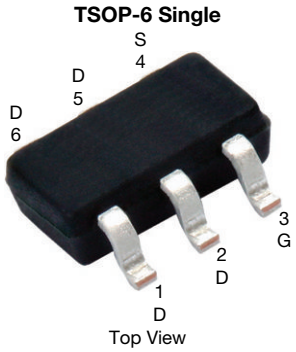
Automotive P-Channel 60 V (D-S) 175 °C MOSFET



FEATURES

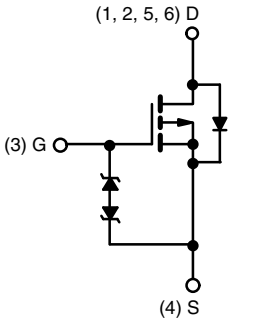
- TrenchFET® power MOSFET
- AEC-Q101 qualified
- 100 % R_g and UIS tested
- Typical ESD protection 800 V
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE

Pb-free

RoHS COMPLIANT

HALOGEN FREE



P-Channel MOSFET

PRODUCT SUMMARY	
V_{DS} (V)	-60
$R_{DS(on)}$ (Ω) at V_{GS} = -10 V	0.095
$R_{DS(on)}$ (Ω) at V_{GS} = -4.5 V	0.135
I_D (A)	-5.3
Configuration	Single
Package	TSOP-6

Marking Code: 9K

ORDERING INFORMATION	
Package	TSOP-6
Lead (Pb)-free and halogen-free	SQ3427CEEV (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}	-60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current	T_C = 25 °C	I_D	-5.3	A
	T_C = 125 °C		-3	
Continuous Source Current (Diode Conduction)		I_S	-6.3	
Pulsed Drain Current [a]		I_{DM}	-21	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	-21	
Single Pulse Avalanche Energy		E_{AS}	22	mJ
Maximum Power Dissipation	T_C = 25 °C	P_D	5	W
	T_C = 125 °C		1.6	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to +175	°C

THERMAL RESISTANCE RATINGS

PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-Ambient	PCB Mount [b]	R_{thJA}	110	°C/W
Junction-to-Foot (Drain)		R_{thJF}	30	

Notes

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %

b. When mounted on 1" square PCB (FR4 material)

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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		-60	-	-	V
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250 µA		-1.5	-2	-2.5	
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V		-		± 10	mA
		V_{DS} = 0 V, V_{GS} = ± 10 V		-	-	± 2	
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V	V_{DS} = -60 V	-	-	-1	µA
		V_{GS} = 0 V	V_{DS} = -60 V, T_J = 125 °C	-	-	-50	
		V_{GS} = 0 V	V_{DS} = -60 V, T_J = 175 °C	-	-	-150	
On-State Drain Current [a]	$I_{D(on)}$	V_{GS} = -10 V	V_{DS} ≤ -5 V	-10	-	-	A
Drain-Source On-State Resistance [a]	$R_{DS(on)}$	V_{GS} = -10 V	I_D = -4.5 A	-	0.079	0.095	Ω
		V_{GS} = -10 V	I_D = -4.5 A, T_J = 125 °C	-	-	0.148	
		V_{GS} = -10 V	I_D = -4.5 A, T_J = 175 °C	-	-	0.178	
		V_{GS} = -4.5 V	I_D = -3.5 A	-	0.112	0.135	
Forward Transconductance[a]	g_{fs}	V_{DS} = -15 V, I_D = -4 A		-	9	-	S
Dynamic [b]							
Input Capacitance	C_{iss}	V_{GS} = 0 V	V_{DS} = -30 V, f = 1 MHz	-	700	1000	pF
Output Capacitance	C_{oss}			-	90	120	
Reverse Transfer Capacitance	C_{rss}			-	50	75	
Total Gate Charge [c]	Q_g	V_{GS} = -10 V	V_{DS} = -30 V, I_D = -5 A	-	15.3	22	nC
Gate-Source Charge [c]	Q_{gs}			-	2.5	-	
Gate-Drain Charge [c]	Q_{gd}			-	5.4	-	
Gate Resistance	R_g	f = 1 MHz		2.7	5.4	8.1	Ω
Turn-On Delay Time [c]	$t_{d(on)}$	V_{DD} = -30 V, R_L = 6 Ω I_D ≅ -5 A, V_{GEN} = -10 V, R_g = 1 Ω		-	8	12	ns
Rise Time [c]	t_r			-	24	35	
Turn-Off Delay Time [c]	$t_{d(off)}$			-	26	38	
Fall Time [c]	t_f			-	33	50	
Source-Drain Diode Ratings and Characteristics [b]							
Pulsed Current [a]	I_{SM}			-	-	-21	A
Forward Voltage	V_{SD}	I_F = -1.6 A, V_{GS} = 0 V		-	-0.8	-1.2	V
Body diode reverse recovery time	t_{rr}	I_F = -1.7 A, di/dit = 100 A/µs		-	24	48	ns
Body diode reverse recovery charge	Q_{rr}			-	29	58	nC
Reverse recovery fall time	t_a			-	21	-	ns
Reverse recovery rise time	t_b			-	3	-	
Body diode peak reverse recovery current	$I_{RM(REC)}$			-	-2.97	-	A

