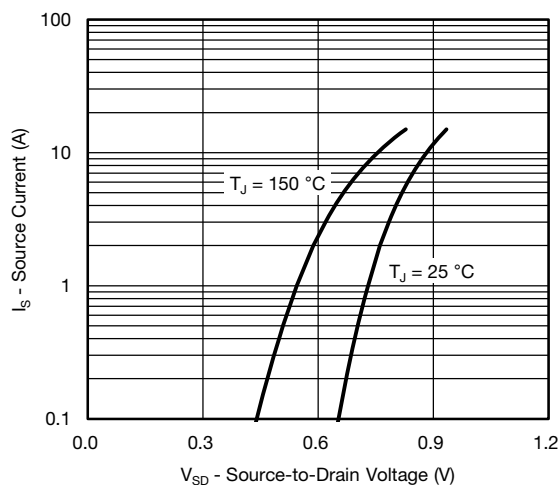
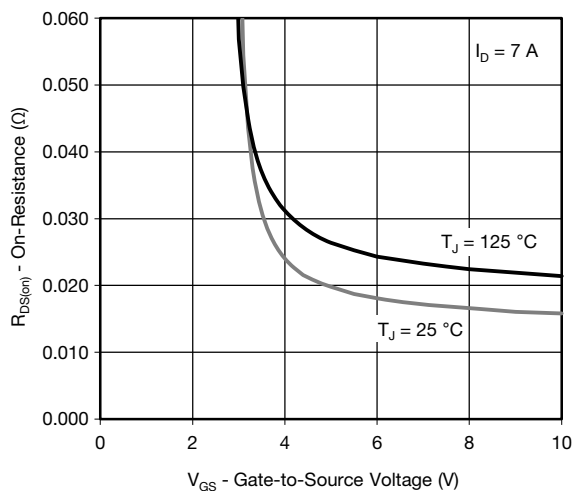
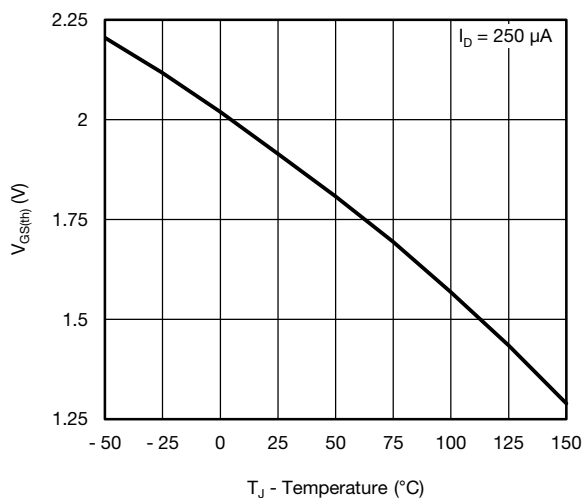
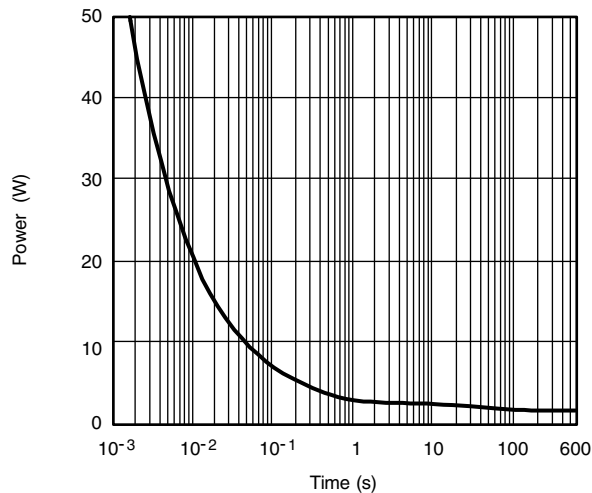
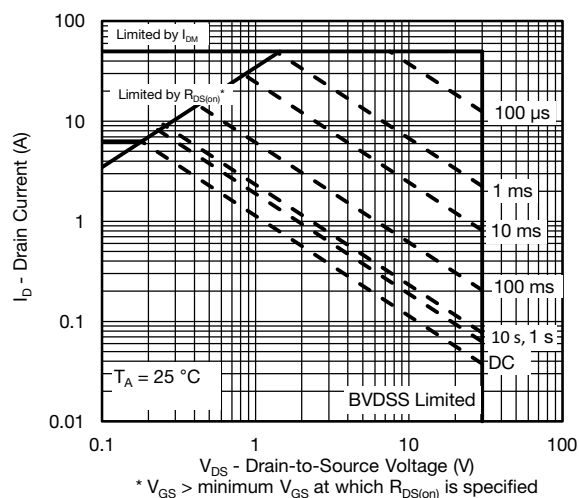
Capacitance



