

## P-Channel 1.5 V (G-S) MOSFET

### PRODUCT SUMMARY

$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)	$Q_g$ (Typ.)
- 8	0.023 at $V_{GS} = - 4.5$ V	- 7	28
	0.029 at $V_{GS} = - 2.5$ V	- 6.2	
	0.036 at $V_{GS} = - 1.8$ V	- 5.2	
	0.048 at $V_{GS} = - 1.5$ V	- 5	

### FEATURES

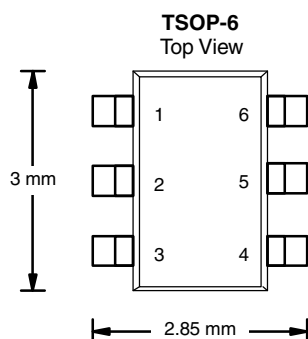
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET: 1.5 V Rated
- Ultra-Low On-Resistance
- 100 %  $R_g$  Tested
- Compliant to RoHS Directive 2002/95/EC



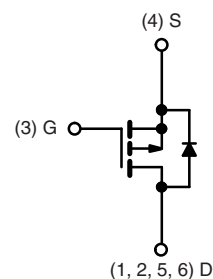
**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
Available

### APPLICATIONS

- Load Switch for Portable Devices



**Ordering Information:** Si3499DV-T1-E3 (Lead (Pb)-free)  
Si3499DV-T1-GE3 (Lead (Pb)-free and Halogen-free)  
**Marking Code:** 99xxx



P-Channel MOSFET

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25$ °C, unless otherwise noted)

Parameter		Symbol	5 s	Steady State	Unit
Drain-Source Voltage		$V_{DS}$	- 8		V
Gate-Source Voltage		$V_{GS}$	$\pm 5$		
Continuous Drain Current ( $T_J = 150\text{ }^{\circ}\text{C}$ ) <sup>a</sup>	$T_A = 25\text{ }^{\circ}\text{C}$	$I_D$	- 7	- 5.3	A
	$T_A = 85\text{ }^{\circ}\text{C}$		- 3.6	- 3.9	
Pulsed Drain Current		$I_{DM}$	- 20		
Continuous Source Current (Diode Conduction) <sup>a</sup>		$I_S$	- 1.7	- 0.9	
Maximum Power Dissipation <sup>a</sup>	$T_A = 25\text{ }^{\circ}\text{C}$	$P_D$	2	1.1	W
	$T_A = 85\text{ }^{\circ}\text{C}$		1	0.6	
Operating Junction and Storage Temperature Range		$T_J, T_{stg}$	- 55 to 150		$^{\circ}\text{C}$

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a</sup>	$R_{thJA}$	45	62.5	°C/W
		90	110	
Maximum Junction-to-Foot (Drain)	$R_{thJF}$	25	30	

Notes:

a. Surface mounted on 1" x 1" FR4 board.

