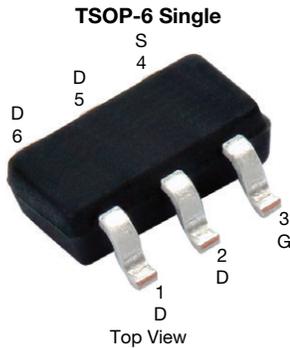


Automotive P-Channel 12 V (D-S) 175 °C MOSFET

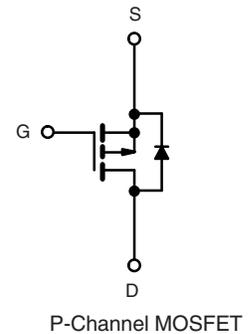


Marking Code: 9TY

FEATURES

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

 AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE


PRODUCT SUMMARY	
V _{DS} (V)	-12
R _{DS(on)} (Ω) at V _{GS} = -4.5 V	0.025
R _{DS(on)} (Ω) at V _{GS} = -2.5 V	0.032
R _{DS(on)} (Ω) at V _{GS} = -1.8 V	0.043
I _D (A)	-8
Configuration	Single

ORDERING INFORMATION	
Package	TSOP-6
Lead (Pb)-free and halogen-free	SQ3461CEV (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}	-12	V		
Gate-source voltage	V _{GS}	± 8			
Continuous drain current ^c	I _D	T _C = 25 °C	-8	A	
		T _C = 125 °C	-6.6		
Continuous source current (diode conduction)	I _S	-6.3	mJ		
Pulsed drain current ^a	I _{DM}	-30			
Single pulse avalanche current	L = 0.1 mH	I _{AS}	-17		
Single pulse avalanche energy		E _{AS}	14		
Maximum power dissipation	T _C = 25 °C	P _D	5	W	
			T _C = 125 °C		1.67
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	
Junction to case (drain)	R _{thJF}	30		

Notes

- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %
- When mounted on 1" square PCB (FR4 material)
- Package limited



SPECIFICATIONS ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-12	-	-	V
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-0.4	-0.6	-1	
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 8\text{ V}$	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, V_{DS} = -12\text{ V}$	-	-	-1	μA
		$V_{GS} = 0\text{ V}, V_{DS} = -12\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	-	-50	
		$V_{GS} = 0\text{ V}, V_{DS} = -12\text{ V}, T_J = 175\text{ }^\circ\text{C}$	-	-	-200	
On-State Drain Current ^a	$I_{D(on)}$	$V_{GS} = -4.5\text{ V}, V_{DS} = -5\text{ V}$	-11	-	-	A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -7.9\text{ A}$	-	0.020	0.025	Ω
		$V_{GS} = -4.5\text{ V}, I_D = -6.6\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	-	0.033	
		$V_{GS} = -4.5\text{ V}, I_D = -3.5\text{ A}, T_J = 175\text{ }^\circ\text{C}$	-	-	0.037	
		$V_{GS} = -2.5\text{ V}, I_D = -7\text{ A}$	-	0.027	0.032	
		$V_{GS} = -1.8\text{ V}, I_D = -3\text{ A}$	-	0.036	0.043	
Forward Transconductance ^b	g_{fs}	$V_{DS} = -5\text{ V}, I_D = -7.9\text{ A}$	-	23	-	S
Dynamic ^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = -6\text{ V}, f = 1\text{ MHz}$	-	1818	2000	pF
Output Capacitance	C_{oss}		-	676	770	
Reverse Transfer Capacitance	C_{rss}		-	587	650	
Total Gate Charge ^c	Q_g	$V_{GS} = -4.5\text{ V}, V_{DS} = -6\text{ V}, I_D = -7.9\text{ A}$	-	24	28	nC
Gate-Source Charge ^c	Q_{gs}		-	3	-	
Gate-Drain Charge ^c	Q_{gd}		-	8	-	
Gate Resistance	R_g	$f = 1\text{ MHz}$	2.6	5.2	8.6	Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = -6\text{ V}, R_L = 1.6\text{ }\Omega, I_D \equiv -7.9\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 1\text{ }\Omega$	-	14	17	ns
Rise Time ^c	t_r		-	56	68	
Turn-Off Delay Time ^c	$t_{d(off)}$		-	55	120	
Fall Time ^c	t_f		-	72	93	
Source-Drain Diode Ratings and Characteristics ^b						
Pulsed Current ^a	I_{SM}		-	-	-20	A
Forward Voltage	V_{SD}	$I_F = -2\text{ A}, V_{GS} = 0\text{ V}$	-	-0.65	-1.2	V