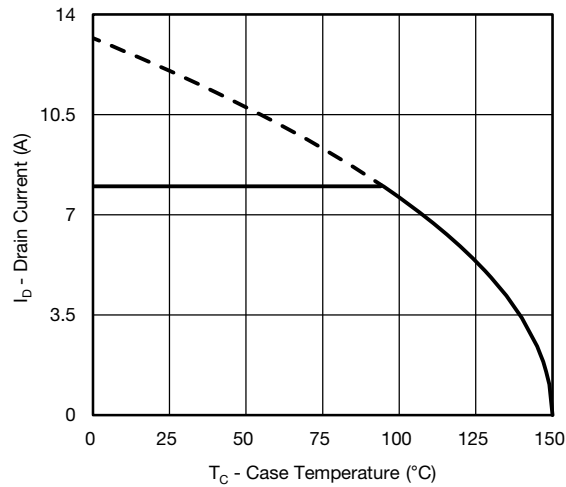
Gate Charge



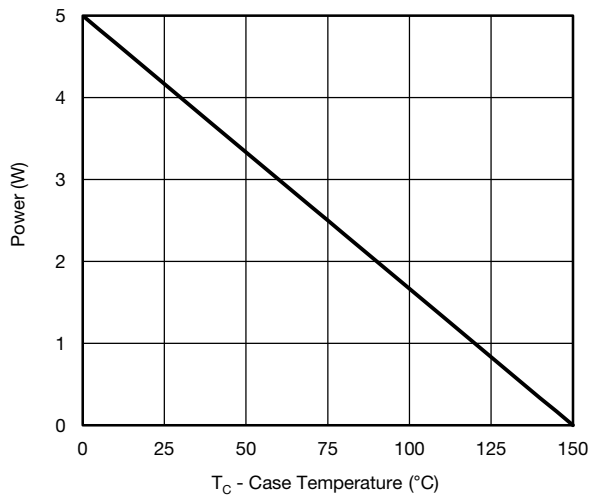
On-Resistance vs. Junction Temperature

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**

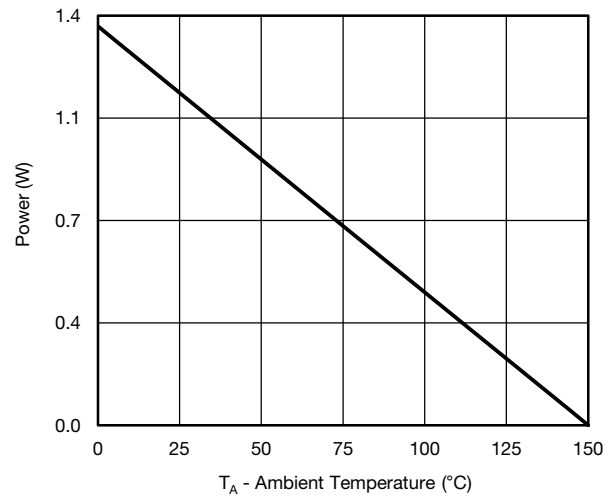
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating*

