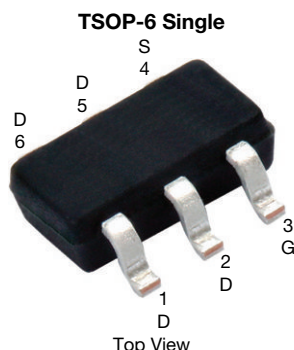


Automotive P-Channel 60 V (D-S) 175 °C MOSFET

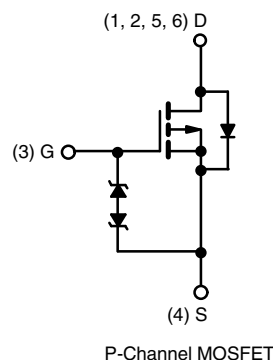


FEATURES

- 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



RoHS
COMPLIANT
HALOGEN
FREE



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	I_D	-5.3	A	$T_C = 25$ °C
		-3		$T_C = 125$ °C
Continuous Source Current (Diode Conduction)	I_S	-6.3		
Pulsed Drain Current ^a	I_{DM}	-21		
Single Pulse Avalanche Current	I_{AS}	-21	mJ	$L = 0.1$ mH
Single Pulse Avalanche Energy	E_{AS}	22		
Maximum Power Dissipation	P_D	5	W	$T_C = 25$ °C
		1.6		$T_C = 125$ °C
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +175	°C	

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

Notes

- a. Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %
b. When mounted on 1" square PCB (FR4 material)



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

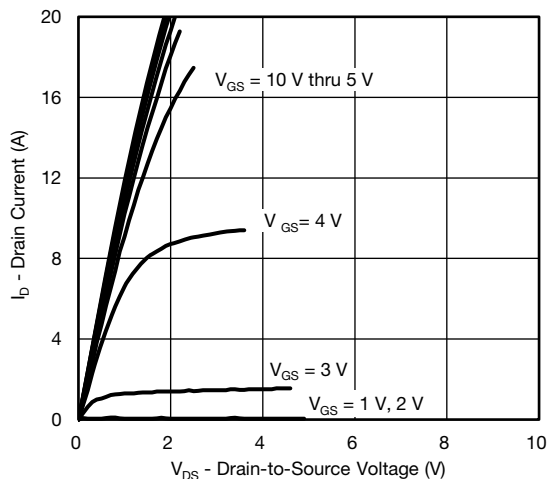
Notes

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

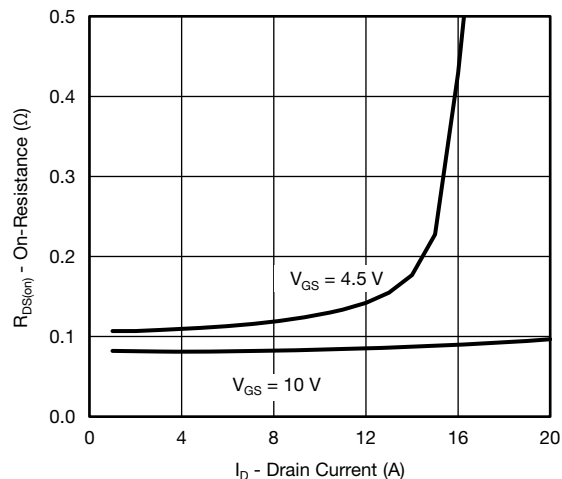
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



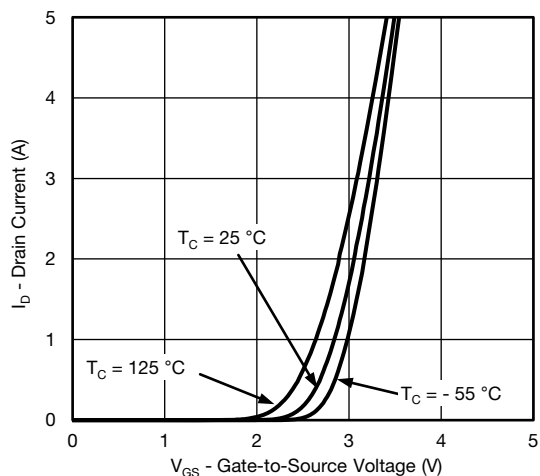
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



