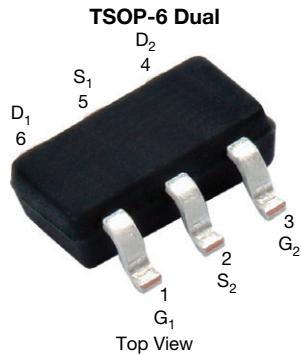


Automotive Dual P-Channel 20 V (D-S) 175 °C MOSFET



Marking code: 8T

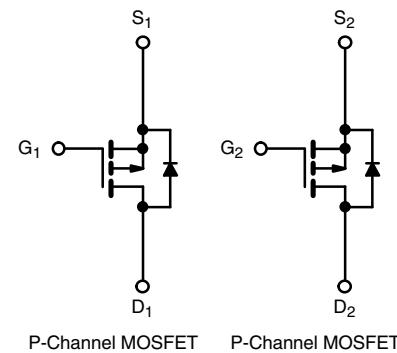
PRODUCT SUMMARY	
V_{DS} (V)	-20
$R_{DS(on)}$ (Ω) at $V_{GS} = -4.5$ V	0.145
$R_{DS(on)}$ (Ω) at $V_{GS} = -2.5$ V	0.200
$R_{DS(on)}$ (Ω) at $V_{GS} = -1.8$ V	0.300
I_D (A)	-3.9
Configuration	Dual

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



RoHS
COMPLIANT
HALOGEN
FREE



ORDERING INFORMATION

Package	TSOP-6
Lead (Pb)-free and halogen-free	SQ3985EV (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}	-20	V
Gate-source voltage	V_{GS}	± 8	
Continuous drain current	I_D	-3.9	A
		-2.2	
Continuous source current (diode conduction) ^a	I_S	-3.7	
Pulsed drain current ^b	I_{DM}	-15	
Single pulse avalanche current	I_{AS}	-8.5	
Single pulse avalanche Energy	E_{AS}	3.6	mJ
Maximum power dissipation ^b	P_D	3	W
		1	
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}	166	°C/W
Junction-to-foot (drain)	R_{thJC}	50	

