

P-Channel 20 V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^a	Q _g (Typ.)
- 20	0.060 at V _{GS} = - 4.5 V	- 4.7	7.53 nC
	0.084 at V _{GS} = - 2.7 V	- 3.9	
	0.100 at V _{GS} = - 2.5 V	- 3.4	

FEATURES

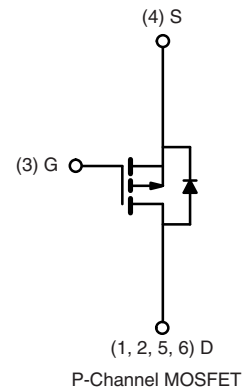
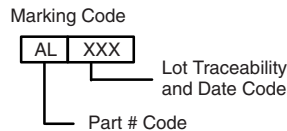
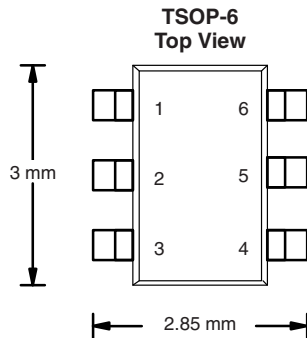
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET[®] Power MOSFET
- PWM Optimized
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

- HDD
- Asynchronous Rectification
- Load Switch for Portable Devices



Ordering Information: Si3443CDV-T1-E3 (Lead (Pb)-free)
Si3443CDV-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}	- 20	V	
Gate-Source Voltage	V _{GS}	± 12	V	
Continuous Drain Current (T _J = 150 °C)	I _D	T _C = 25 °C	- 5.97	A
		T _C = 70 °C	- 4.6	
		T _A = 25 °C	- 4.7 ^{b, c}	
		T _A = 70 °C	- 3.4 ^{b, c}	
Pulsed Drain Current	I _{DM}	- 20	A	
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	- 2.67	A
		T _A = 25 °C	- 1.71 ^{b, c}	
Maximum Power Dissipation	P _D	T _C = 25 °C	3.2	W
		T _C = 70 °C	2.05	
		T _A = 25 °C	2 ^{b, c}	
		T _A = 70 °C	1.28 ^{b, 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 ^{b, d}	R _{thJA}	51	62.5	°C/W	
Maximum Junction-to-Foot (Drain)	R _{thJF}	32	39	°C/W	

Notes:

- Based on T_C = 25 °C.
- Surface mounted on 1" x 1" FR4 board.
- t = 5 s.
- Maximum under steady state conditions is 110 °C/W.

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}	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-20			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		-18.8		mV/ $^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			3.25		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-0.6		-1.5	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 12\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			-10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq -5\text{ V}, V_{GS} = -4.5\text{ V}$	-20			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -4.7\text{ A}$		0.0500	0.0600	Ω
		$V_{GS} = -2.7\text{ V}, I_D = -3.9\text{ A}$		0.0692	0.0840	
		$V_{GS} = -2.5\text{ V}, I_D = -3.4\text{ A}$		0.0830	0.1000	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -10\text{ V}, I_D = -4.7\text{ A}$		15		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = -10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		610		pF
Output Capacitance	C_{oss}			132		
Reverse Transfer Capacitance	C_{rss}			105		
Total Gate Charge	Q_g	$V_{DS} = -10\text{ V}, V_{GS} = -5\text{ V}, I_D = -4.7\text{ A}$		8.26	12.4	nC
				7.53	11.3	
Gate-Source Charge	Q_{gs}	$V_{DS} = -10\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -4.7\text{ A}$		1.53		
Gate-Drain Charge	Q_{gd}			2.37		
Gate Resistance	R_g	$f = 1\text{ MHz}$	1.7	8.5	12.75	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -10\text{ V}, R_L = 2.12\text{ }\Omega$ $I_D \cong -4.7\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 1\text{ }\Omega$		27	41	ns
Rise Time	t_r			59	88.5	
Turn-Off Delay Time	$t_{d(off)}$			30	45	
Fall Time	t_f			11	16.5	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			-2.67	A
Pulse Diode Forward Current ^a	I_{SM}				-20	
Body Diode Voltage	V_{SD}	$I_S = -1.7\text{ A}$		-0.8	-1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -1.7\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		20	30	ns
Body Diode Reverse Recovery Charge	Q_{rr}			9	13.5	nC
Reverse Recovery Fall Time	t_a			15		ns
Reverse Recovery Rise Time	t_b			5.1		

