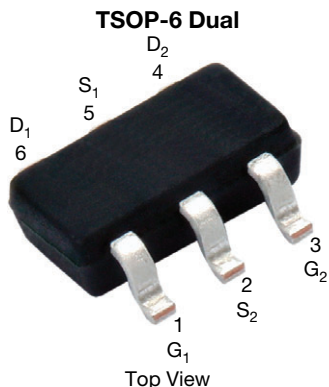


Automotive Dual P-Channel 30 V (D-S) 175 °C MOSFET



Marking code: 8X

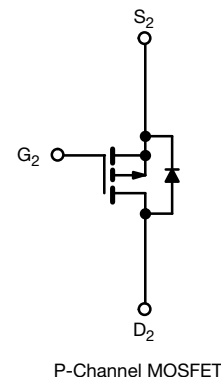
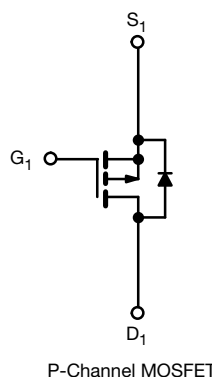
PRODUCT SUMMARY	
V_{DS} (V)	-30
$R_{DS(on)}$ (Ω) at $V_{GS} = -10$ V	-0.110
$R_{DS(on)}$ (Ω) at $V_{GS} = -4.5$ V	-0.185
I_D (A)	-2.75
Configuration	Dual
Package	TSOP-6

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



ABSOLUTE MAXIMUM RATINGS ($T_A = 25$ °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-source voltage		V_{DS}	-30	V
Gate-source voltage		V_{GS}	± 20	
Continuous drain current ($T_J = 150$ °C) ^a	$T_C = 25$ °C	I_D	-3	A
	$T_C = 125$ °C		-1.74	
Pulsed drain current		I_{DM}	-11	
Continuous source current (diode conduction) ^a		I_S	-2.1	W
Maximum power dissipation ^a	$T_C = 25$ °C	P_D	1.67	
	$T_C = 125$ °C		0.56	
Unclamped inductive surge UIS		I_{AV}	-5	A
Operating junction and storage temperature range		T_J, T_{stg}	-55 to +175	°C

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	LIMIT	UNIT
Maximum junction-to-ambient ^a	Steady state	R_{thJA}	150	°C/W
Maximum junction-to-foot (drain)	Steady state	R_{thJF}	90	