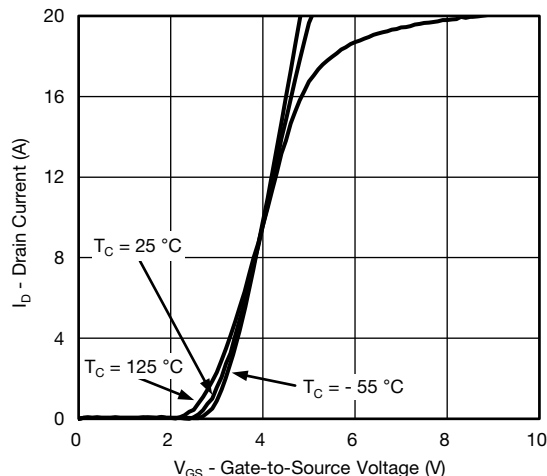
Output Characteristics



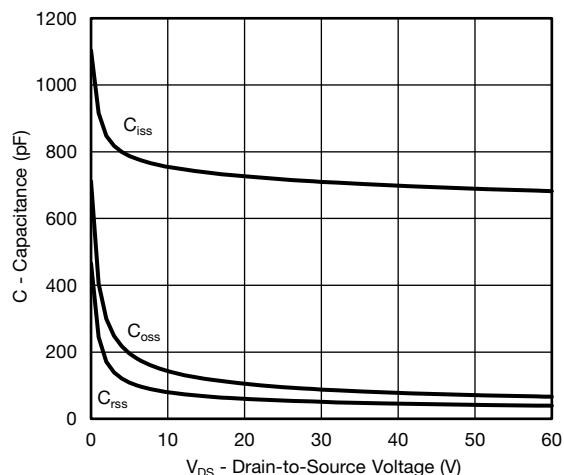
On-Resistance vs. Drain Current and Gate Voltage