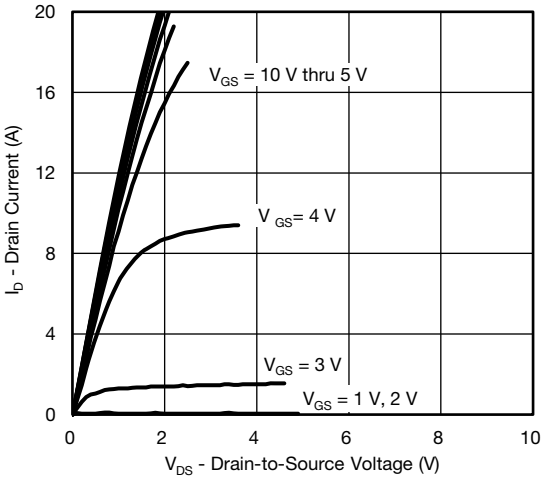
Notes

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

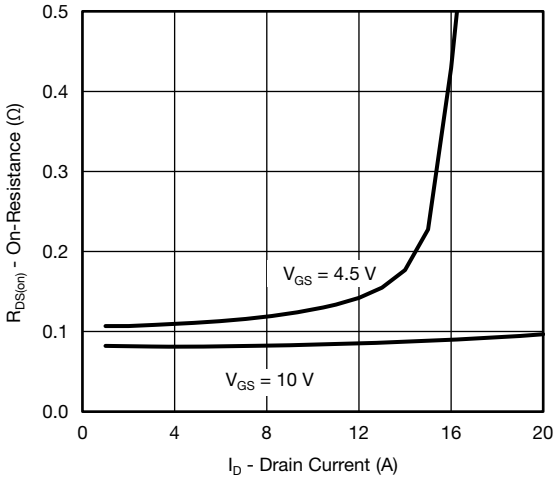
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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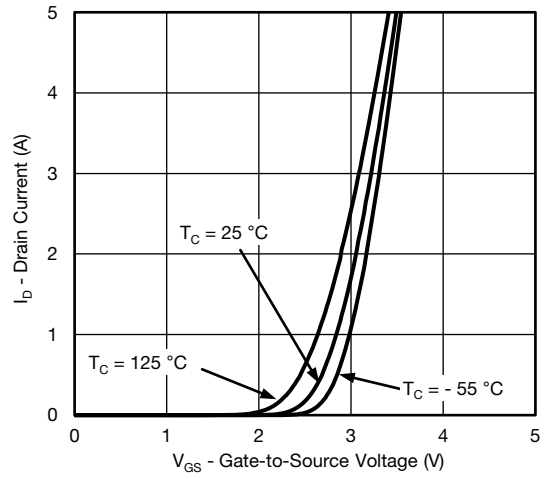
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