Notes

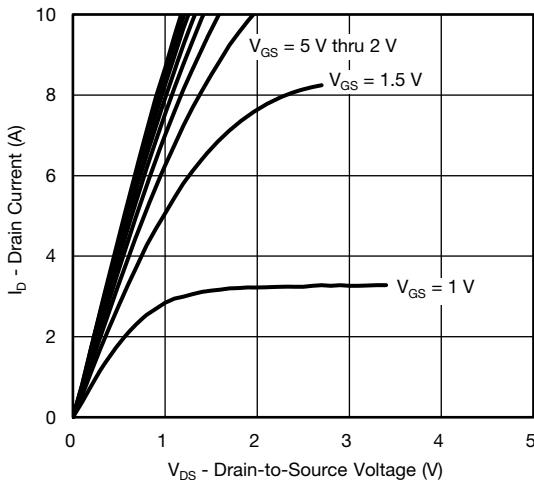
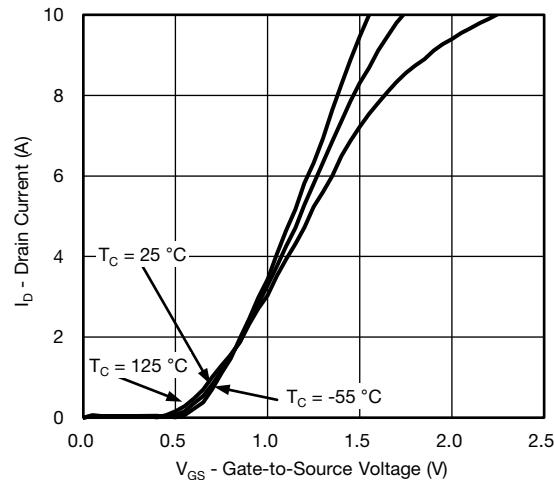
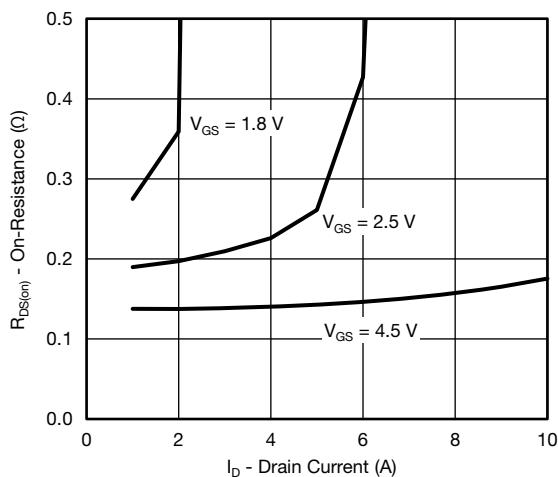
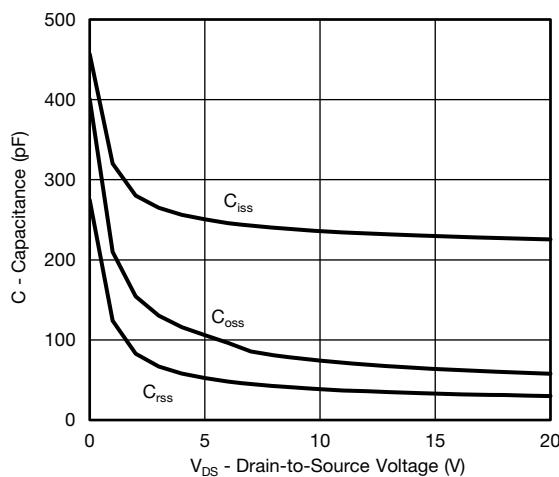
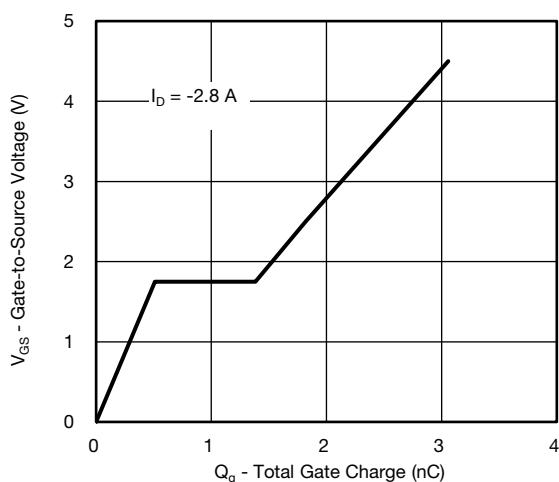
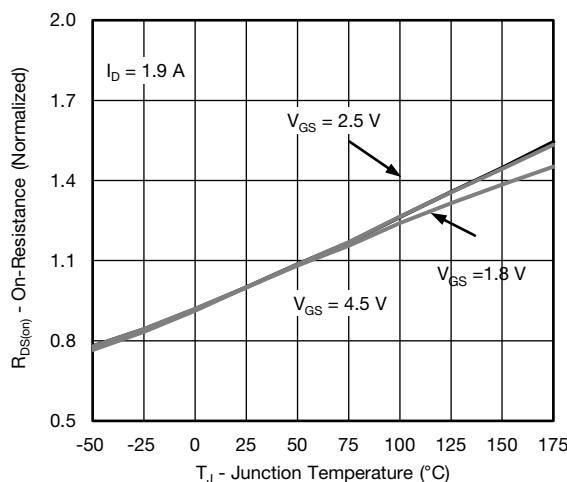
- Package limited
- Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %
- When mounted on 1" square PCB (FR4 material)