**SPECIFICATIONS** ( $T_J = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted)

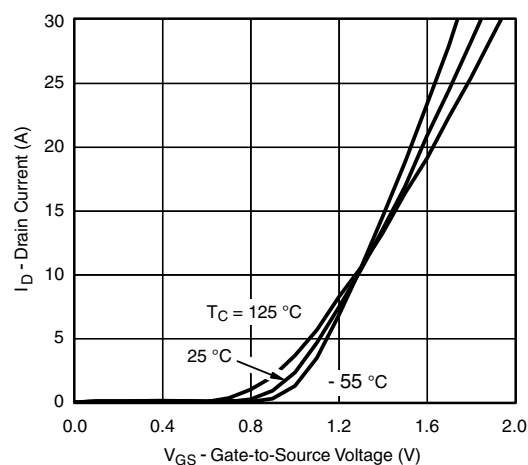
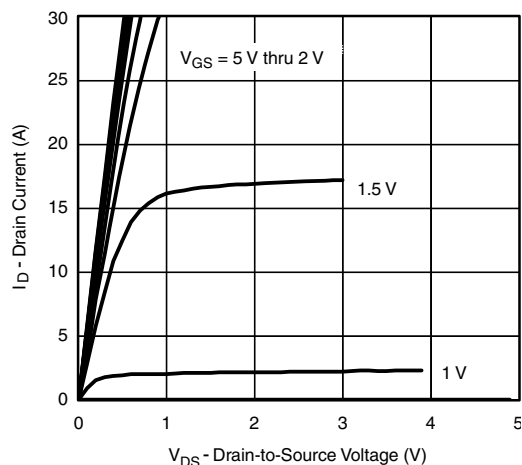
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = -250\text{ }\mu\text{A}$	-0.35		-0.75	V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}$ , $V_{GS} = \pm 5\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -8\text{ V}$ , $V_{GS} = 0\text{ V}$			-1	$\mu\text{A}$
		$V_{DS} = -8\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_J = 85\text{ }^{\circ}\text{C}$			-10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = -5\text{ V}$ , $V_{GS} = -4.5\text{ V}$	-20			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}$ , $I_D = -7\text{ A}$		0.019	0.023	$\Omega$
		$V_{GS} = -2.5\text{ V}$ , $I_D = -6.2\text{ A}$		0.024	0.029	
		$V_{GS} = -1.8\text{ V}$ , $I_D = -5.2\text{ A}$		0.028	0.036	
		$V_{GS} = -1.5\text{ V}$ , $I_D = -3\text{ A}$		0.035	0.048	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -5\text{ V}$ , $I_D = -7\text{ A}$		28		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = -1.7\text{ A}$ , $V_{GS} = 0\text{ V}$		-0.63	-1.1	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = -4\text{ V}$ , $V_{GS} = -4.5\text{ V}$ , $I_D = -7\text{ A}$		28	42	nC
Gate-Source Charge	$Q_{gs}$			2.9		
Gate-Drain Charge	$Q_{gd}$			5.8		
Gate Resistance	$R_g$		4	8.5	13	$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -4\text{ V}$ , $R_L = 4\text{ }\Omega$ $I_D = -1\text{ A}$ , $V_{GEN} = -4.5\text{ V}$ , $R_g = 6\text{ }\Omega$		27	40	ns
Rise Time	$t_r$			65	100	
Turn-Off Delay Time	$t_{d(off)}$			210	315	
Fall Time	$t_f$			110	165	
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = -1.7\text{ A}$ , $dI/dt = 100\text{ A}/\mu\text{s}$		40	70	

Notes:

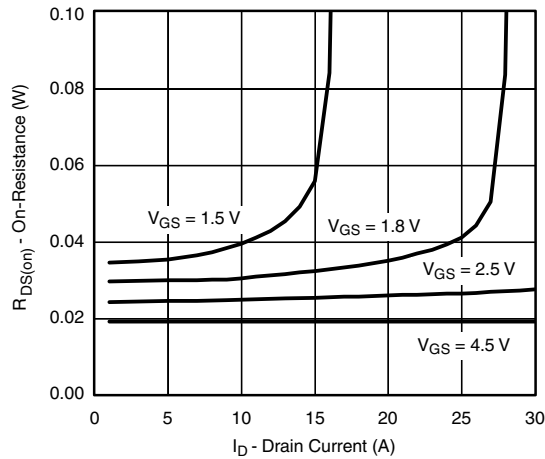
a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

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

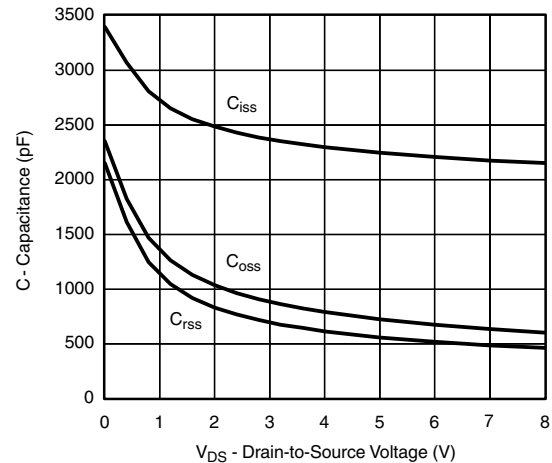
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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