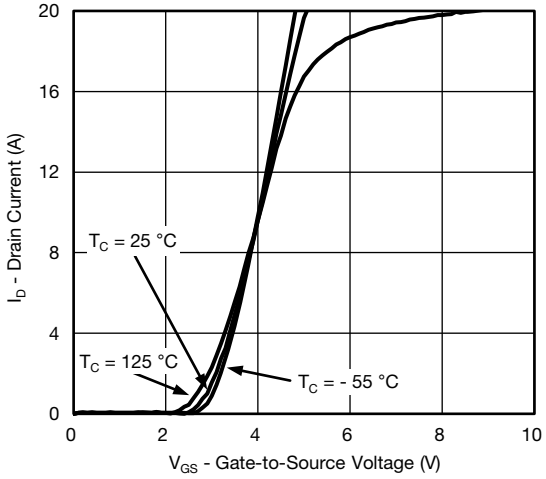
Output Characteristics



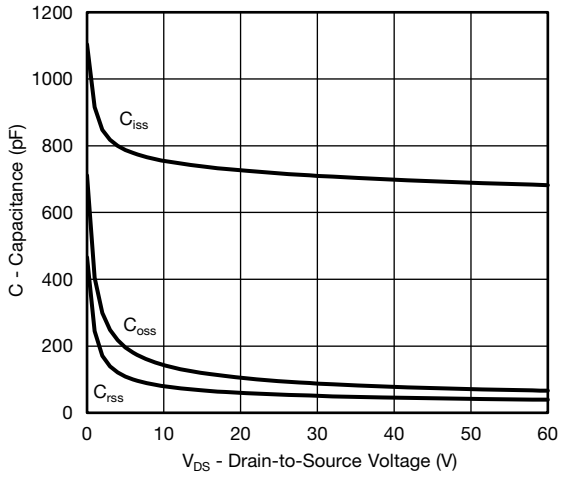
On-Resistance vs. Drain Current and Gate Voltage