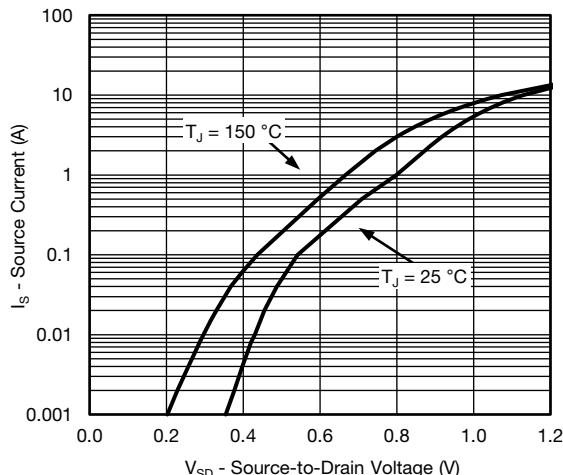
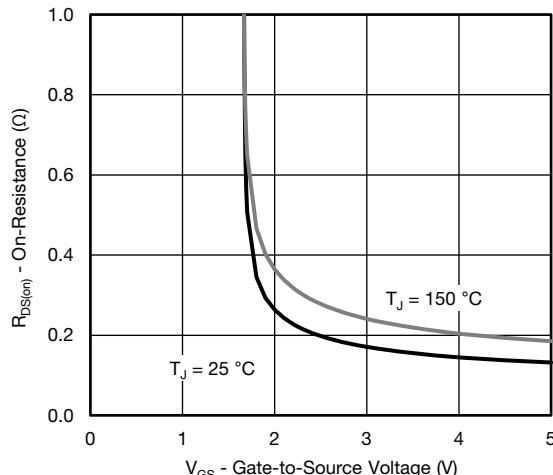
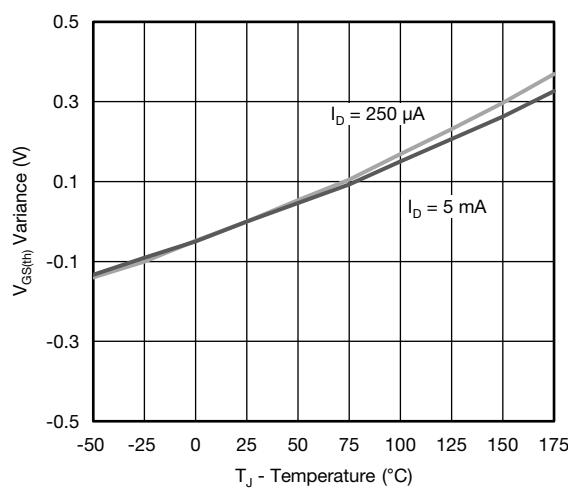
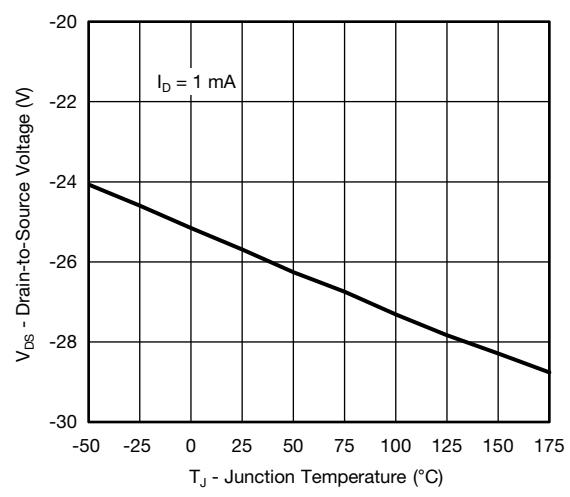
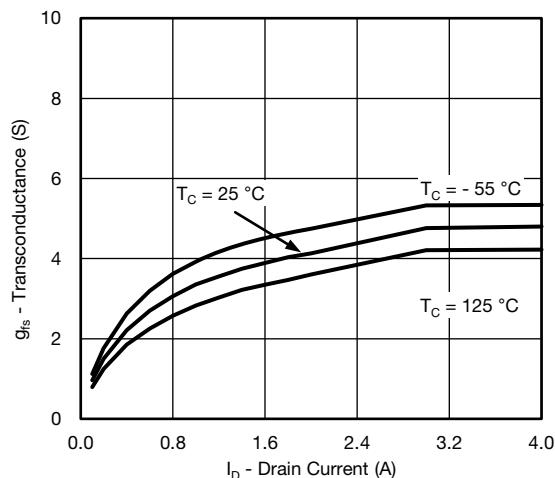
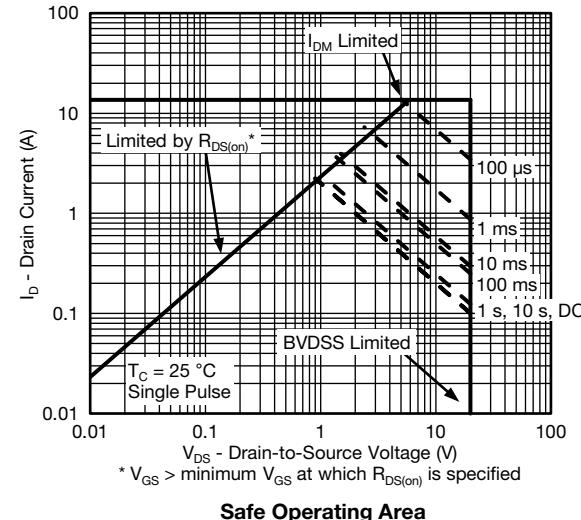
SPECIFICATIONS ($T_C = 25^\circ\text{C}$, unless otherwise noted)								
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT	
Static								
Drain-source breakdown voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = -250\text{ }\mu\text{A}$		-20	-	-	V	
Gate-source threshold voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = -250\text{ }\mu\text{A}$		-0.45	-0.6	-1.5		
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}	$V_{GS} = 0\text{ V}$	$V_{DS} = -20\text{ V}$	-	-	-1	μA	
		$V_{GS} = 0\text{ V}$	$V_{DS} = -20\text{ V}$, $T_J = 125^\circ\text{C}$	-	-	-50		
		$V_{GS} = 0\text{ V}$	$V_{DS} = -20\text{ V}$, $T_J = 175^\circ\text{C}$	-	-	-150		
On-state drain current ^a	$I_{D(\text{on})}$	$V_{GS} = -4.5\text{ V}$	$V_{DS} \geq -5\text{ V}$	-8	-	-	A	
Drain-source on-state resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = -4.5\text{ V}$	$I_D = -2.8\text{ A}$	-	0.130	0.145	Ω	