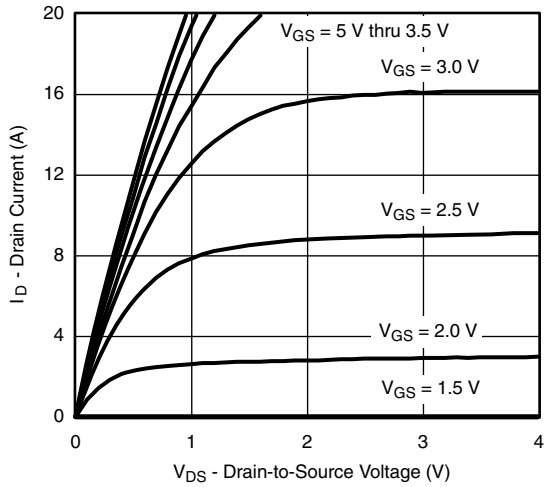
Notes:

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

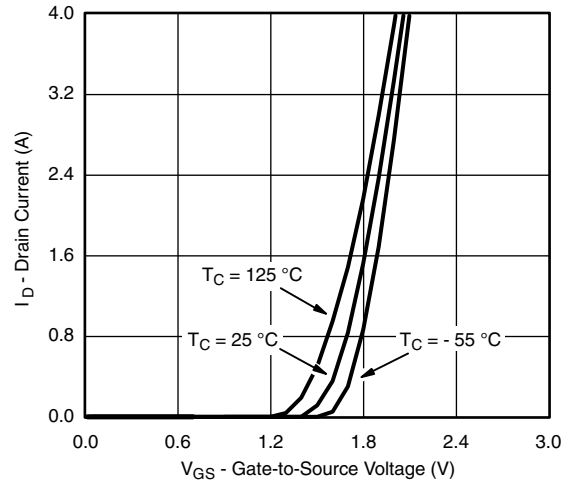
b. Guaranteed by design, not subject to production testing.

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.

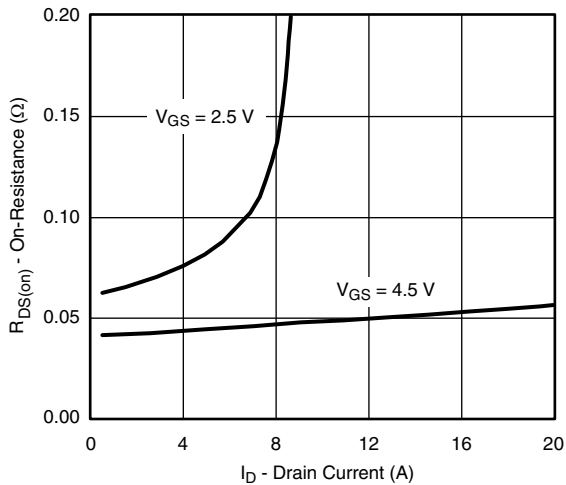
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



