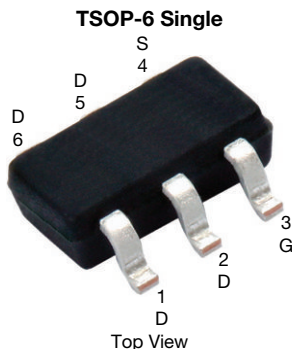


Automotive P-Channel 60 V (D-S) 175 °C MOSFET

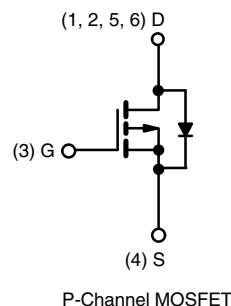


FEATURES

- 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



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

Marking Code: 9Q

ORDERING INFORMATION

Package	TSOP-6
Lead (Pb)-free and halogen-free	SQ3427CEV (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	T _C = 25 °C	-5.3
		T _C = 125 °C	-3
Continuous Source Current (Diode Conduction)	I _S	-6.3	A
Pulsed Drain Current ^a	I _{DM}	-21	
Single Pulse Avalanche Current	I _{AS}	-21	
Single Pulse Avalanche Energy	E _{AS}	22	mJ
Maximum Power Dissipation	P _D	T _C = 25 °C	5
		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	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).

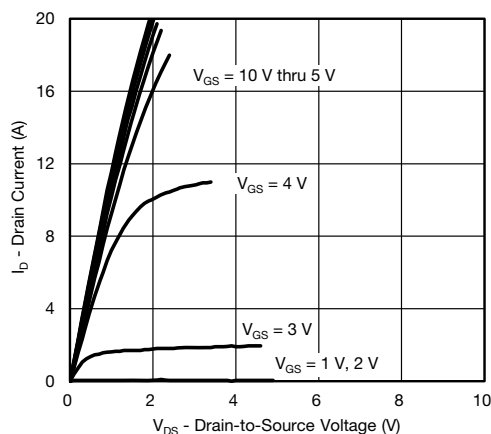
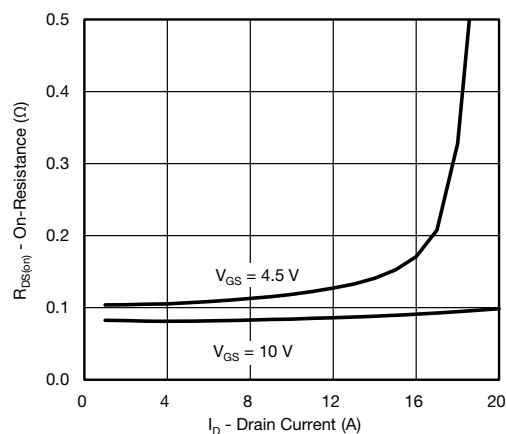
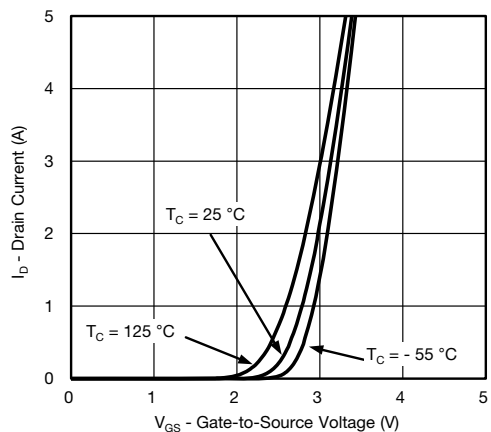
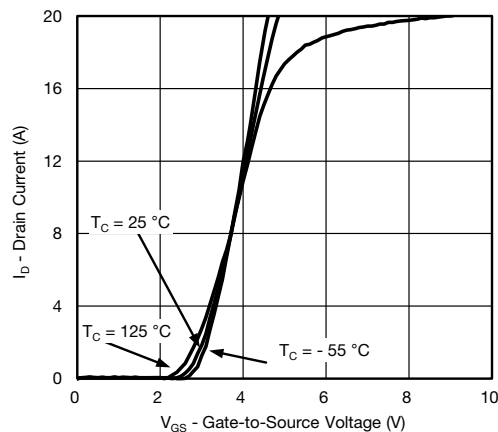
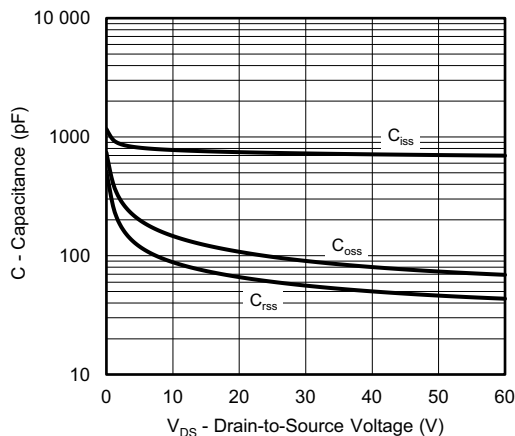
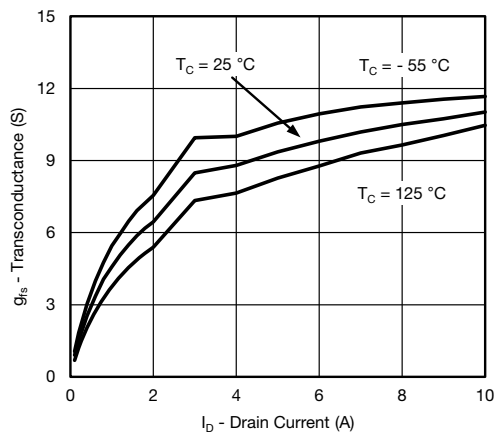