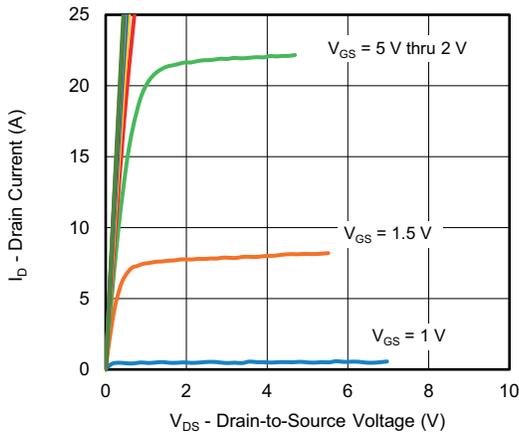
Notes

- 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.

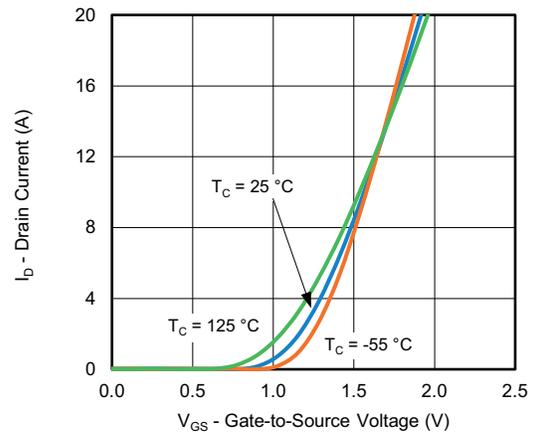
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



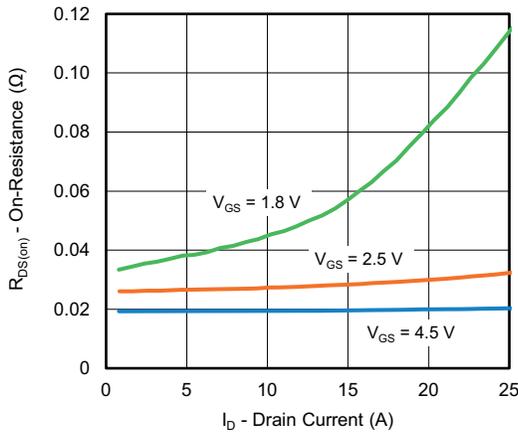
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