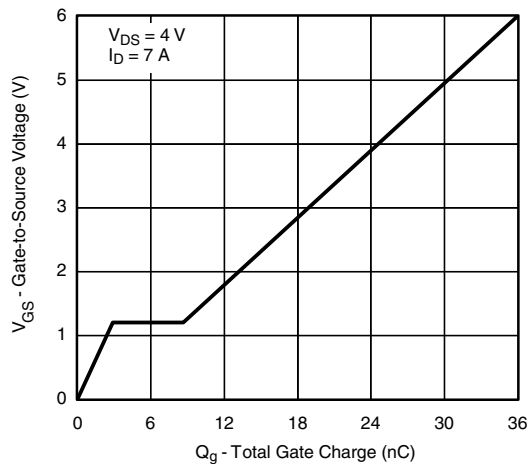
## TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



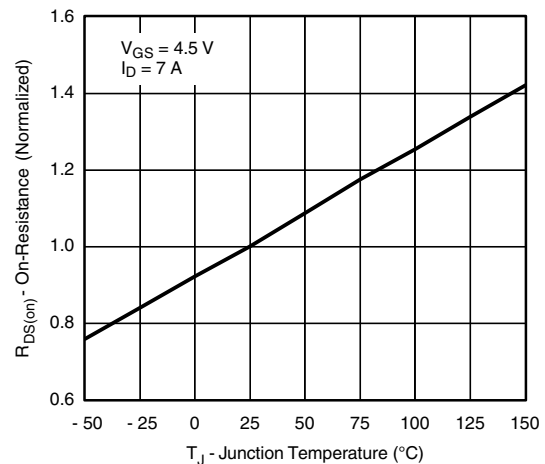
On-Resistance vs. Drain Current



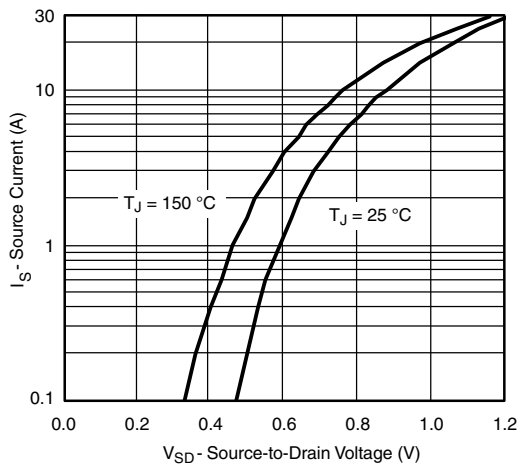
Capacitance



