

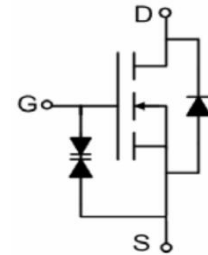


MX2N7002

N-Channel Enhancement Mode Power MOSFET

General Features

- $V_{DS} = 60V, I_D = 0.3A$
- $V_{GS} = 5V, R_{DS(ON)}(Typ.) = 1.3\Omega$
- $V_{GS} = 10V, R_{DS(ON)}(Typ.) = 1\Omega$
- ESD Rating: HBM 2300V

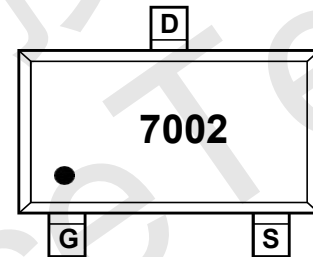


Schematic diagram

1. High power and current handling capability
2. Lead free product is acquired
3. Surface mount package

Application

1. Direct logic-level interface: TTL/CMOS
2. Drivers: relays, solenoids, lamps, hammers, display, memories, transistors, etc.
3. Battery operated systems
4. Solid-state relays



Marking and pin assignment
SOT-23 (TOP VIEW)

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current (T _J = 150°C)	I_D	T _A = 25°C	0.3
		T _A = 100°C	0.19
Drain Current-Pulsed (Note 1)	I_{DM}	0.8	A
Maximum Power Dissipation	P_D	0.35	W
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 To 150	°C



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Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	60	68	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±10V, V _{DS} =0V	-	±100	±500	nA
		V _{GS} =±20V, V _{DS} =0V	-	±4	±10	uA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1	1.7	2.5	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} =5V, I _D =0.4A	-	1.3	3	Ω
		V _{GS} =10V, I _D =0.5A	-	1	2	Ω
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =0.2A	0.1	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, F=1.0MHz	-	21	50	PF
Output Capacitance	C _{OSS}		-	11	25	PF
Reverse Transfer Capacitance	C _{rSS}		-	4.2	5	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =30V, I _D =0.2A V _{GS} =10V, R _{GEN} =10Ω	-	10	-	nS
Turn-on Rise Time	t _r		-	50	-	nS
Turn-Off Delay Time	t _{d(off)}		-	17	-	nS
Turn-Off Fall Time	t _f		-	10	-	nS
Total Gate Charge	Q _g	V _{DS} =10V, I _D =0.3A, V _{GS} =4.5V	-	1.7	3	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =0.2A	-	-	1.3	V
Diode Forward Current (Note 2)	I _S		-	-	0.2	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

Thermal Characteristics

Thermal Resistance, Junction-to-Ambient (Note 2)	R _{th JA}	350	°C/W
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Typical Performance Characteristics