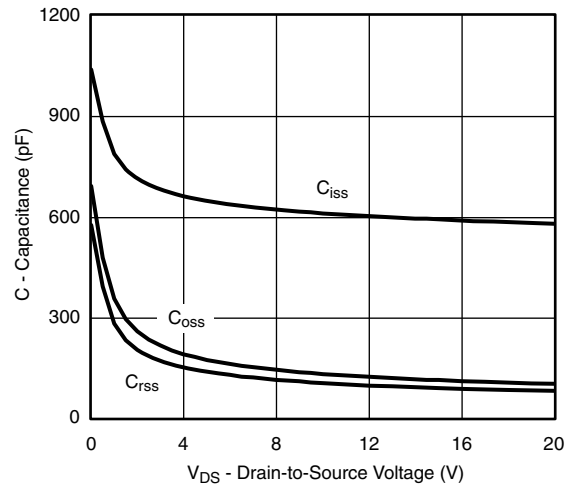
Output Characteristics



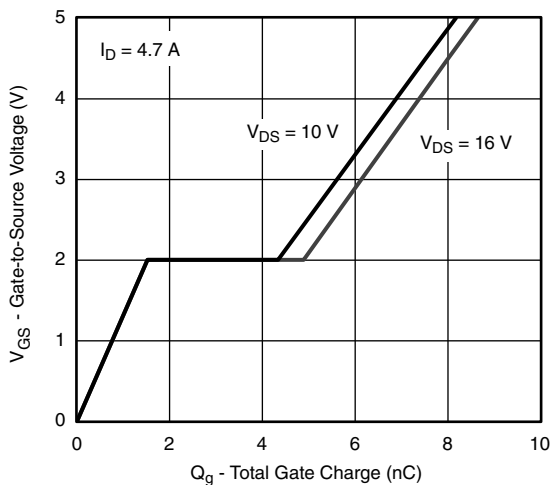
Transfer Characteristics



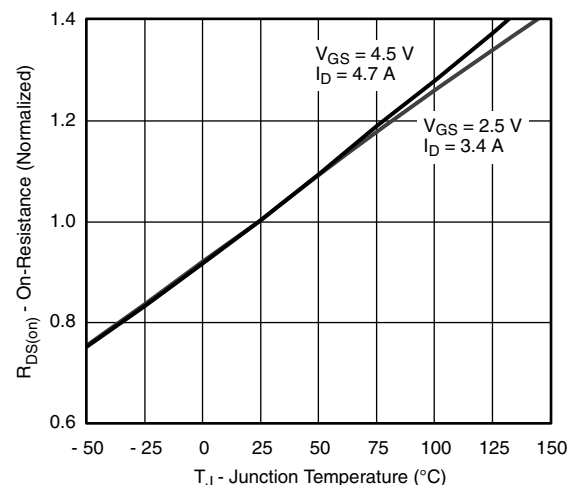
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

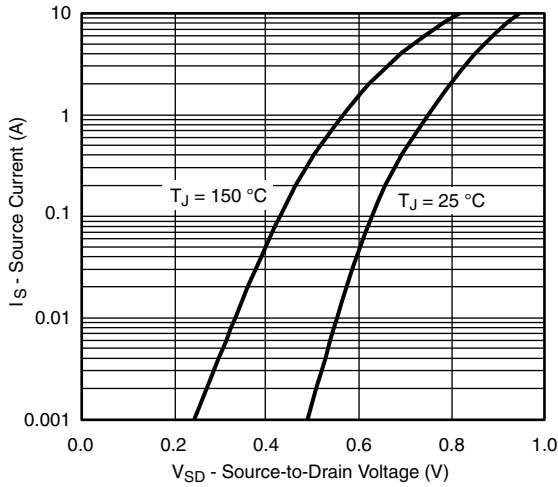


Gate Charge

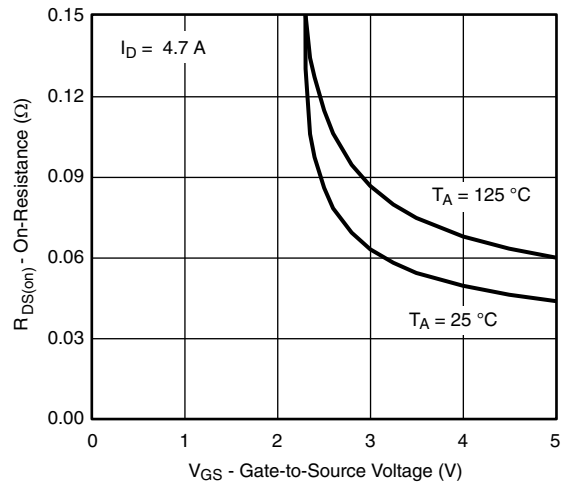


On-Resistance vs. Junction Temperature

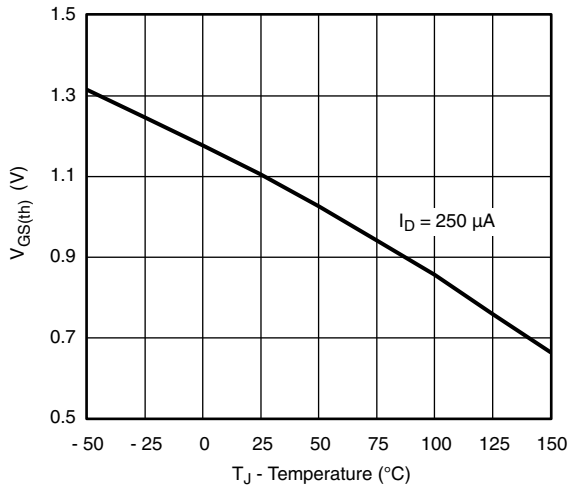
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