		$V_{GS} = -2.5\text{ V}$	$I_D = -2\text{ A}$	-	0.177	0.200		
		$V_{GS} = -1.8\text{ V}$	$I_D = -1.8\text{ A}$	-	0.240	0.300		
Forward transconductance ^b	g_{fs}	$V_{DS} = -1.6\text{ V}$, $I_D = -2.8\text{ A}$		-	7	-	S	
Dynamic^b								
Input capacitance	C_{iss}	$V_{GS} = 0\text{ V}$	$V_{DS} = -10\text{ V}$, $f = 1\text{ MHz}$	-	235	350	pF	
Output capacitance	C_{oss}			-	75	110		
Reverse transfer capacitance	C_{rss}			-	40	57		
Total gate charge ^c	Q_g	$V_{GS} = -4.5\text{ V}$	$V_{DS} = -10\text{ V}$, $I_D = -2.8\text{ A}$	-	3.1	4.6	nC	
Gate-source charge ^c	Q_{gs}			-	0.5	-		
Gate-drain charge ^c	Q_{gd}			-	0.9	-		
Gate resistance	R_g	$f = 1\text{ MHz}$		2.7	5.5	8.3	Ω	
Turn-on delay time ^c	$t_{d(\text{on})}$	$V_{DD} = -10\text{ V}$, $R_L = 10\text{ }\Omega$, $I_D \approx -1\text{ A}$, $V_{GEN} = -4.5\text{ V}$, $R_g = 1\text{ }\Omega$	$I_F = -1.6\text{ A}$, $V_{GS} = 0\text{ V}$	-	5	7	ns	
Rise time ^c	t_r			-	26	35		
Turn-off delay time ^c	$t_{d(\text{off})}$			-	40	54		
Fall time ^c	t_f			-	20	28		
Source-Drain Diode Ratings and Characteristics^b								
Pulsed current ^a	I_{SM}			-	-	-15	A	
Forward voltage	V_{SD}	$I_F = -1.6\text{ A}$, $V_{GS} = 0\text{ V}$		-	-0.8	-1.2	V	