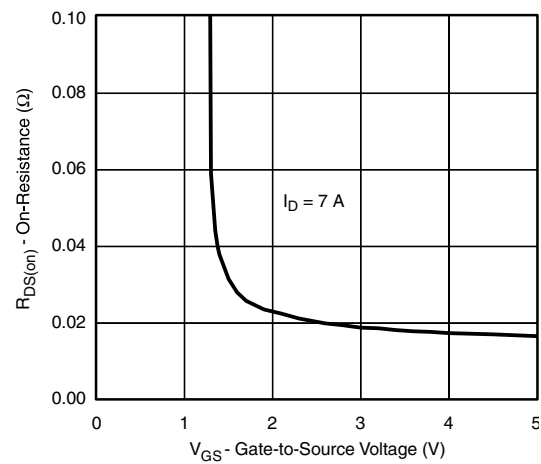
Gate Charge



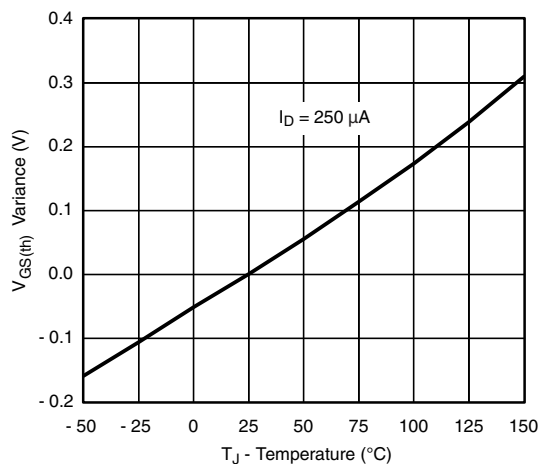
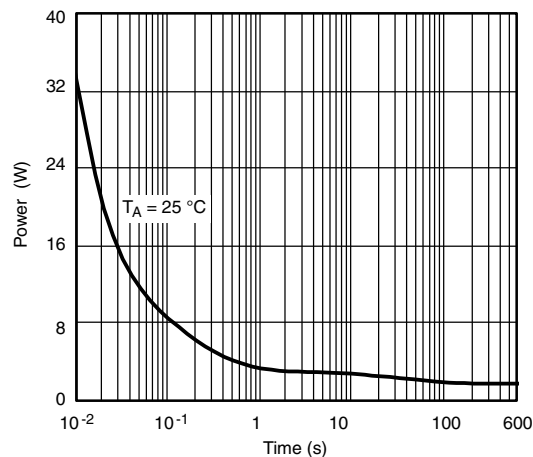
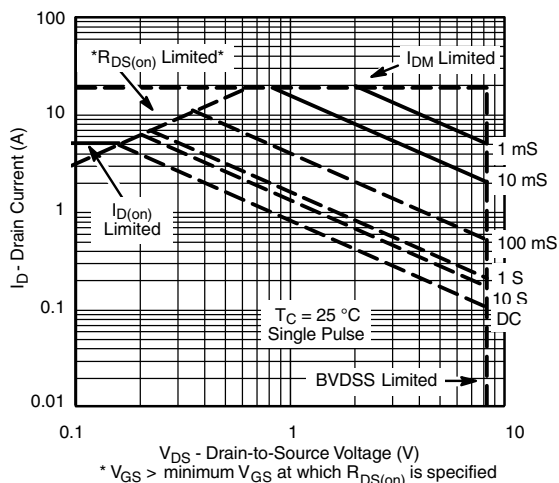
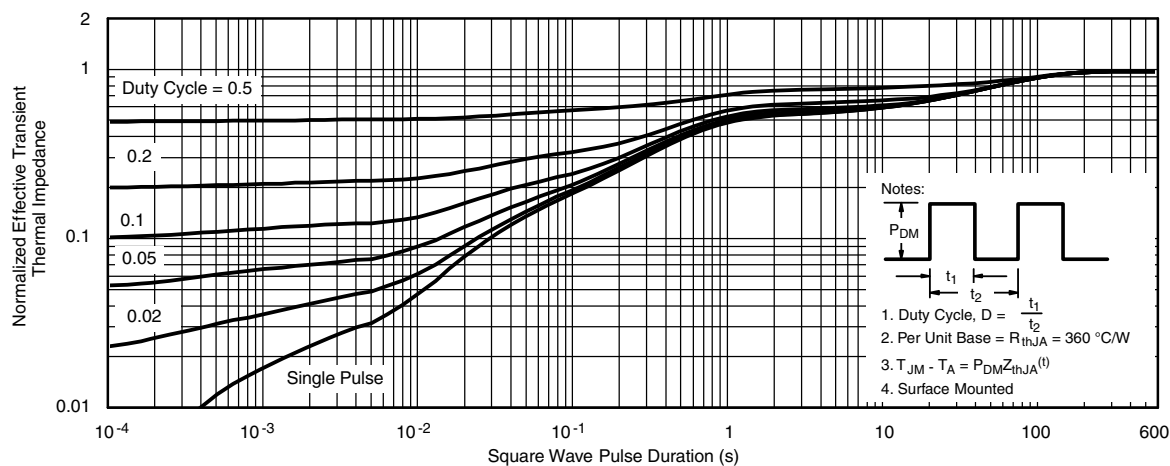
On-Resistance vs. Junction Temperature