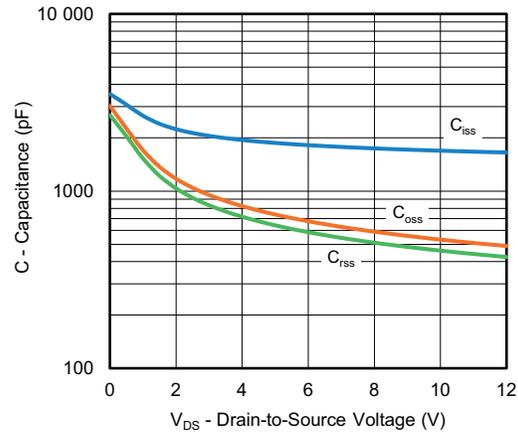
Output Characteristics



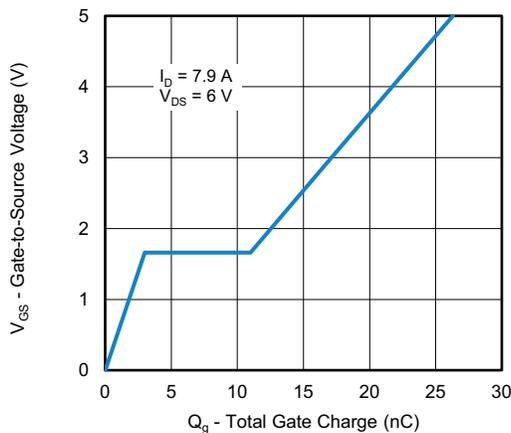
Transfer Characteristics



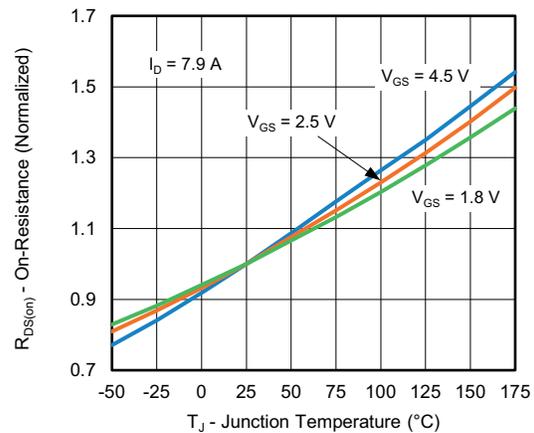
On-Resistance vs. Drain Current



Capacitance



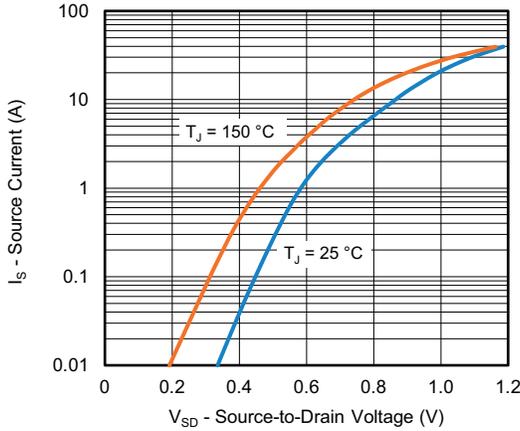
Gate Charge



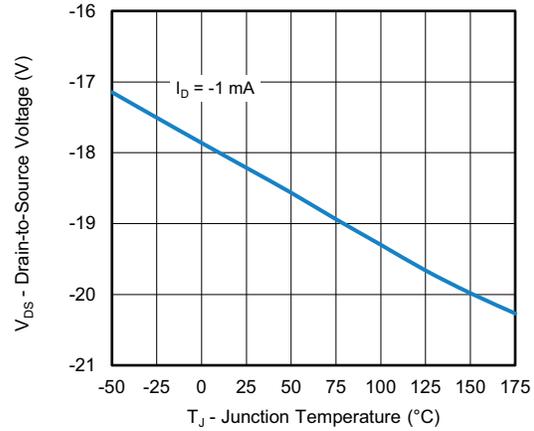
On-Resistance vs. Junction Temperature



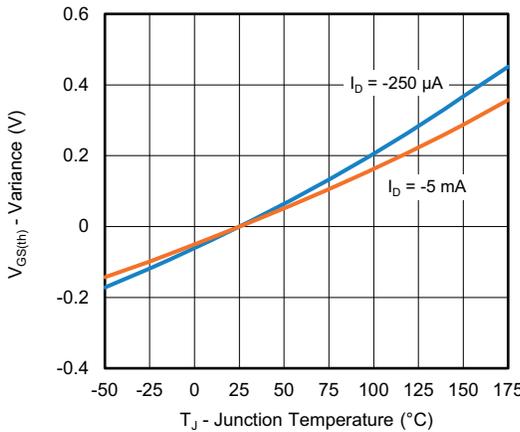
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



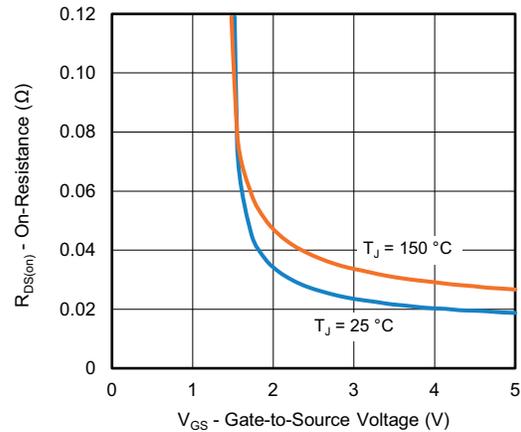
Source-Drain Diode Forward Voltage



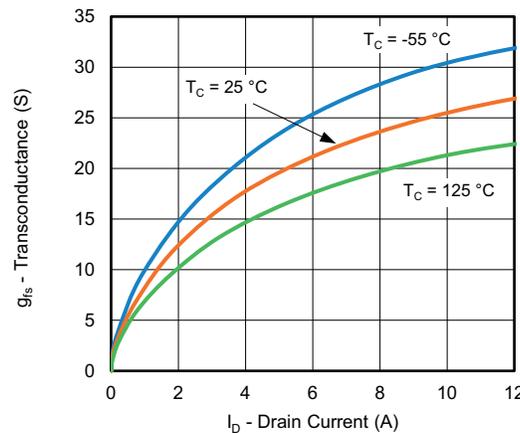
Drain-to-Source Voltage vs. Junction Temperature