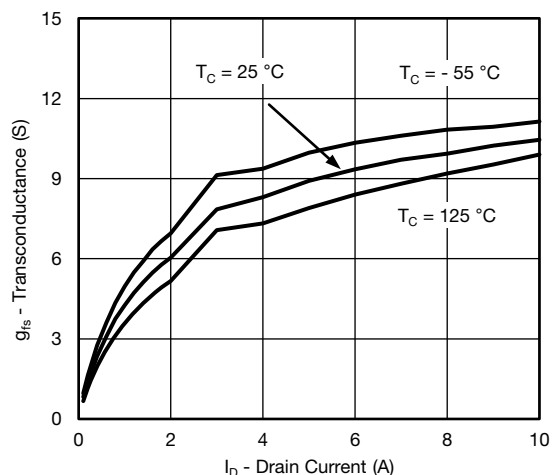
Transfer Characteristics



Transfer Characteristics



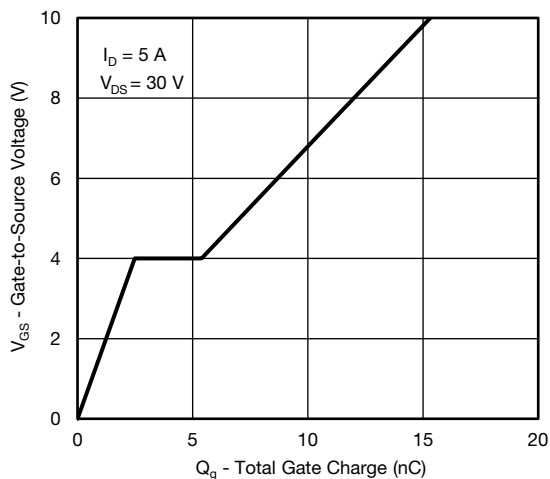
Capacitance



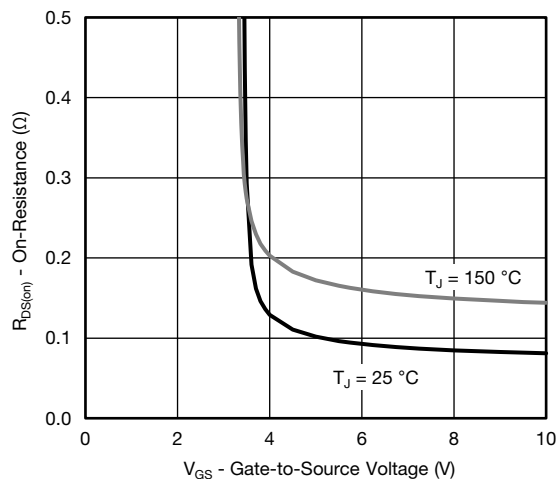
Transconductance



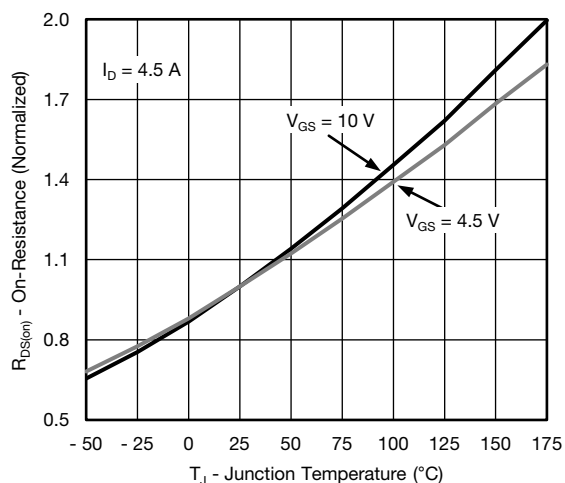
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



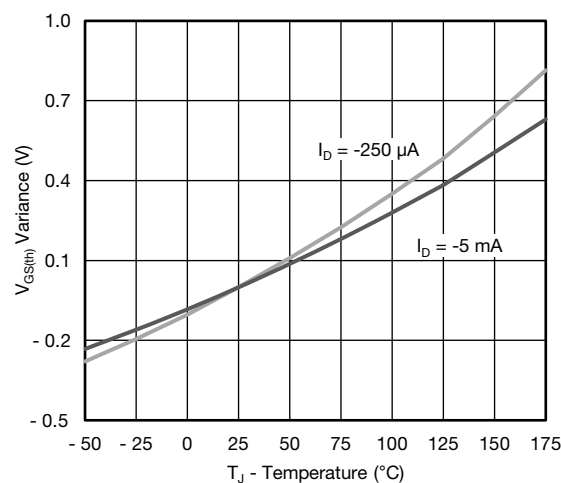
Gate Charge



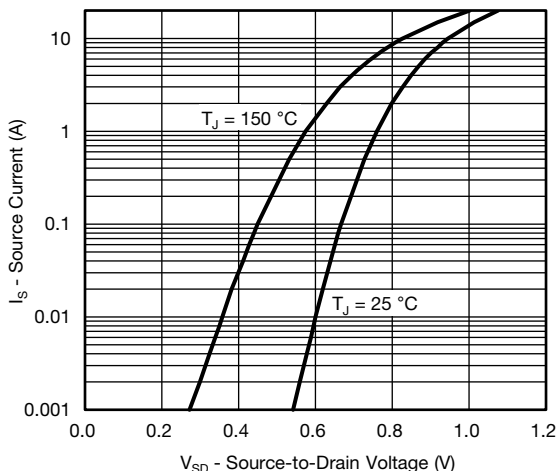
On-Resistance vs. Gate-to-Source Voltage