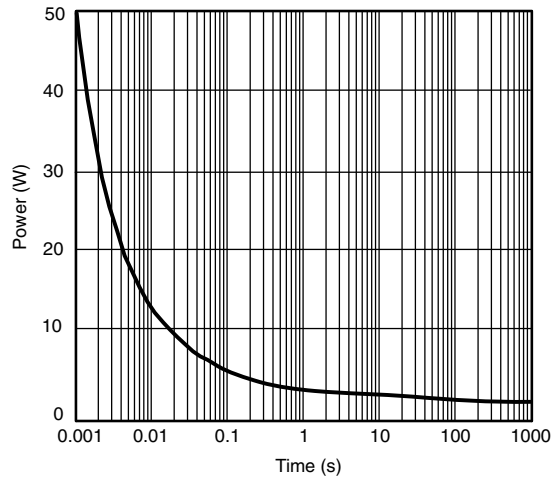
Source-Drain Diode Forward Voltage



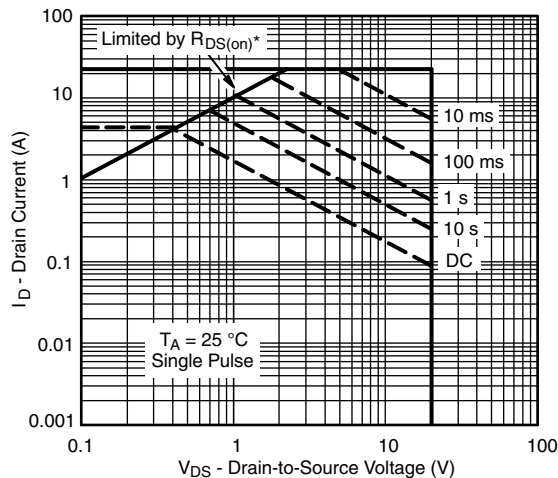
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

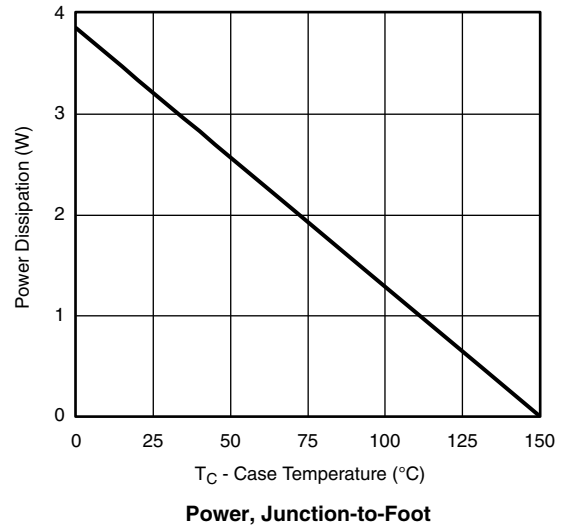
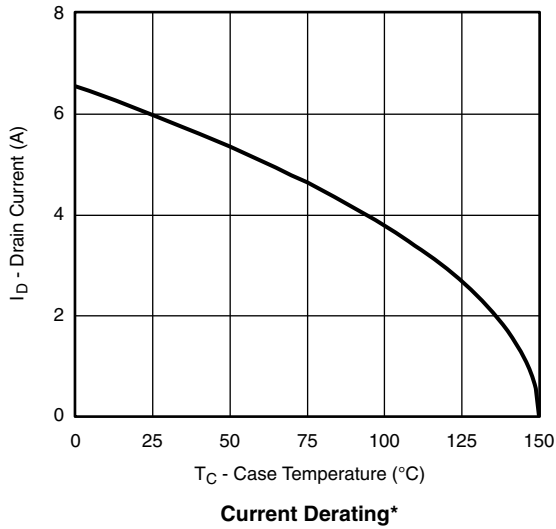