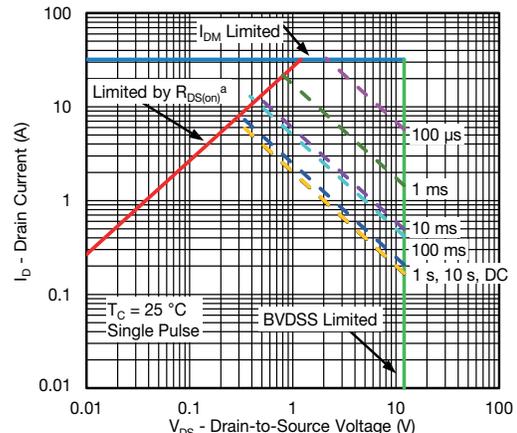
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage



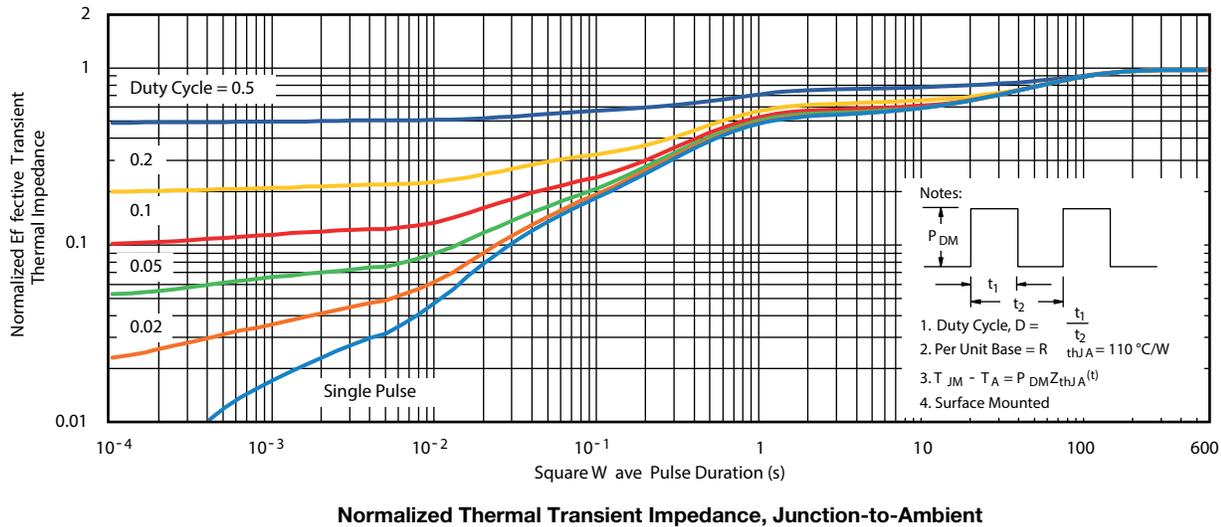
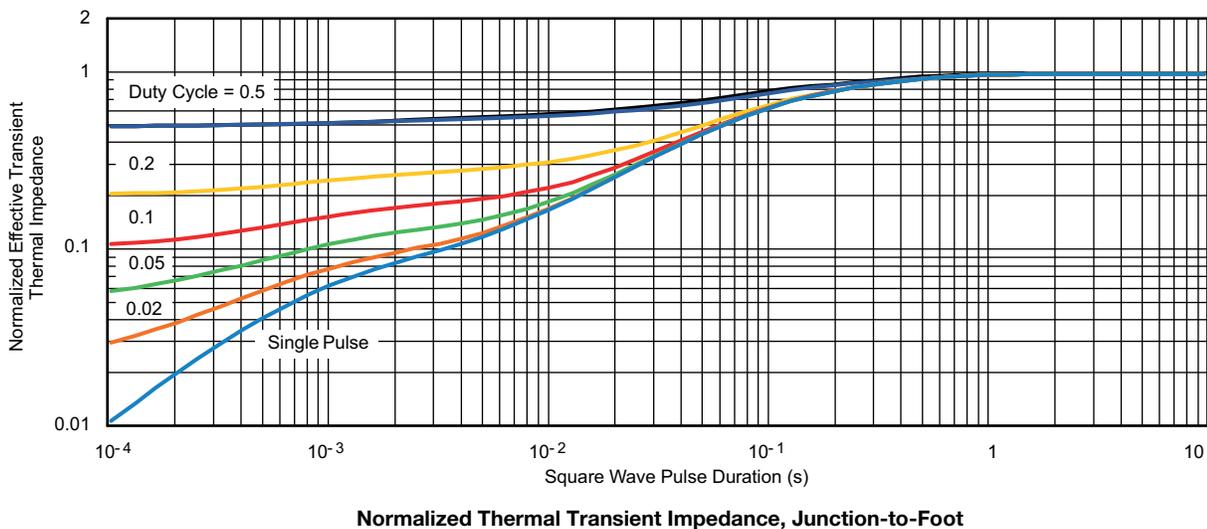
Transconductance