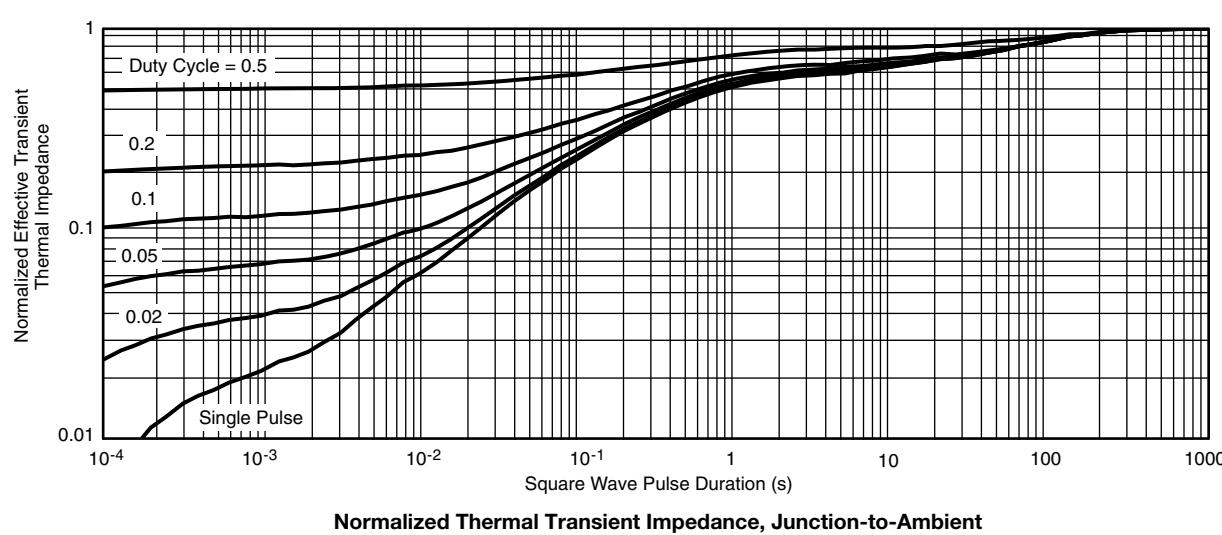
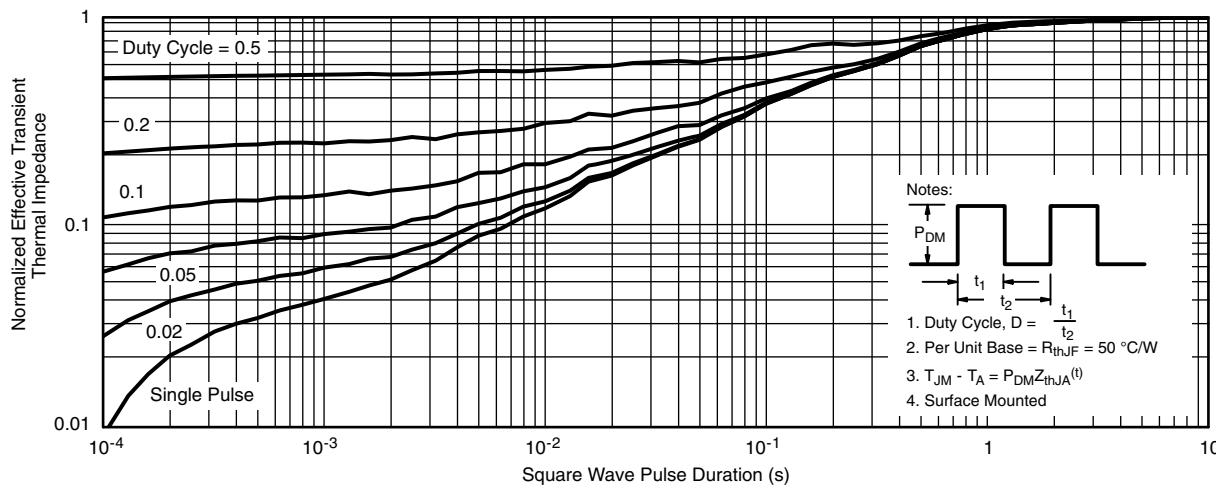
Notes