Note

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

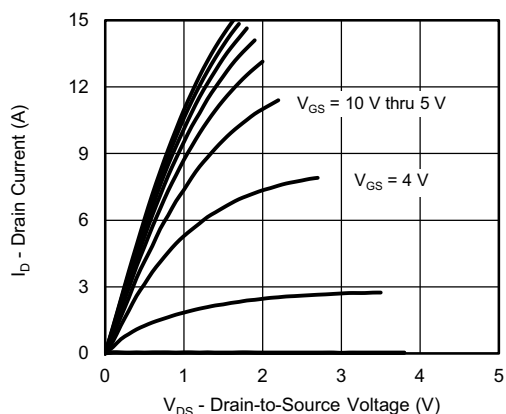
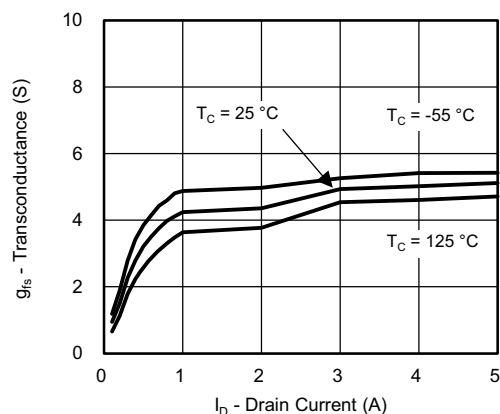
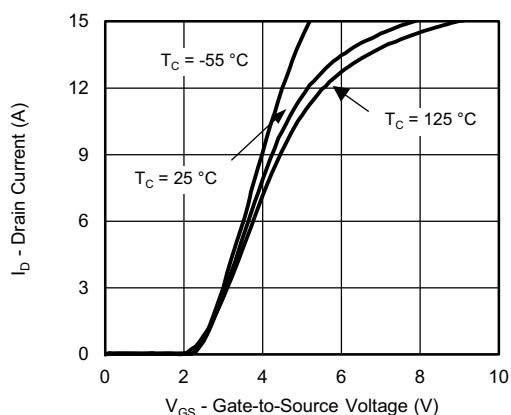
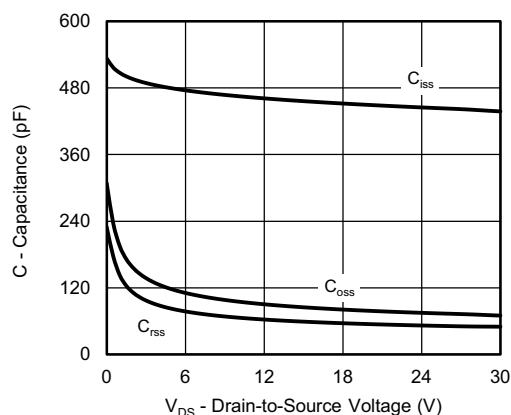
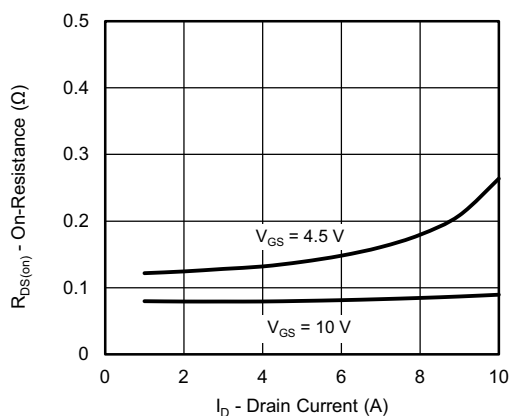
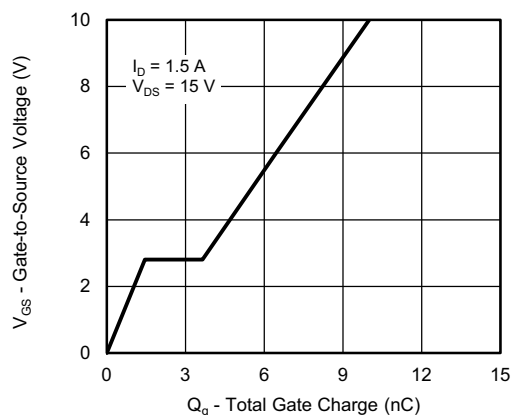