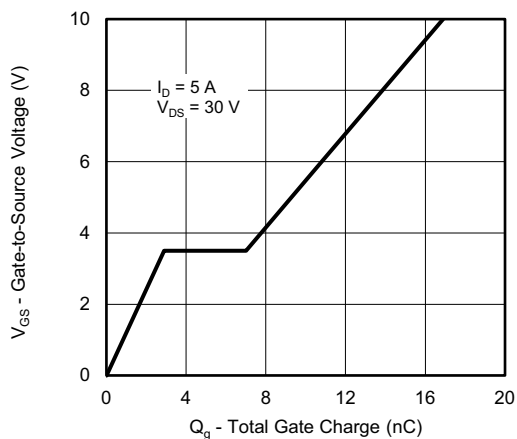
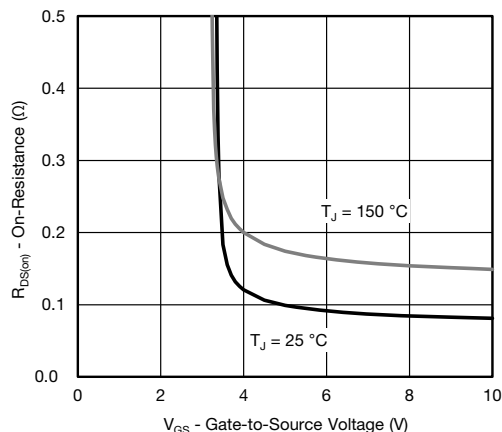
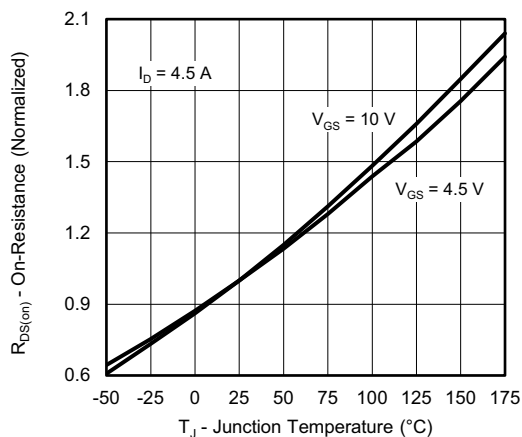
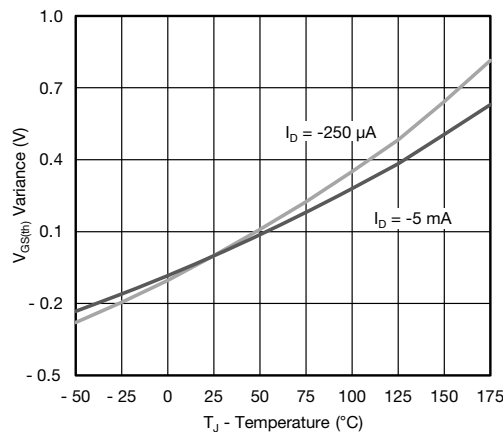
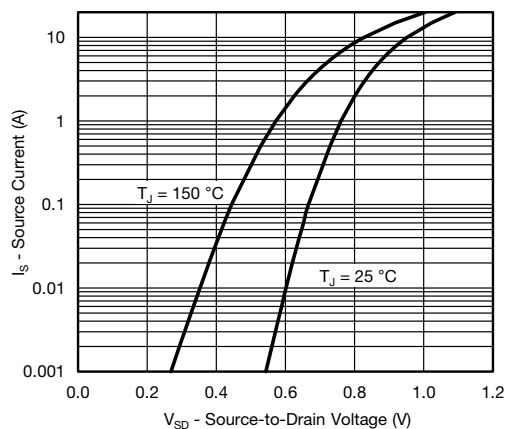
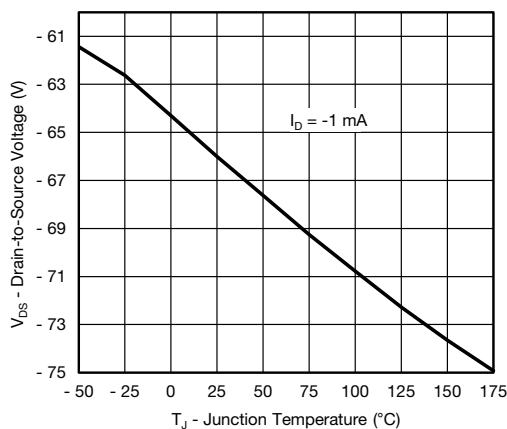
SPECIFICATIONS (T _C = 25 °C, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0, I _D = -250 μA		-60	-	-	V
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250 μA		-1.5	-2	-2.5	
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V		-		± 100	nA
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	-	726	1000	pF
Output Capacitance	C _{oss}			-	91	120	
Reverse Transfer Capacitance	C _{rss}			-	56	80	
Total Gate Charge ^c	Q _g	V _{GS} = -10 V	V _{DS} = -30 V, I _D = -5 A	-	16.9	22	nC
Gate-Source Charge ^c	Q _{gs}			-	2.9	-	
Gate-Drain Charge ^c	Q _{gd}			-	4.1	-	
Gate Resistance	R _g	f = 1 MHz		2.5	5	7.5	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)}			-	25	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/dt = 100 A/μs		-	23	46	ns
Body diode reverse recovery charge	Q _{rr}			-	27	54	nC
Reverse recovery fall time	t _a			-	20	-	
Reverse recovery rise time	t _b			-	3	-	ns
Body diode peak reverse recovery current	I _{RM(REC)}			-	-2.86	-	A