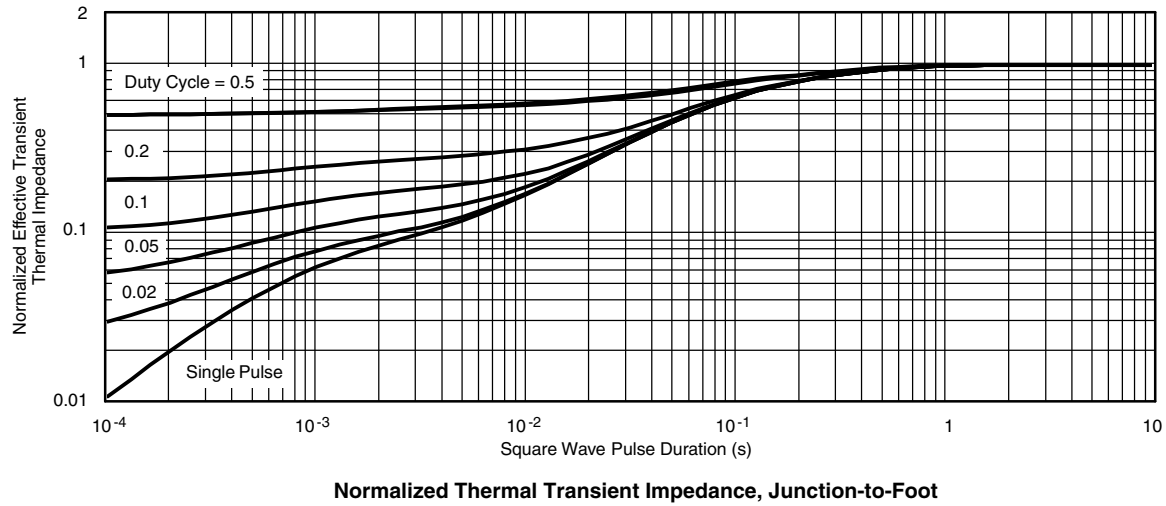
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)**Threshold Voltage****Single Pulse Power****Safe Operating Area****Normalized Thermal Transient Impedance, Junction-to-Ambient**

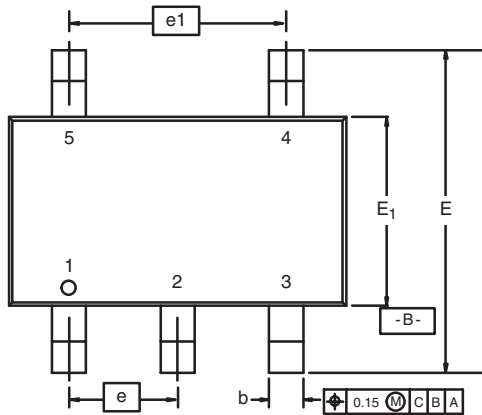
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



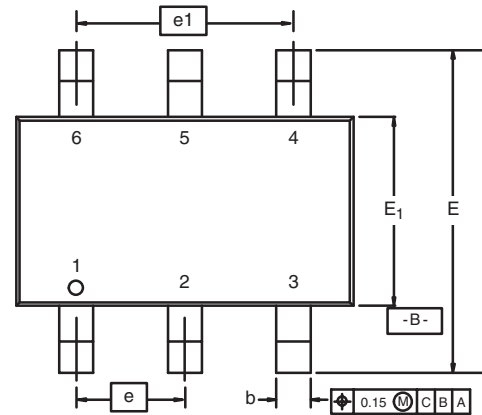
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## TSOP: 5/6-LEAD

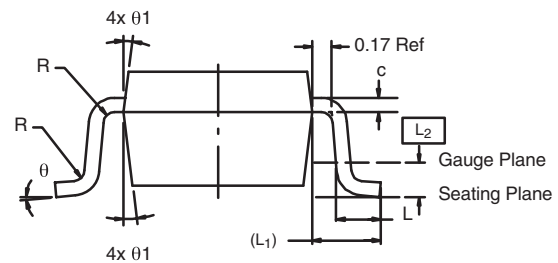
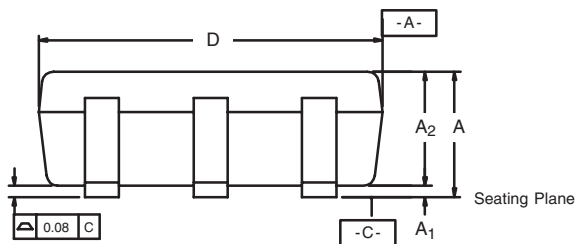
JEDEC Part Number: MO-193C