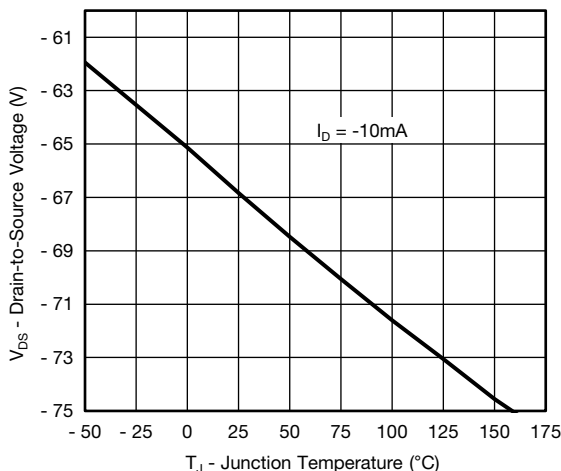
On-Resistance vs. Junction Temperature



Threshold Voltage



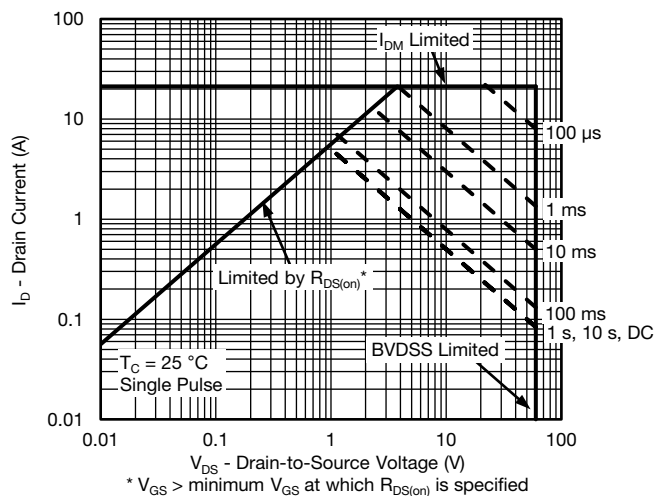
Source-Drain Diode Forward Voltage



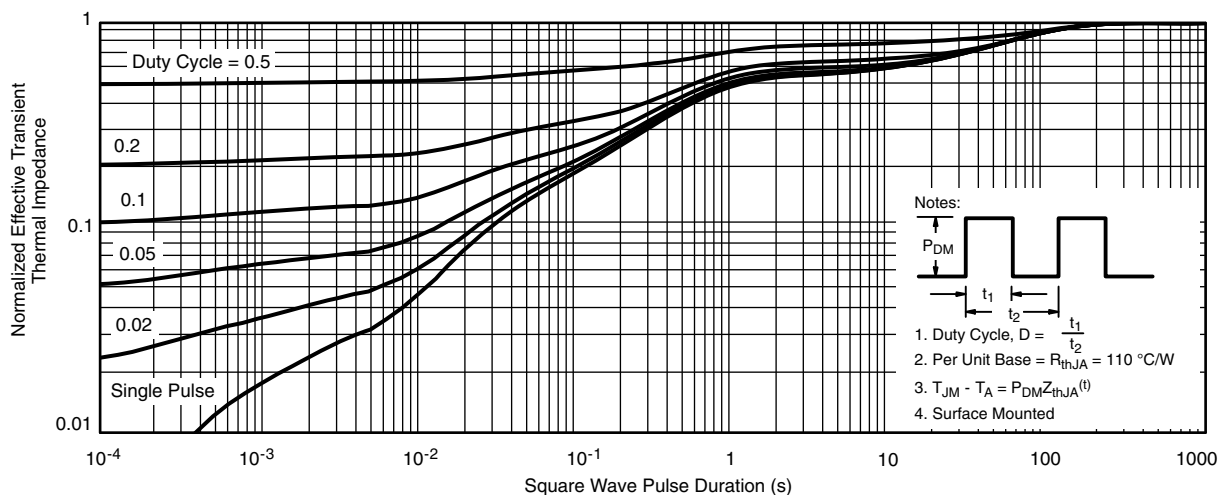
Drain-to-Source Voltage vs. Junction Temperature



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



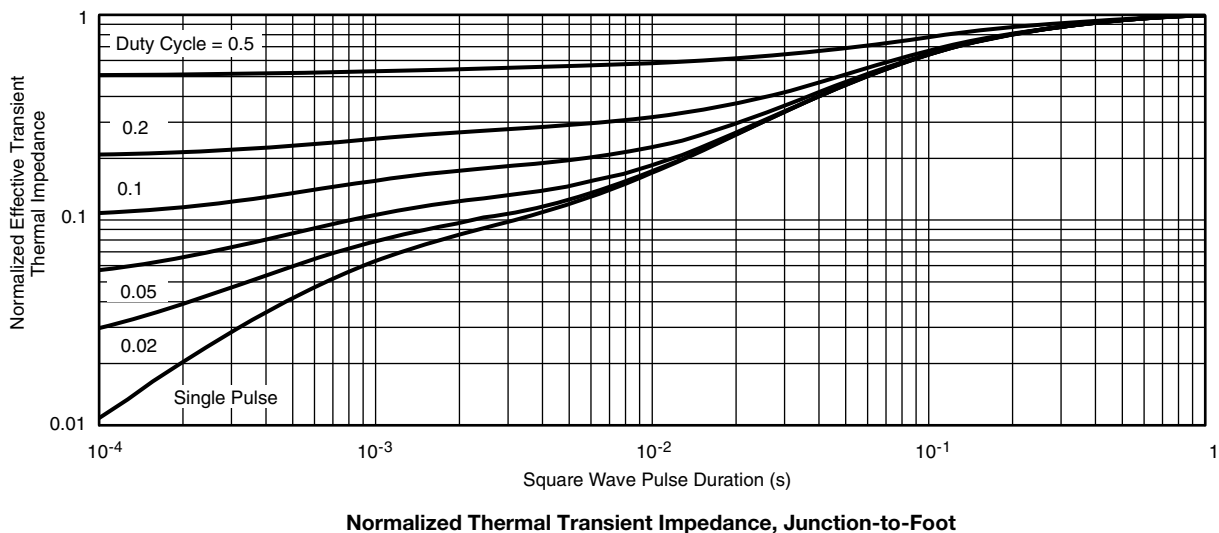
Safe Operating Area, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