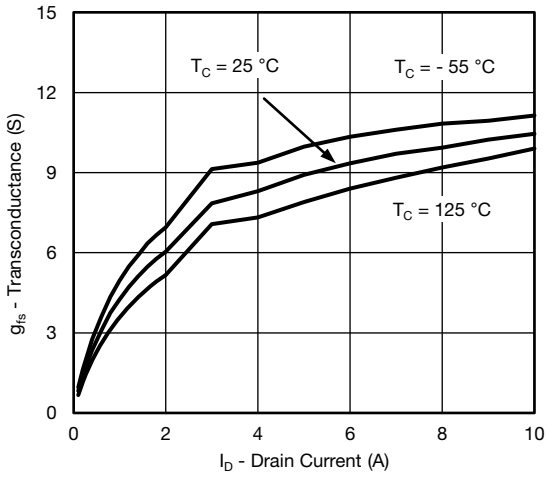
Transfer Characteristics



Transfer Characteristics



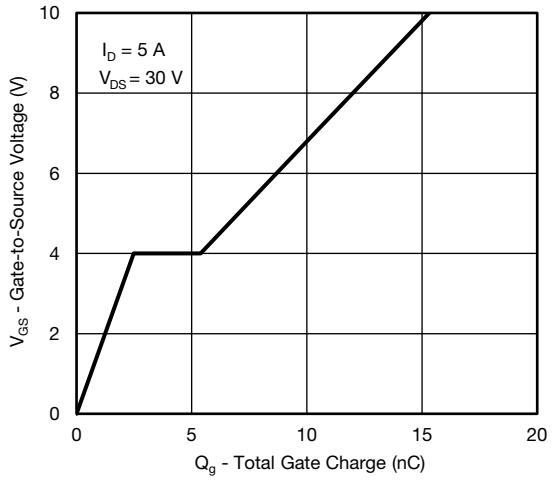
Capacitance



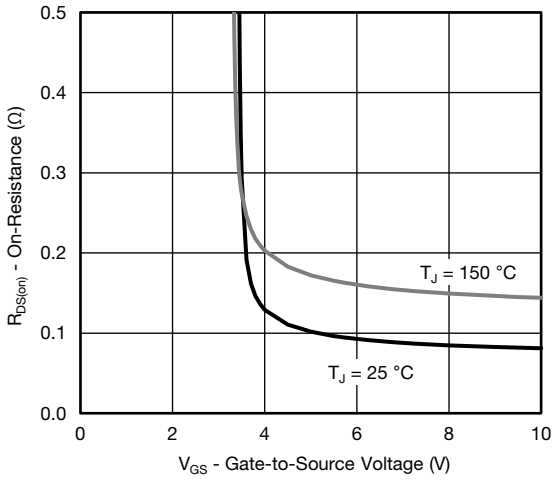
Transconductance

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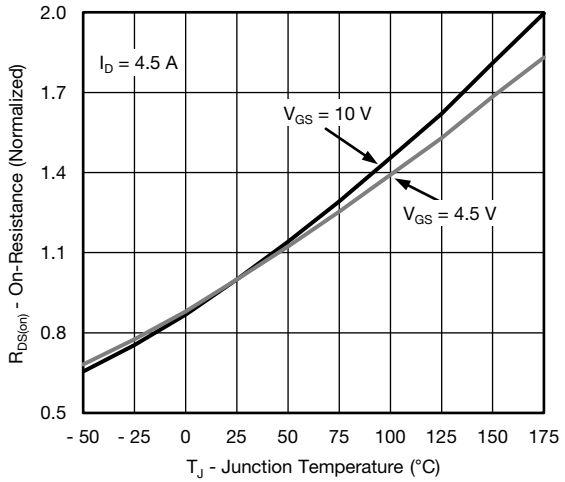
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



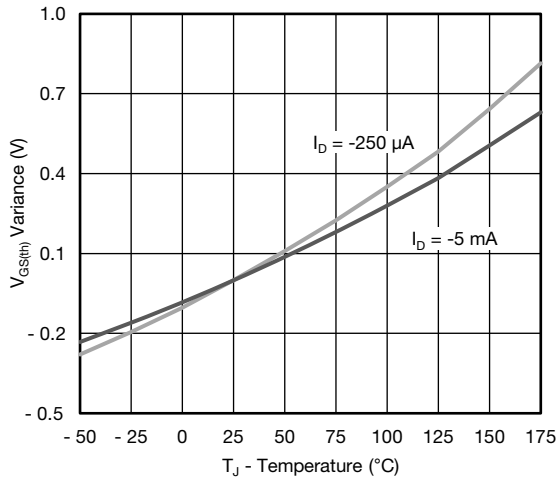
Gate Charge



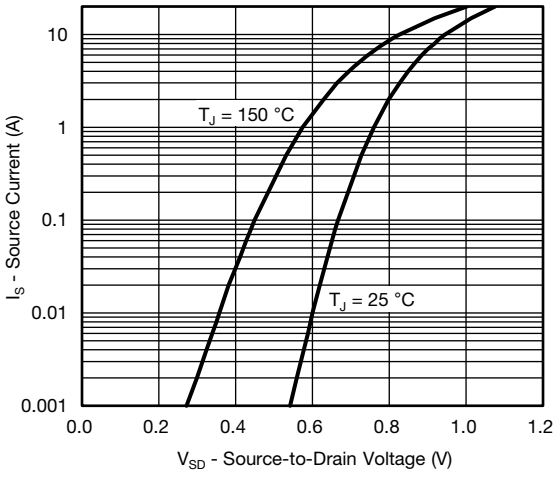
On-Resistance vs. Gate-to-Source Voltage