Safe Operating Area

Note

- a. V_{GS} > minimum V_{GS} at which R_{DS(on)} is specified

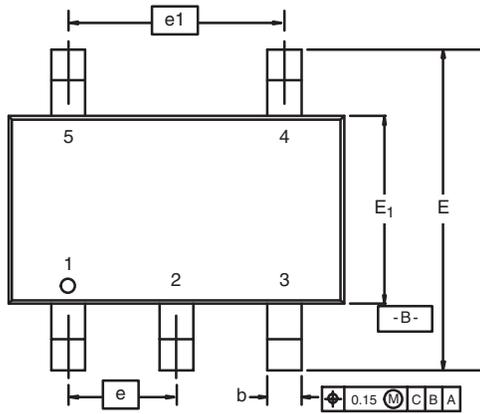
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)

THERMAL RATINGS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)

Note

- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction-to-Ambient ($25\text{ }^\circ\text{C}$)
 - Normalized Transient Thermal Impedance Junction-to-Foot ($25\text{ }^\circ\text{C}$)
 are given for general guidelines only to enable the user to get a "ball park" indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

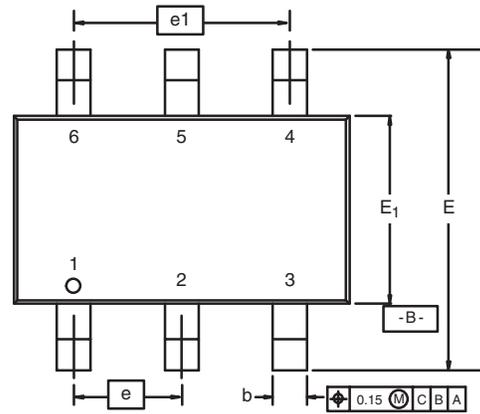
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TSOP: 5/6-LEAD

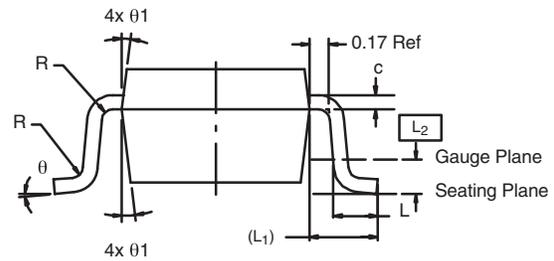
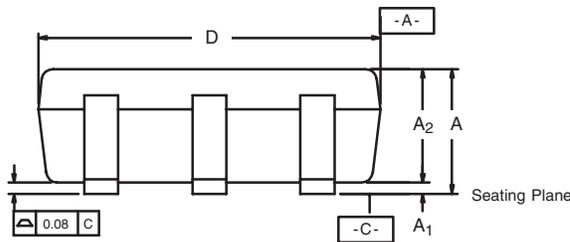
JEDEC Part Number: MO-193C



5-LEAD TSOP

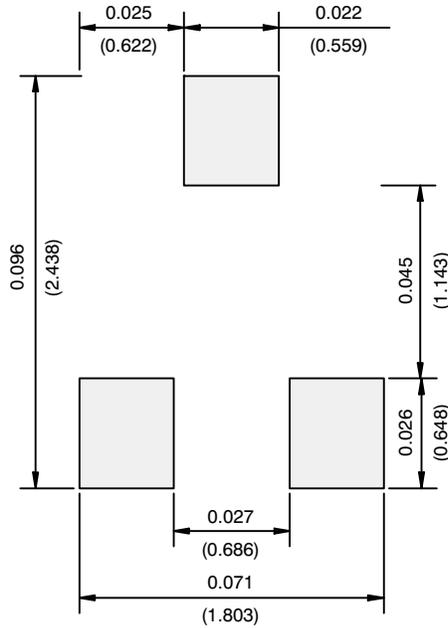


6-LEAD TSOP



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 MINIMUM PADS FOR SC-70: 3-Lead



Recommended Minimum Pads
Dimensions in Inches/(mm)

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