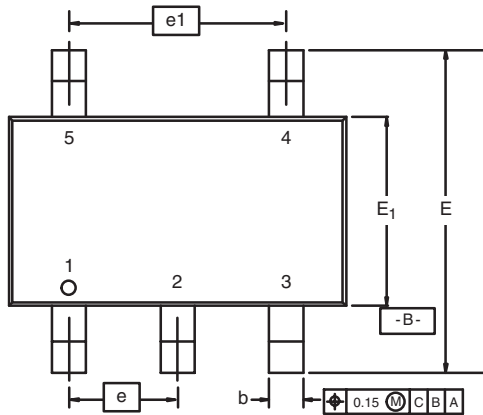


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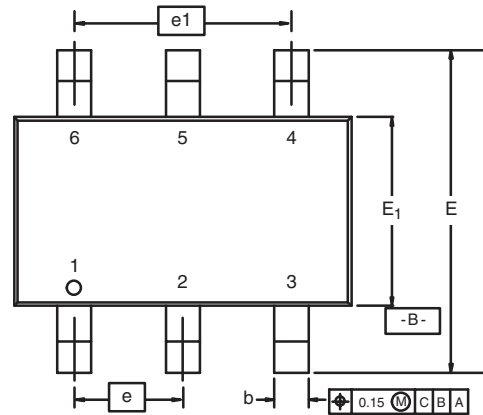


TSOP: 5/6-LEAD

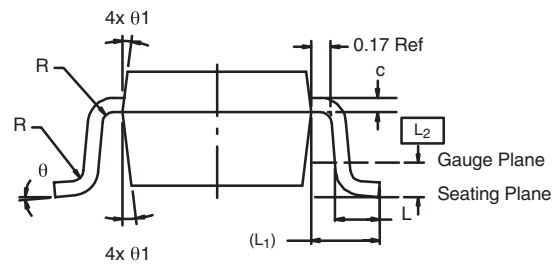
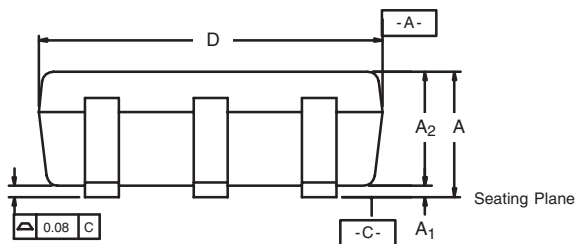
JEDEC Part Number: MO-193C



5-LEAD TSOP

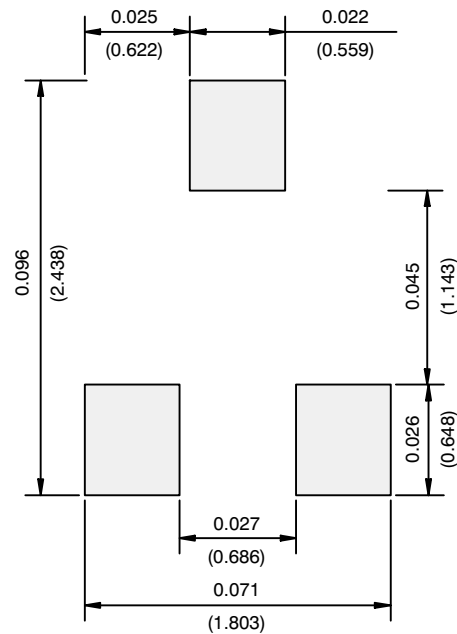


6-LEAD TSOP



Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	0.91	-	1.10	0.036	-	0.043
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)

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