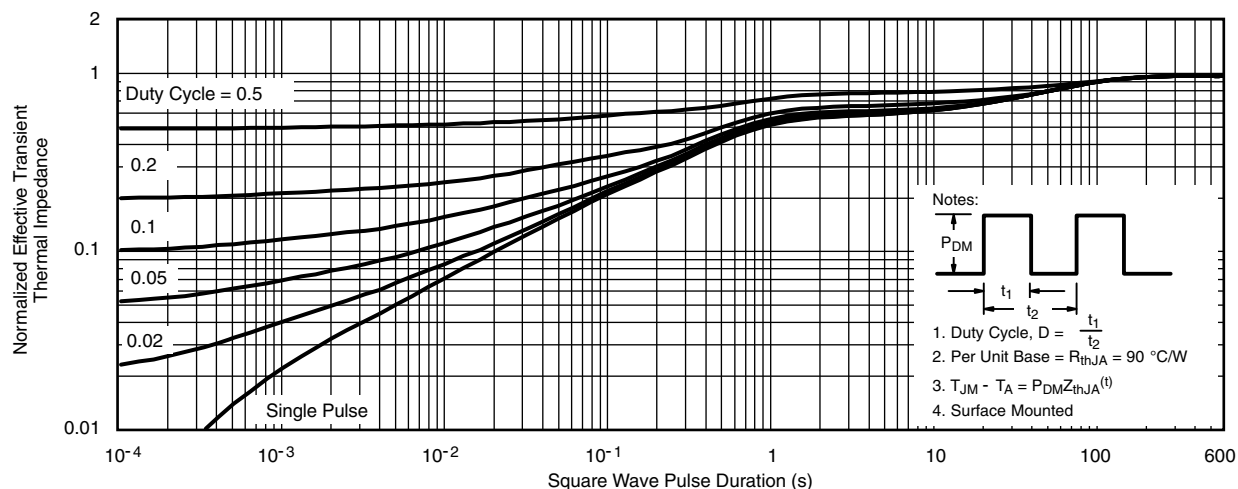
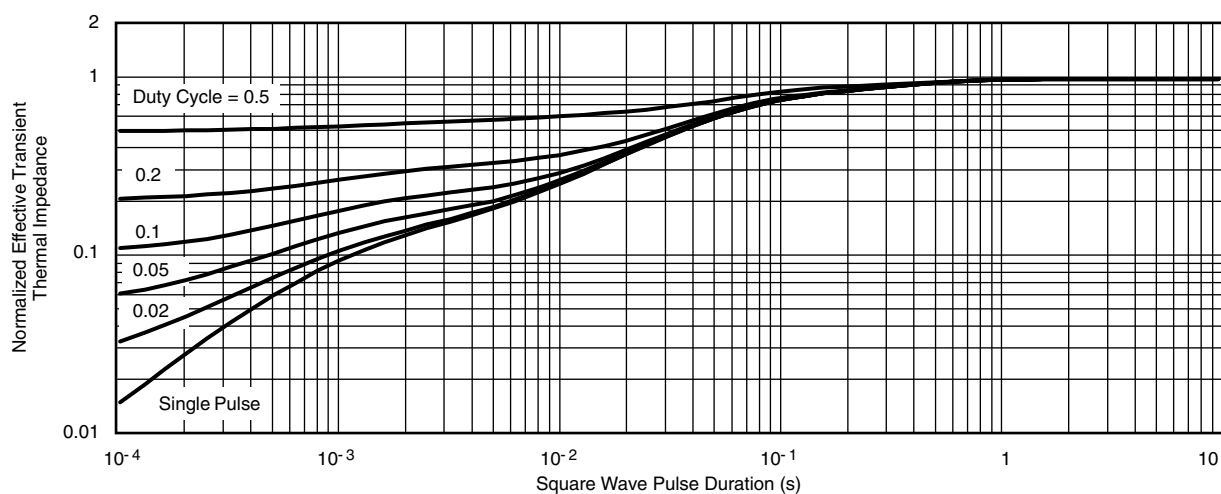


Power Derating, Junction-to-Case



Power Derating, Junction-to-Ambient

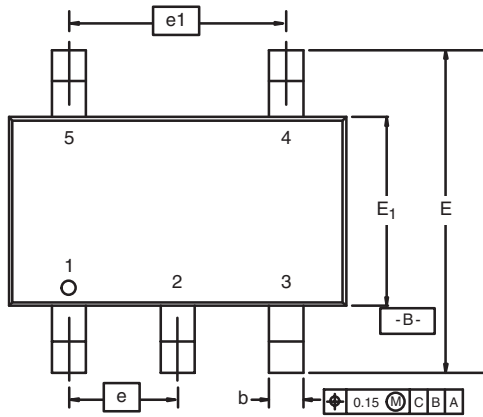
* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)**Normalized Thermal Transient Impedance, Junction-to-Ambient****Normalized Thermal Transient Impedance, Junction-to-Foot**

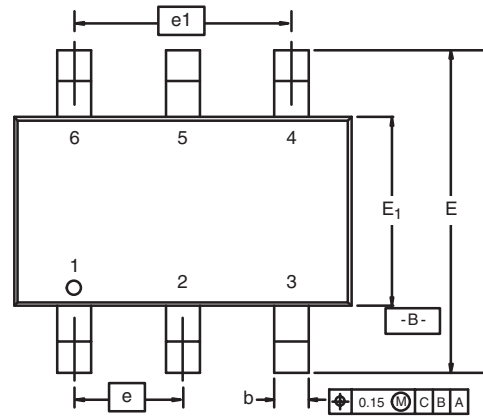
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TSOP: 5/6-LEAD