SPECIFICATIONS (T _J = 25°C, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250 μA		-1.5	-	-2.5	V
Gate-body leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V		-	-	± 100	nA
Zero gate voltage drain current	I _{DSS}	V _{GS} = 0 V	V _{DS} = -30 V	-	-	-1	μA
		V _{GS} = 0 V	V _{DS} = -30 V, T _J = 175 °C	-	-	-50	
On-state drain current ^a	I _{D(on)}	V _{GS} = -10 V	V _{DS} ≤ -5 V	-4	-	-	A
Drain-source on-state resistance ^a	R _{DS(on)}	V _{GS} = -10 V	I _D = -1.5 A	-	0.085	0.133	Ω
		V _{GS} = -4.5 V	I _D = -2 A	-	0.135	0.185	
Forward transconductance ^a	g _{fs}	V _{DS} = -5 V, I _D = -1 A		-	4.2	-	S
Diode forward voltage ^a	V _{SD}	I _S = -0.5 A, V _{GS} = 0 V		-	-0.83	-1.10	V
Dynamic ^b							
Input capacitance	C _{iss}	V _{GS} = 0 V	V _{DS} = -15 V	-	456	570	pF
Output capacitance	C _{oss}			-	85	106	
Reverse capacitance	C _{rss}			-	59	74	
Total gate charge	Q _g	V _{GS} = -10 V	V _{DS} = -15 V, I _D = -3 A	-	9.7	12.2	nC
Gate-source charge	Q _{gs}			-	1.3	-	
Gate-drain charge	Q _{gd}			-	2	-	
Gate resistance	R _g	f = 1 MHz		9	-	24	Ω
Turn-on delay time	t _{d(on)}	V _{DD} = -10 V, R _L = 10 Ω, I _D ≅ -1 A, V _{GEN} = -10 V, R _g = 1 Ω		-	6.6	8.3	ns
Rise time	t _r			-	2.4	3	
Turn-off delay time	t _{d(off)}			-	18.4	23	
Fall time	t _f			-	2.2	2.8	
Source-Drain Diode Ratings and Characteristic ^b							
Pulsed current	I _{SM}			-	-	-11	A
Forward voltage	V _{SD}	I _F = 0.5 A, V _{GS} = 0 V		-	-0.83	-1.1	V
Reverse recovery fall time	t _a	V _{DD} = -24 V, I _{FM} = -1.5 A, di/dt = 100 A/μs, R = 160 Ω, L = 1 mH, pulse W = 2 μs		-	9.1	-	ns
Reverse recovery rise time	t _b			-	4.8	-	ns
Body diode reverse recovery time	t _{rr}			-	14	28	ns
Body diode reverse recovery charge	Q _{rr}			-	9	18	μC
Body diode peak reverse recovery current	I _{RM(REC)}			-	-1.4	-	A

Notes

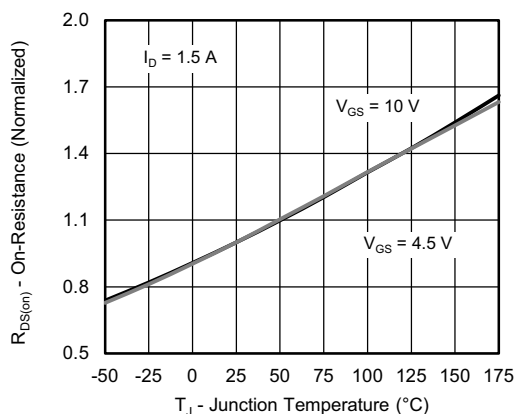
- a. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\ \%$
b. Guaranteed by design, not subject to production testing

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.

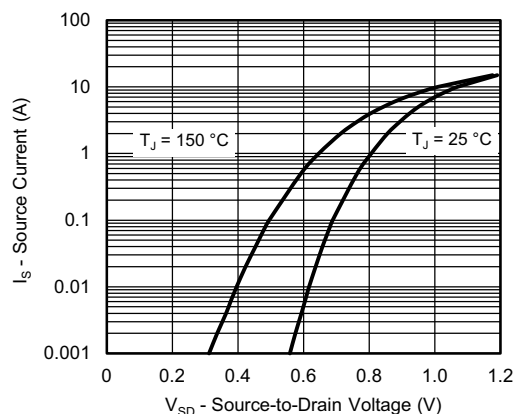
TYPICAL CHARACTERISTICS (25 °C unless otherwise noted)

Output Characteristics

Transconductance

Transfer Characteristics

Capacitance

On-Resistance vs. Drain Current

Gate Charge



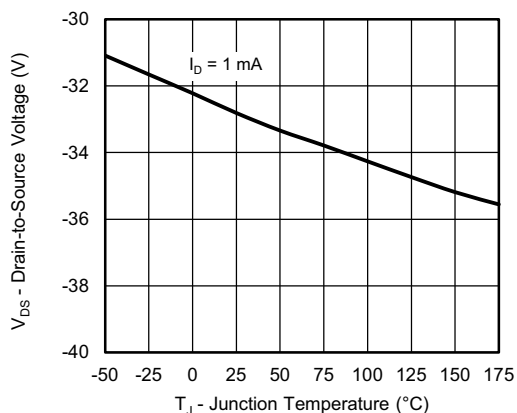
TYPICAL CHARACTERISTICS (25 °C unless otherwise noted)