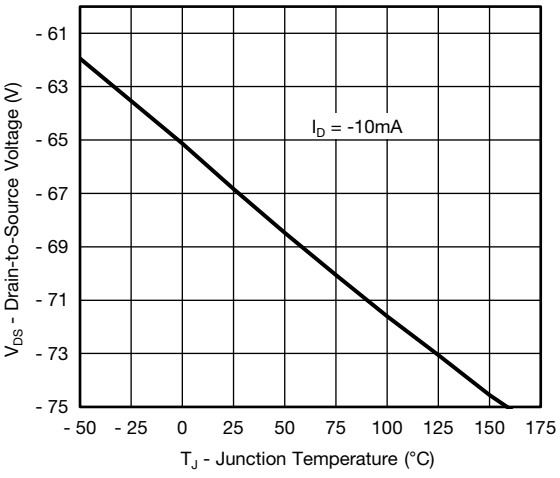
On-Resistance vs. Junction Temperature



Threshold Voltage



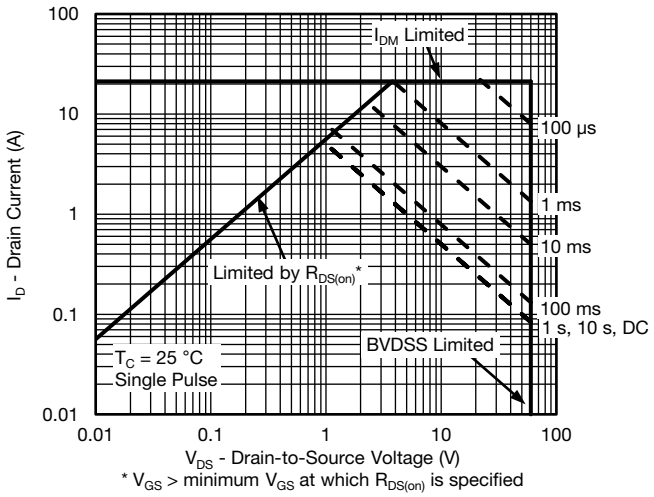
Source-Drain Diode Forward Voltage



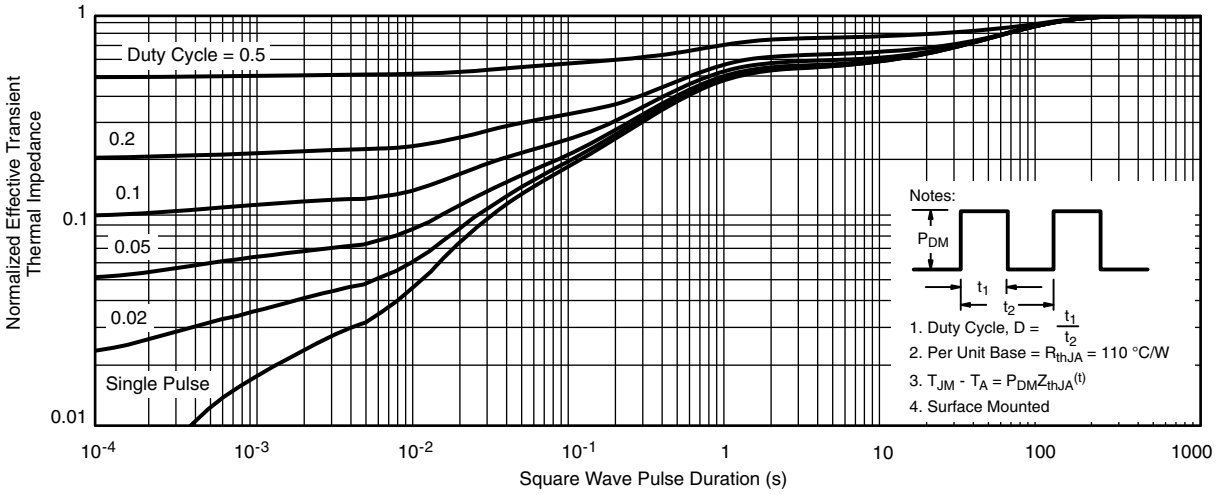
Drain-to-Source Voltage vs. Junction Temperature

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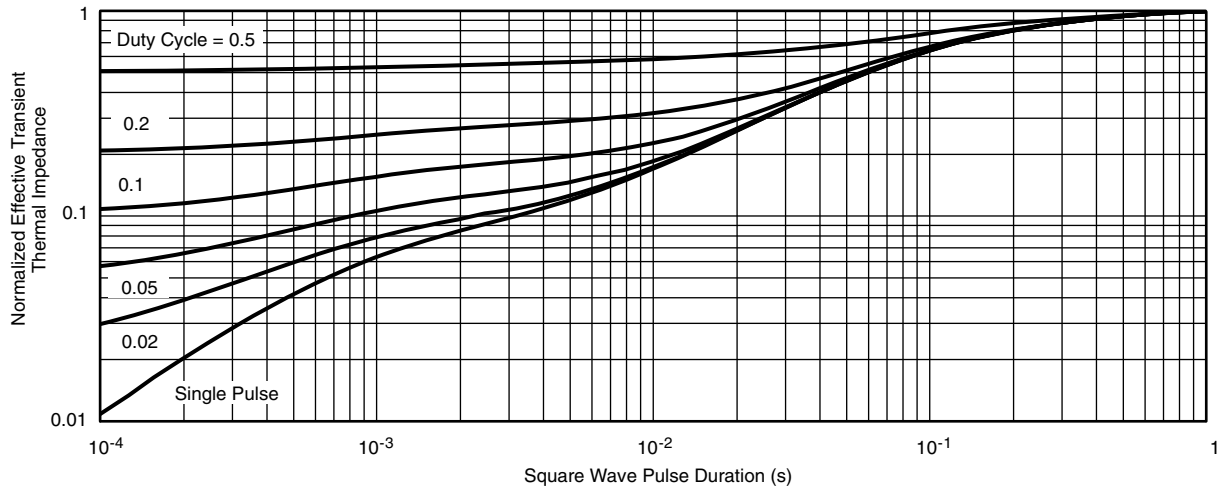
Safe Operating Area, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient