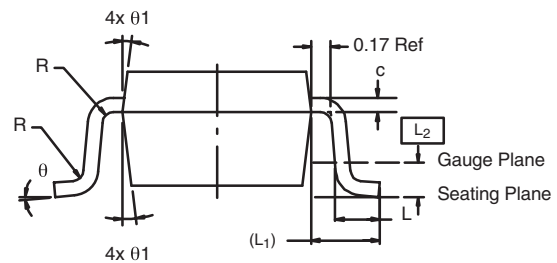
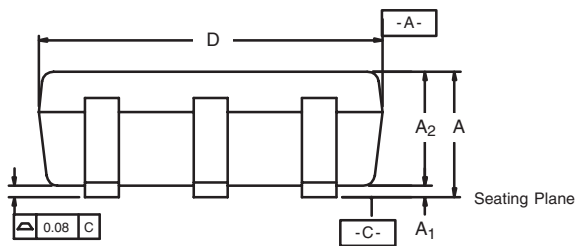
JEDEC Part Number: MO-193C



5-LEAD TSOP

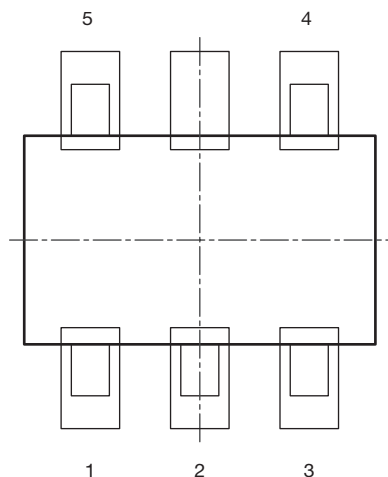


6-LEAD TSOP

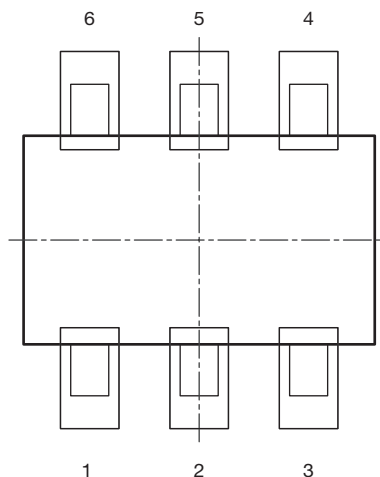


Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	0.91	-	1.10	0.036	-	0.043
A ₁	0.01	-	0.10	0.0004	-	0.004
A ₂	0.90	-	1.00	0.035	0.038	0.039
b	0.30	0.32	0.45	0.012	0.013	0.018
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.95	3.05	3.10	0.116	0.120	0.122
E	2.70	2.85	2.98	0.106	0.112	0.117
E ₁	1.55	1.65	1.70	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						

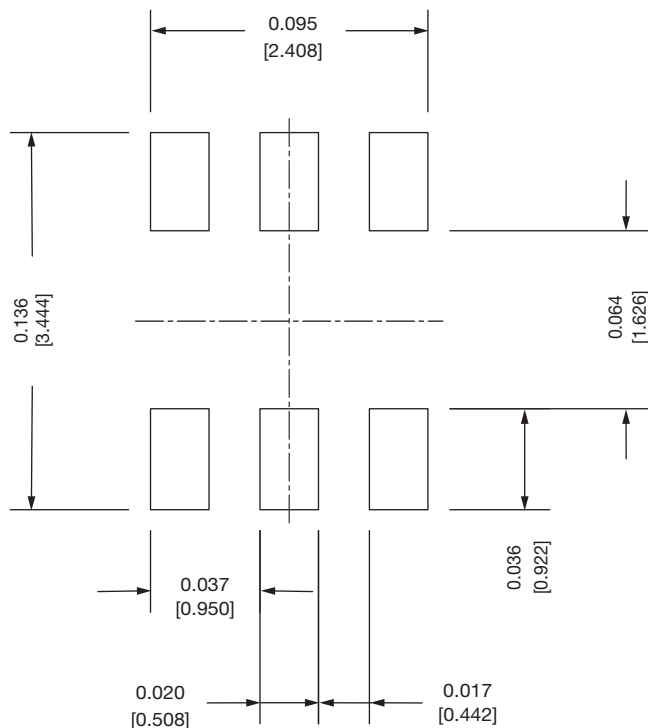
Recommended Land Pattern For TSOP-5L / TSOP-6L



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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