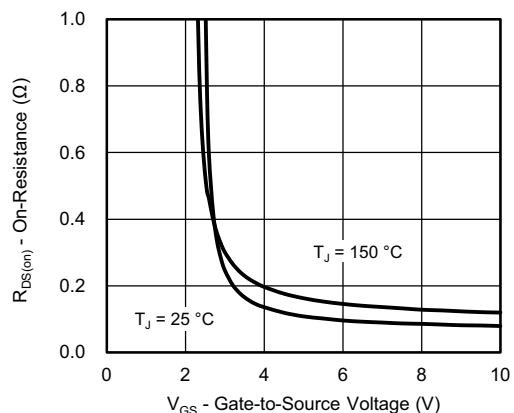
On-Resistance vs. Junction Temperature



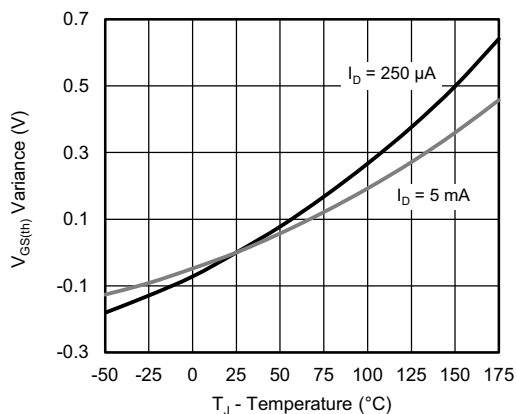
Source-Drain Diode Forward Voltage



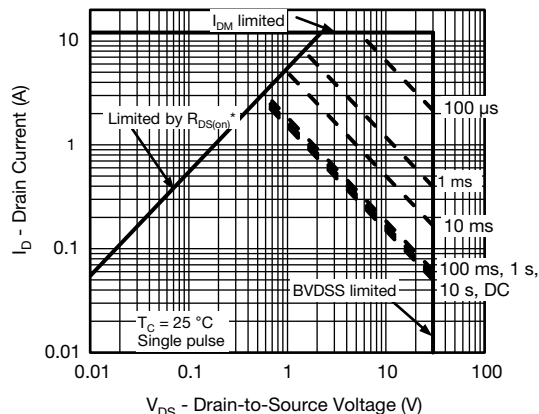
Drain Source Breakdown vs. Junction Temperature