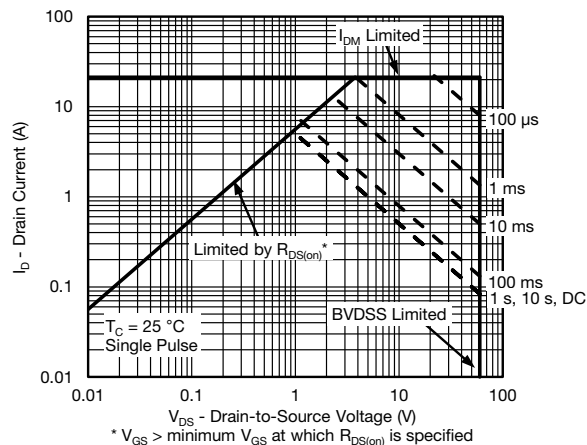
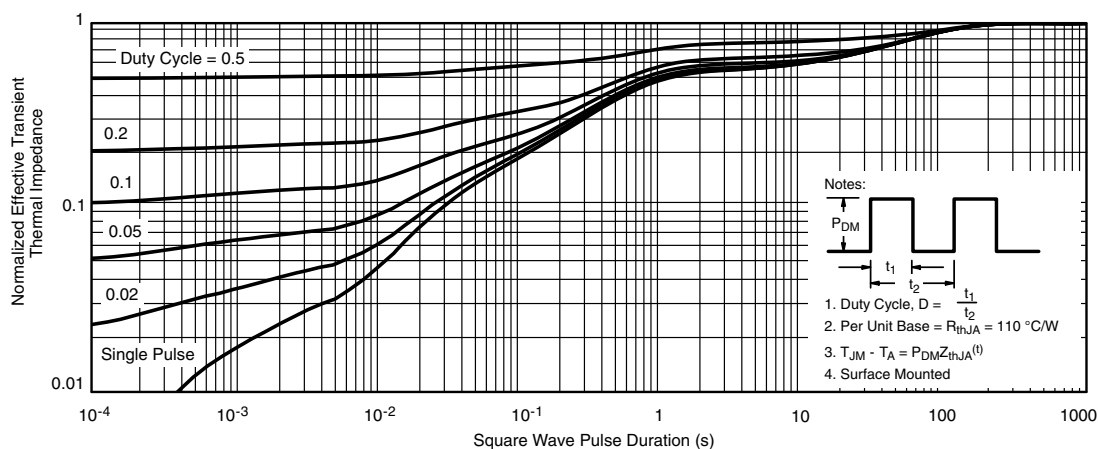
Notes