Single Pulse Power, Junction-to-Ambient



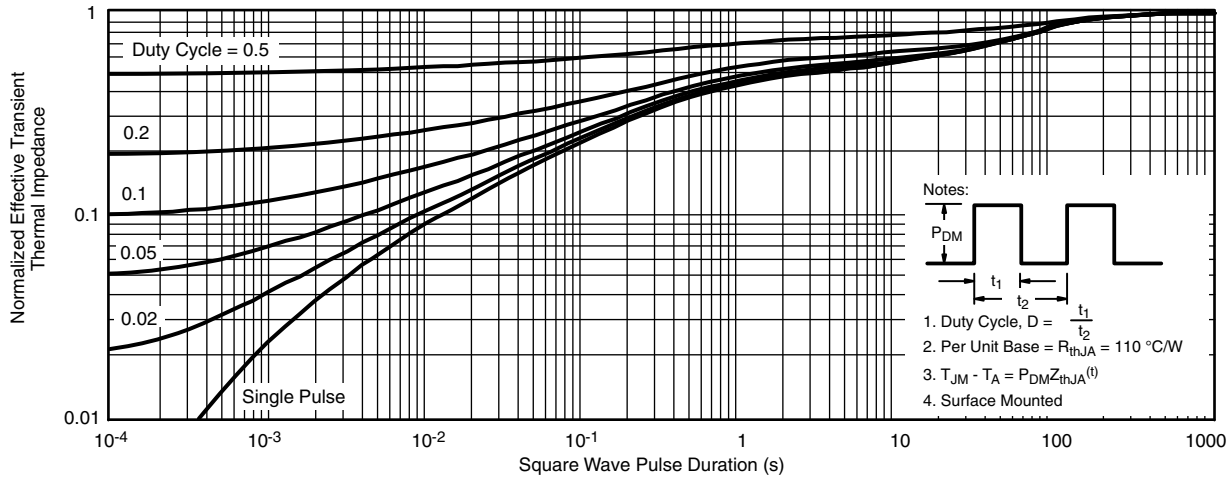
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified
Safe Operating Area

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

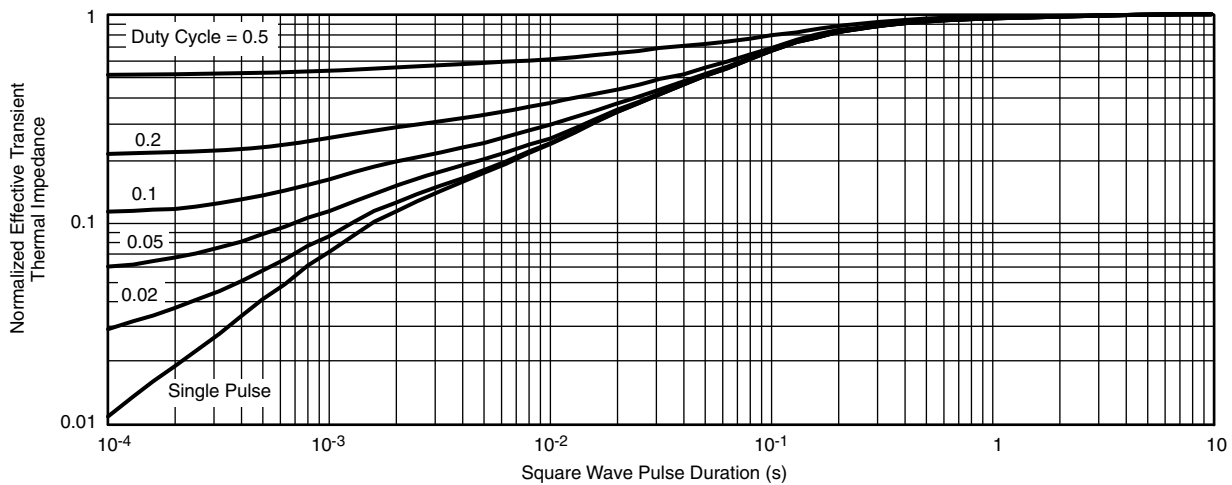


* The power dissipation P_D is based on $T_{J(max.)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

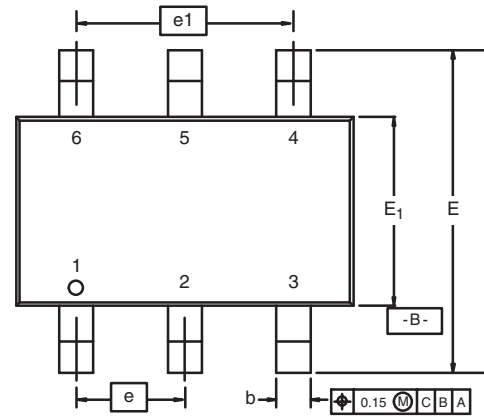
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TSOP: 5/6-LEAD

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
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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