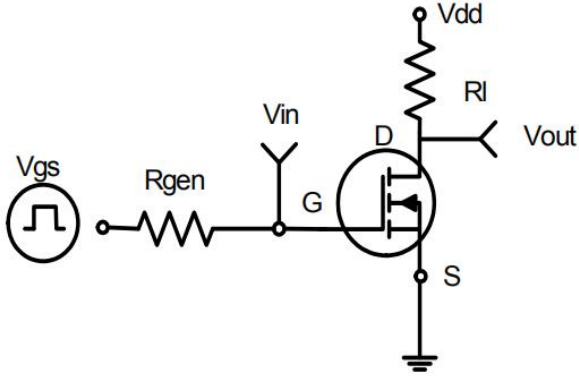


Figure 1: Switching Test Circuit

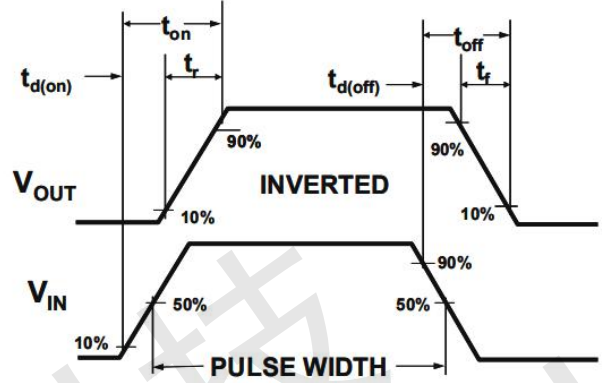


Figure 2: Switching Waveforms

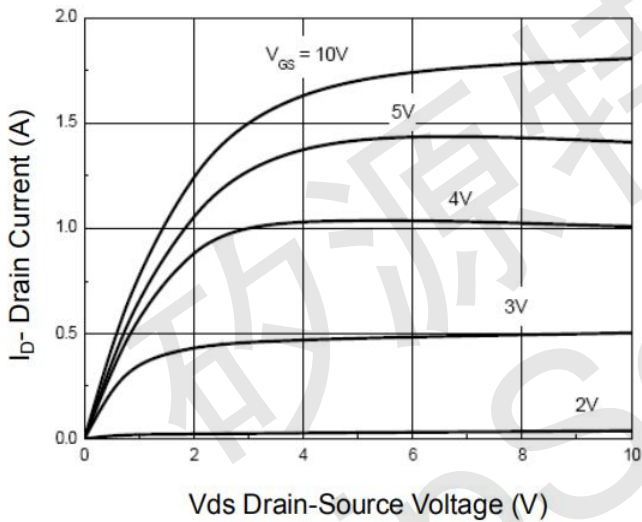


Figure 3 Output Characteristics

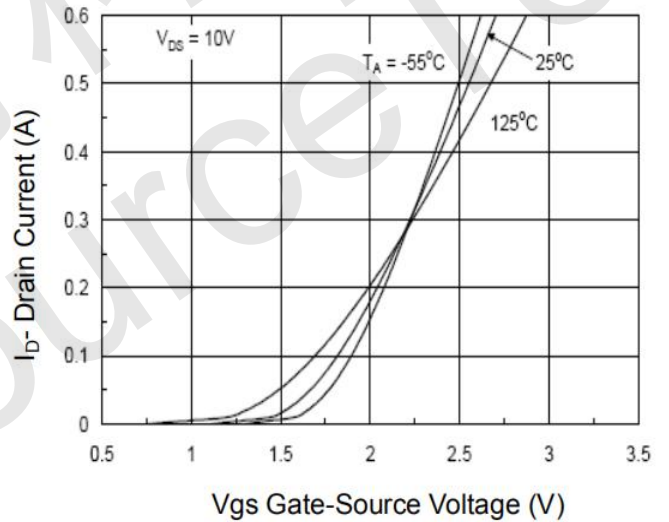


Figure 4 Transfer Characteristics

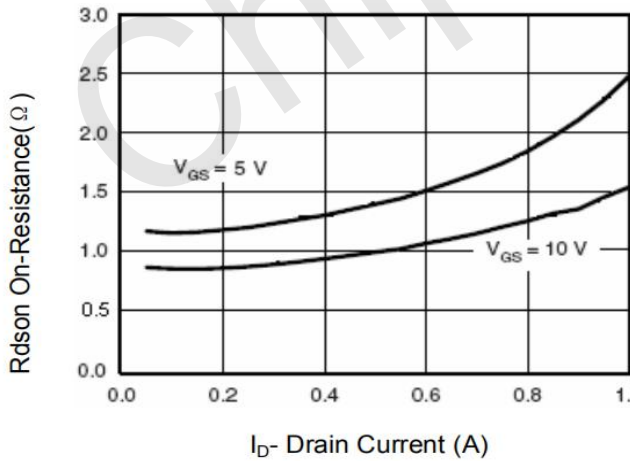


Figure 5 Drain-Source On-Resistance

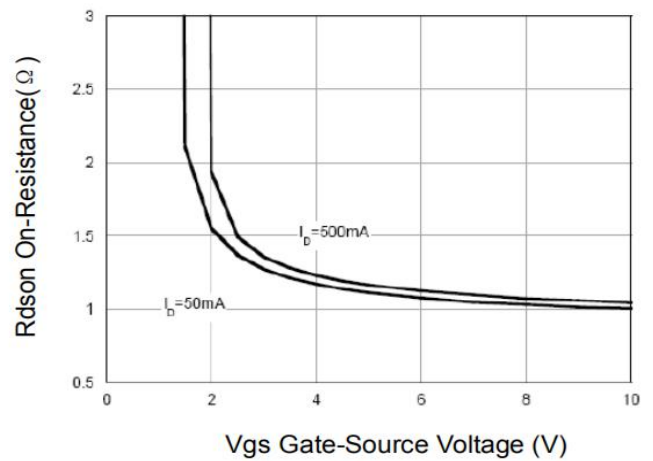


Figure 6 Rds(on) vs Vgs



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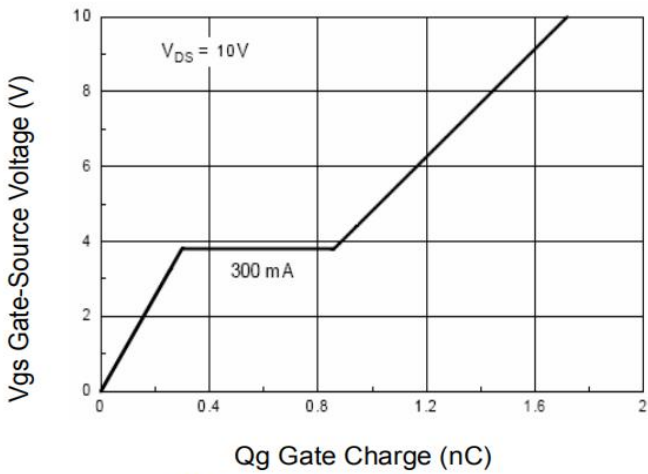