- 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.

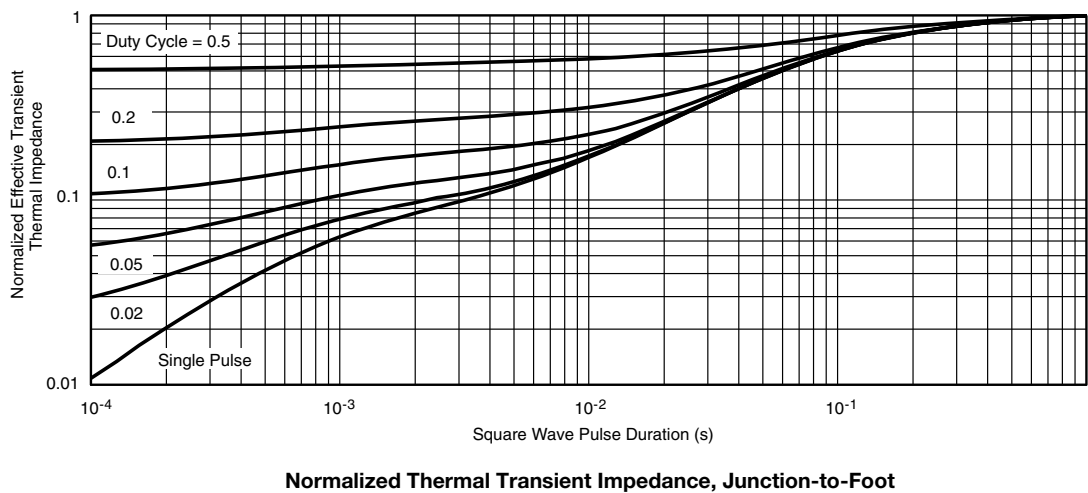
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

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



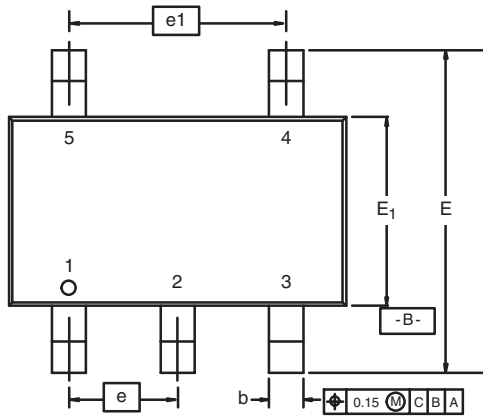
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



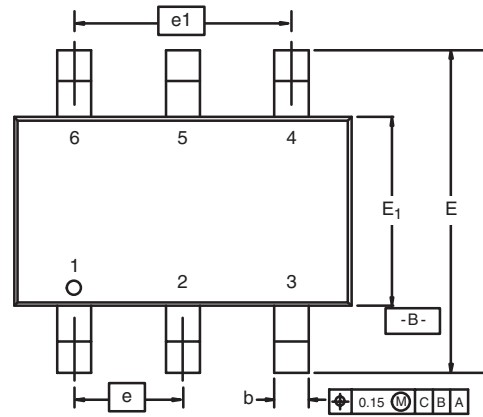
Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package / tape drawings, part marking, and reliability data, see www.vishay.com/ppg?62369.