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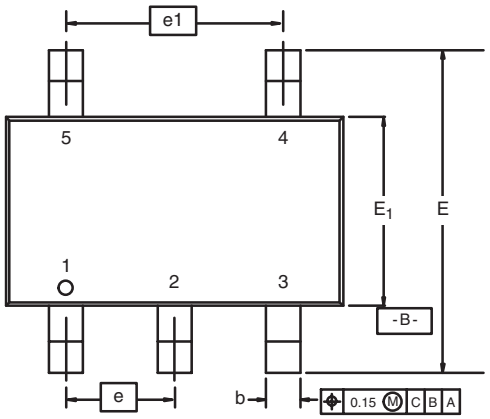


Normalized Thermal Transient Impedance, Junction-to-Foot

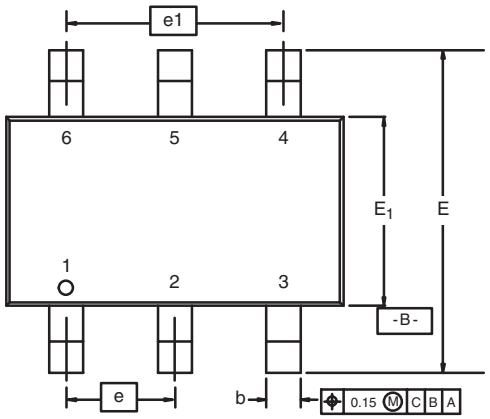
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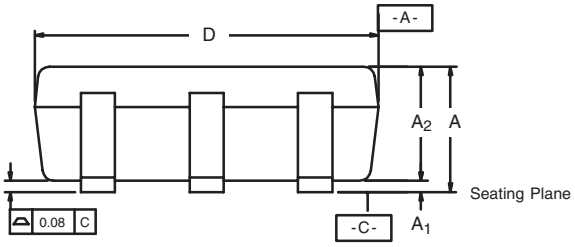
TSOP: 5/6–LEAD
JEDEC Part Number: MO-193C

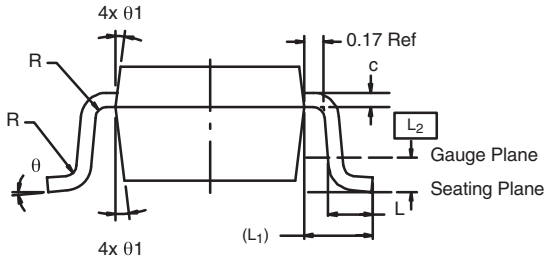


5-LEAD TSOP



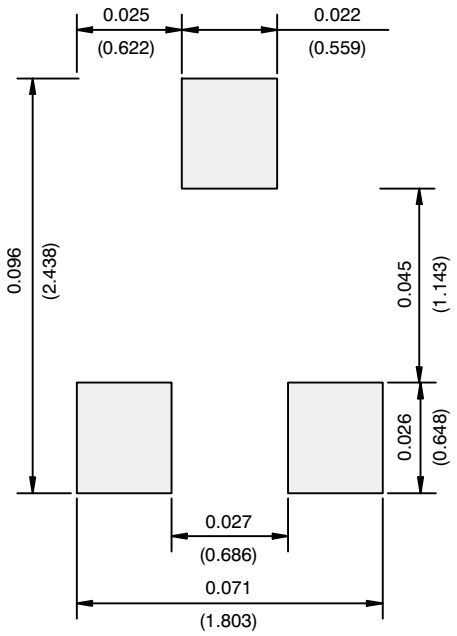
6-LEAD TSOP





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 MINIMUM PADS FOR SC-70: 3-Lead



Recommended Minimum Pads
Dimensions in Inches/(mm)

Return to Index

APPLICATION NOTE

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