5-LEAD TSOP

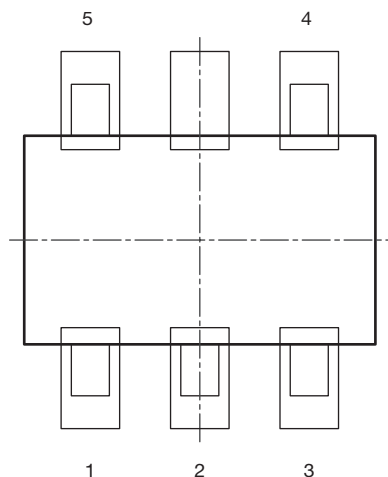


6-LEAD TSOP

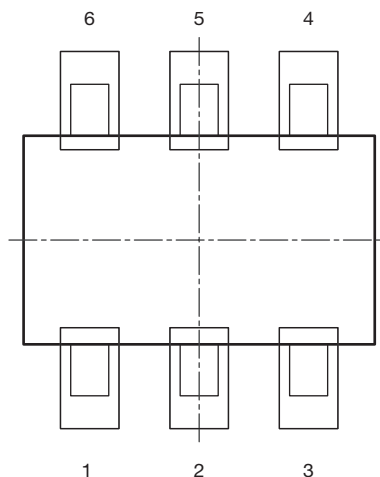


Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	0.91	-	1.10	0.036	-	0.043
A <sub>1</sub>	0.01	-	0.10	0.0004	-	0.004
A <sub>2</sub>	0.90	-	1.00	0.035	0.038	0.039
b	0.30	0.32	0.45	0.012	0.013	0.018
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.95	3.05	3.10	0.116	0.120	0.122
E	2.70	2.85	2.98	0.106	0.112	0.117
E <sub>1</sub>	1.55	1.65	1.70	0.061	0.065	0.067
e	0.95 BSC			0.0374 BSC		
e <sub>1</sub>	1.80	1.90	2.00	0.071	0.075	0.079
L	0.32	-	0.50	0.012	-	0.020
L <sub>1</sub>	0.60 Ref			0.024 Ref		
L <sub>2</sub>	0.25 BSC			0.010 BSC		
R	0.10	-	-	0.004	-	-
θ	0°	4°	8°	0°	4°	8°
θ <sub>1</sub>	7° Nom			7° Nom		
ECN: C-06593-Rev. I, 18-Dec-06						
DWG: 5540						

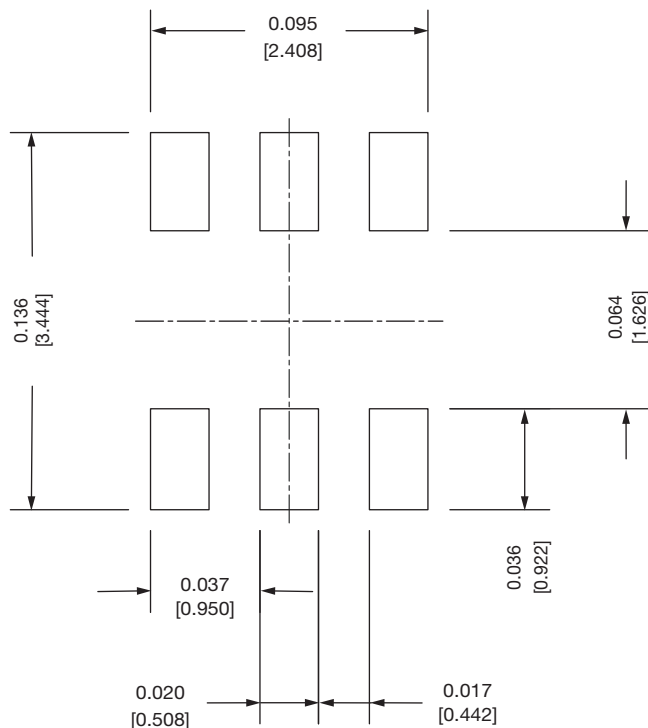
## Recommended Land Pattern For TSOP-5L / TSOP-6L



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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