TSOP: 5/6-LEAD

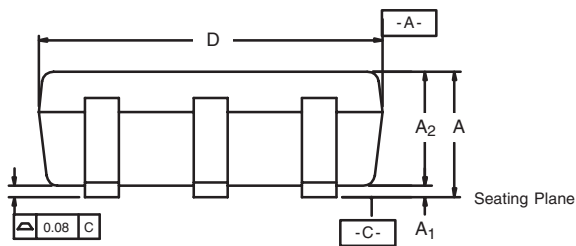
JEDEC Part Number: MO-193C



5-LEAD TSOP

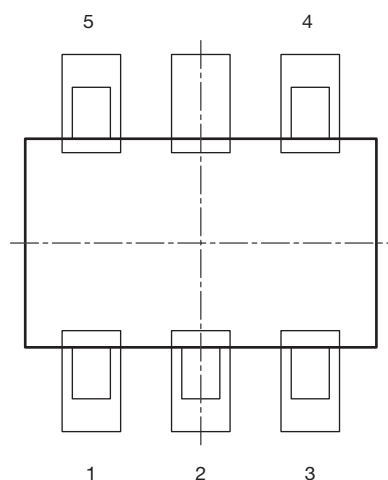


6-LEAD TSOP

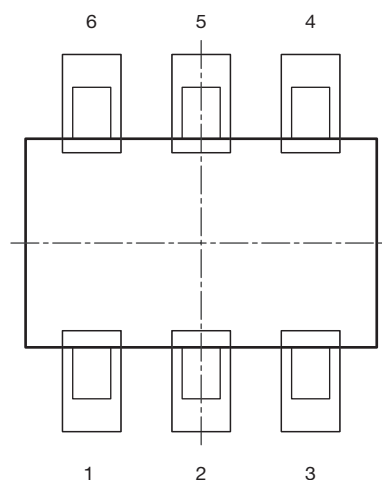


Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	0.91	-	1.10	0.036	-	0.043
A ₁	0.01	-	0.10	0.0004	-	0.004
A ₂	0.90	-	1.00	0.035	0.038	0.039
b	0.30	0.32	0.45	0.012	0.013	0.018
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.95	3.05	3.10	0.116	0.120	0.122
E	2.70	2.85	2.98	0.106	0.112	0.117
E ₁	1.55	1.65	1.70	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						

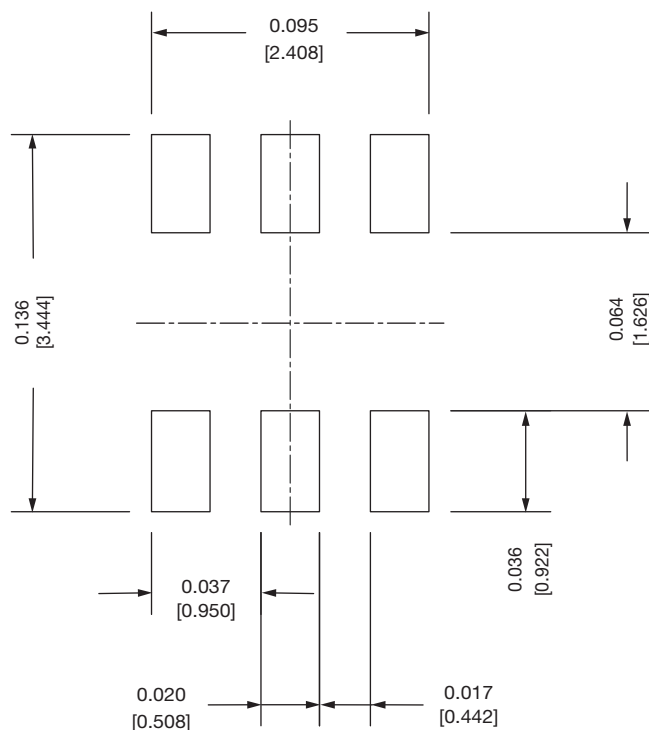
Recommended Land Pattern For TSOP-5L / TSOP-6L



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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