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

Output Characteristics

Transfer Characteristics

On-Resistance vs. Drain Current

Capacitance

Gate Charge

On-Resistance vs. Junction Temperature

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

Source Drain Diode Forward Voltage

On-Resistance vs. Gate-to-Source Voltage

Threshold Voltage

Drain Source Breakdown vs. Junction Temperature

Transconductance

Safe Operating Area

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

Note

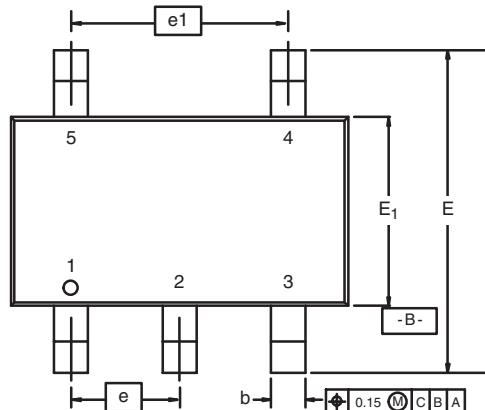
- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction-to-Ambient (25°C)
 - Normalized Transient Thermal Impedance Junction-to-Foot (25°C)

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

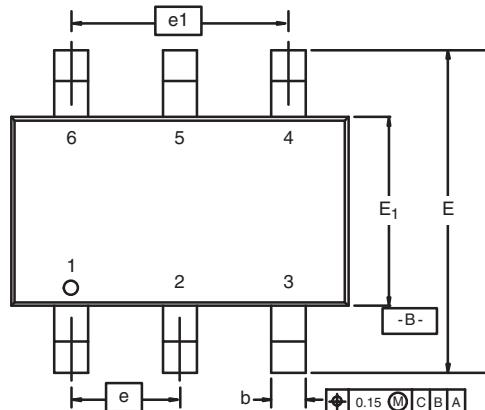
Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg?63249.

TSOP: 5/6-LEAD

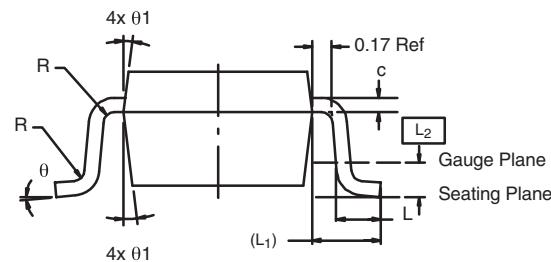
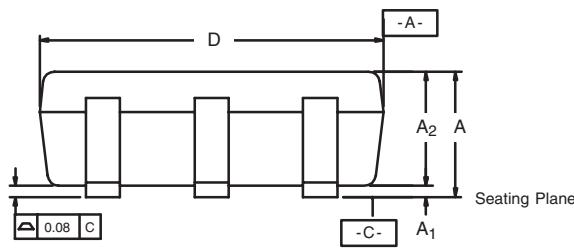
JEDEC Part Number: MO-193C