On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

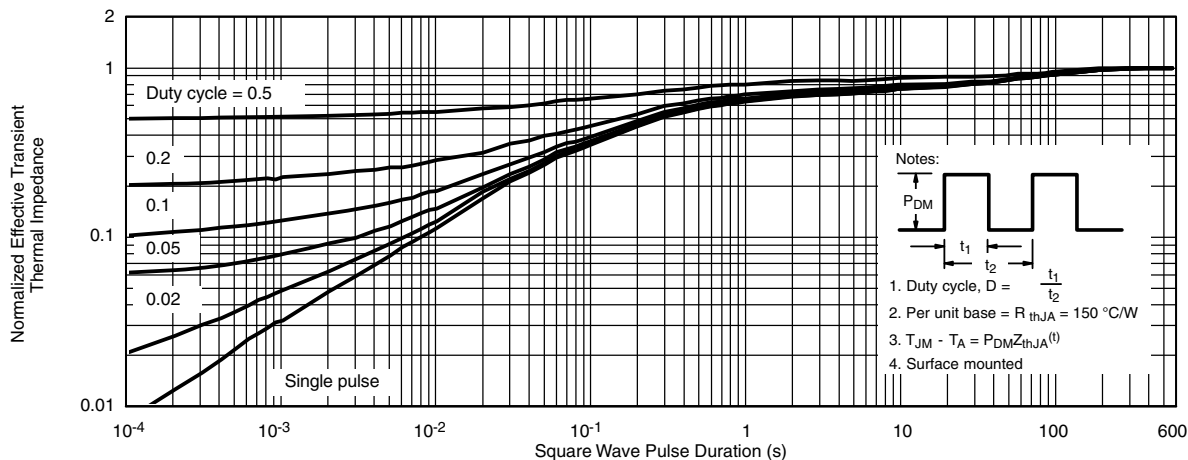


* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

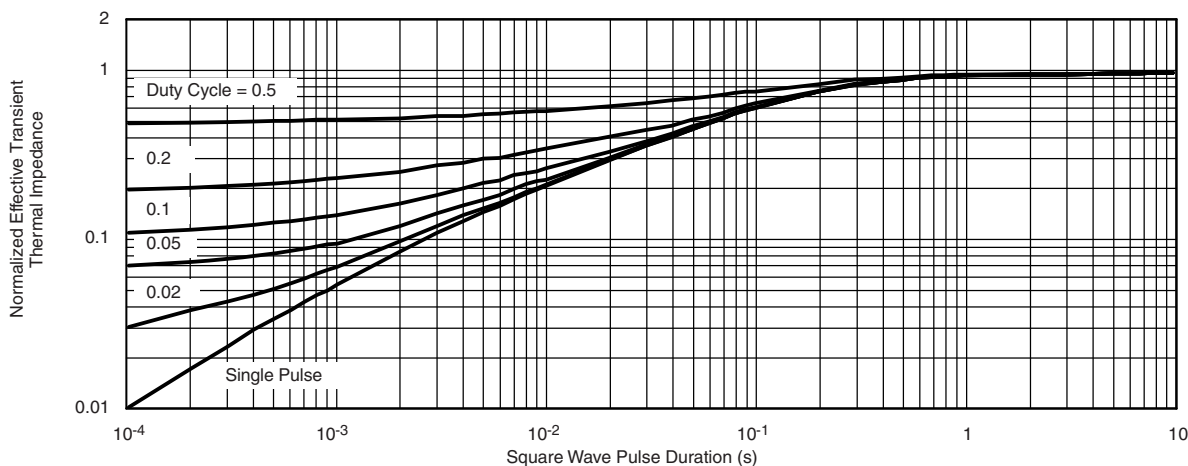
Safe Operating Area, Junction-to-Case



TYPICAL CHARACTERISTICS (25 °C unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient

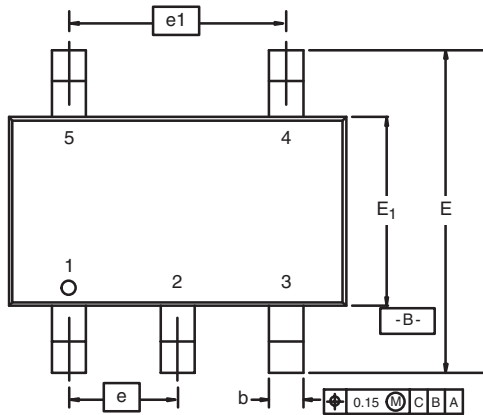


Normalized Thermal Transient Impedance, Junction-to-Foot

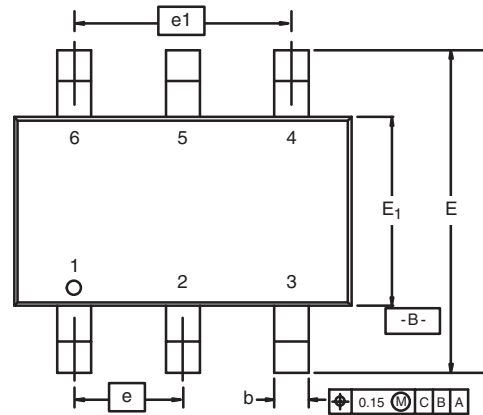
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TSOP: 5/6-LEAD

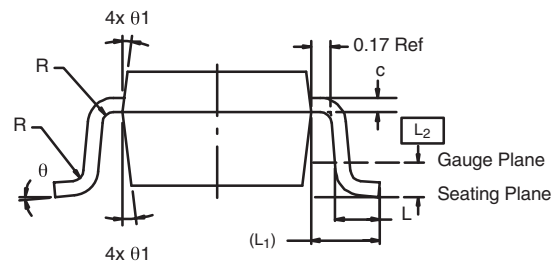
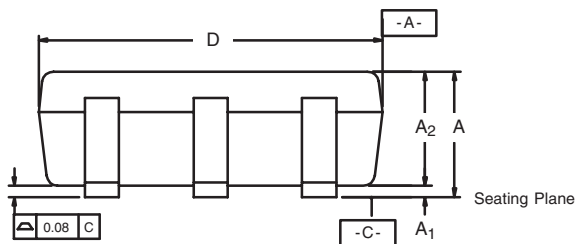
JEDEC Part Number: MO-193C



5-LEAD TSOP

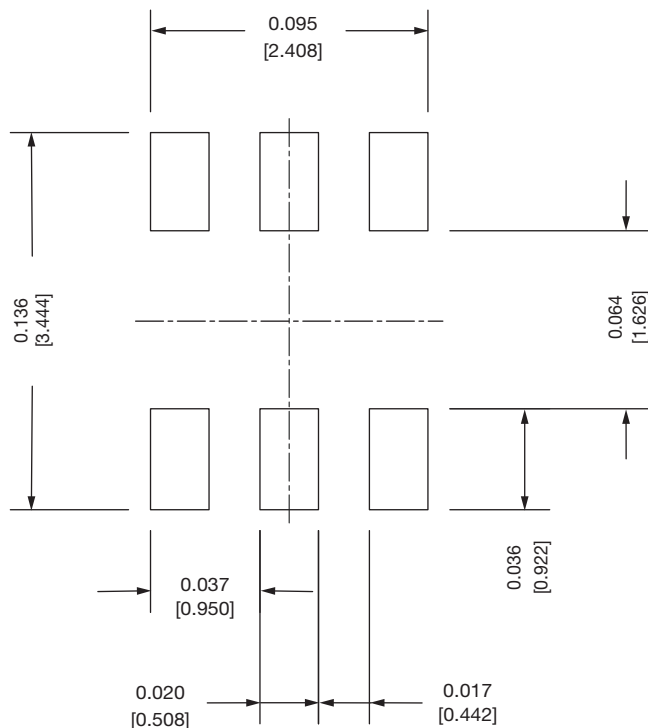
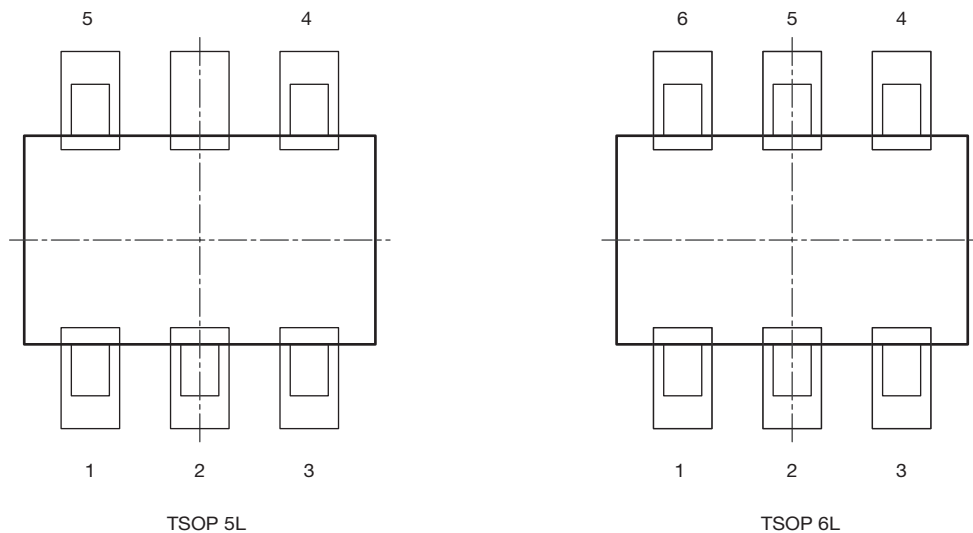


6-LEAD TSOP



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 Land Pattern For 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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