5-LEAD TSOP



6-LEAD TSOP

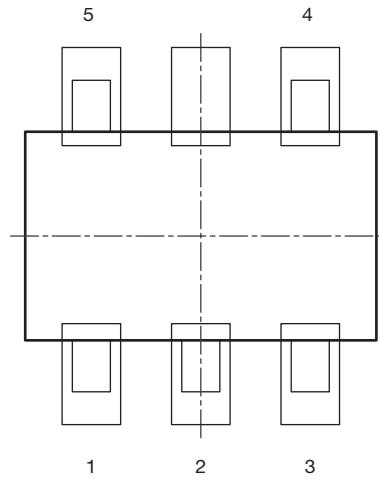


Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	0.91	-	1.10	0.036	-	0.043
A₁	0.01	-	0.10	0.0004	-	0.004
A₂	0.90	-	1.00	0.035	0.038	0.039
b	0.30	0.32	0.45	0.012	0.013	0.018
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.95	3.05	3.10	0.116	0.120	0.122
E	2.70	2.85	2.98	0.106	0.112	0.117
E₁	1.55	1.65	1.70	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		

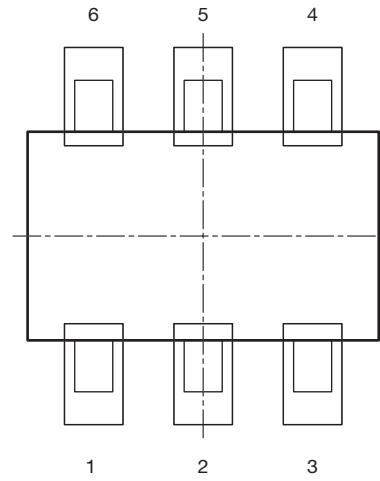
ECN: C-06593-Rev. I, 18-Dec-06

DWG: 5540

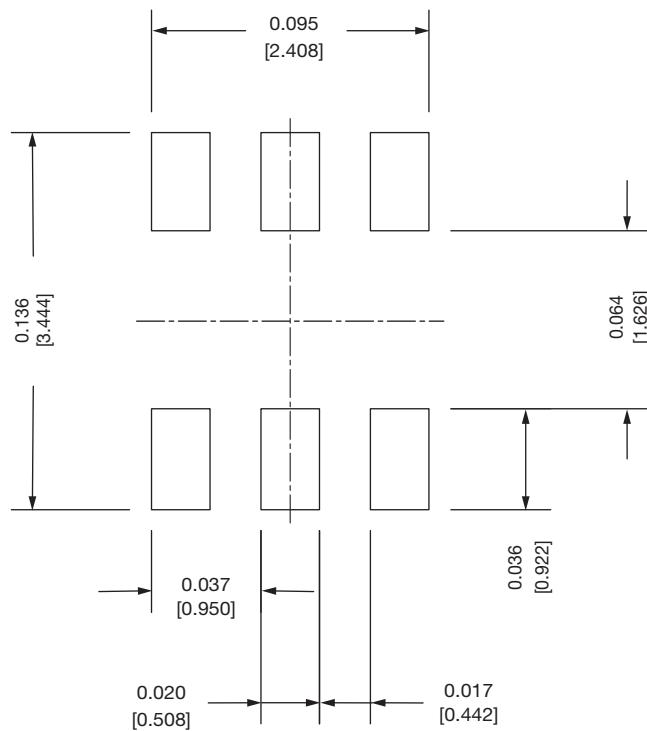
Recommended Land Pattern For TSOP-5L / TSOP-6L



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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