Figure 7 Gate Charge

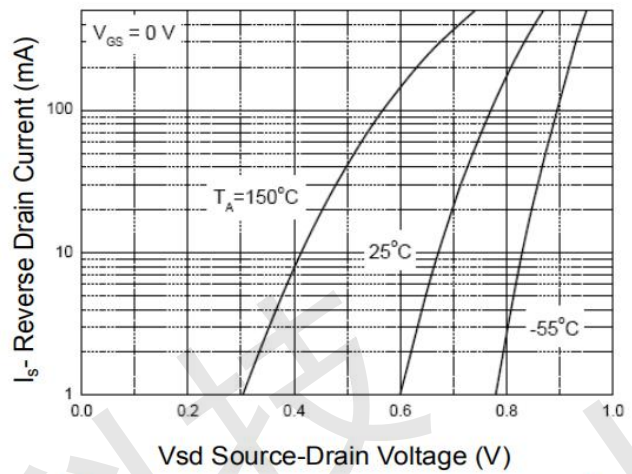


Figure 8 Source-Drain Diode Forward

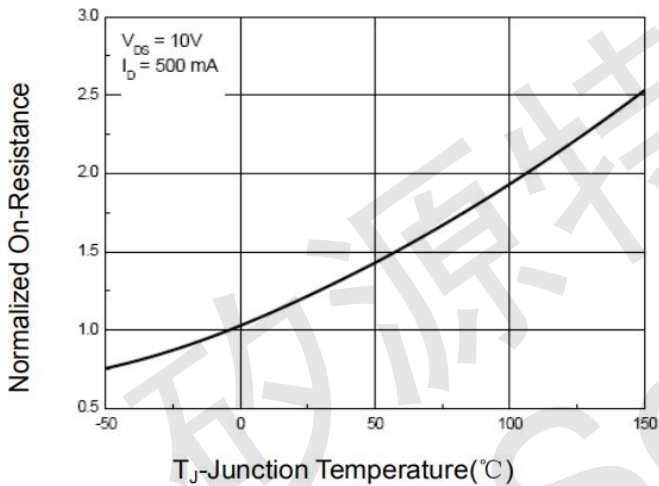


Figure 9 Drain-Source On-Resistance

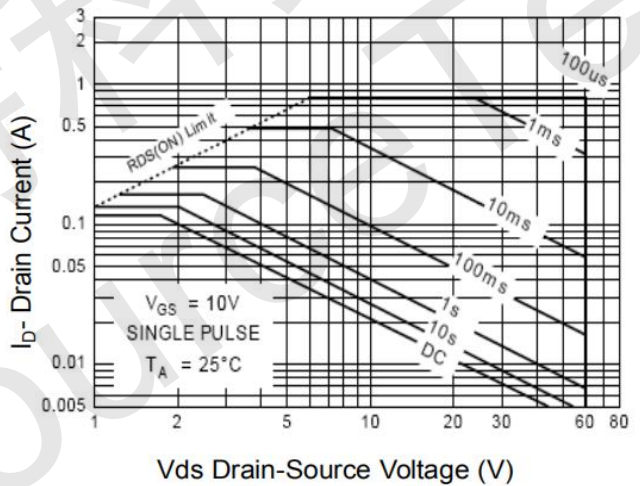


Figure 10 Safe Operation Area

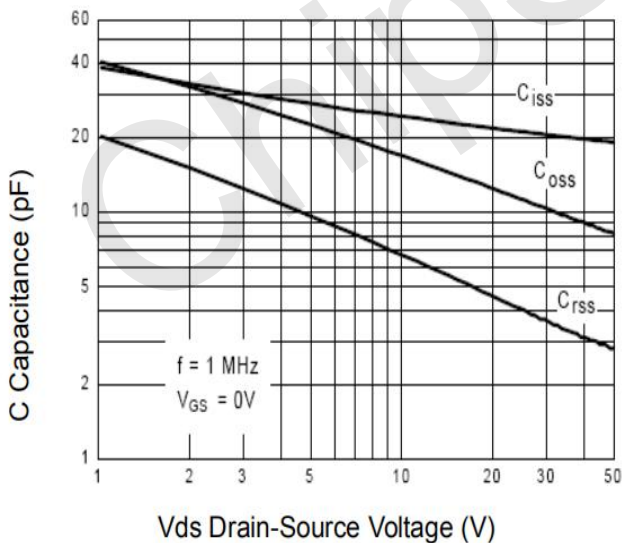


Figure 11 Capacitance vs Vds



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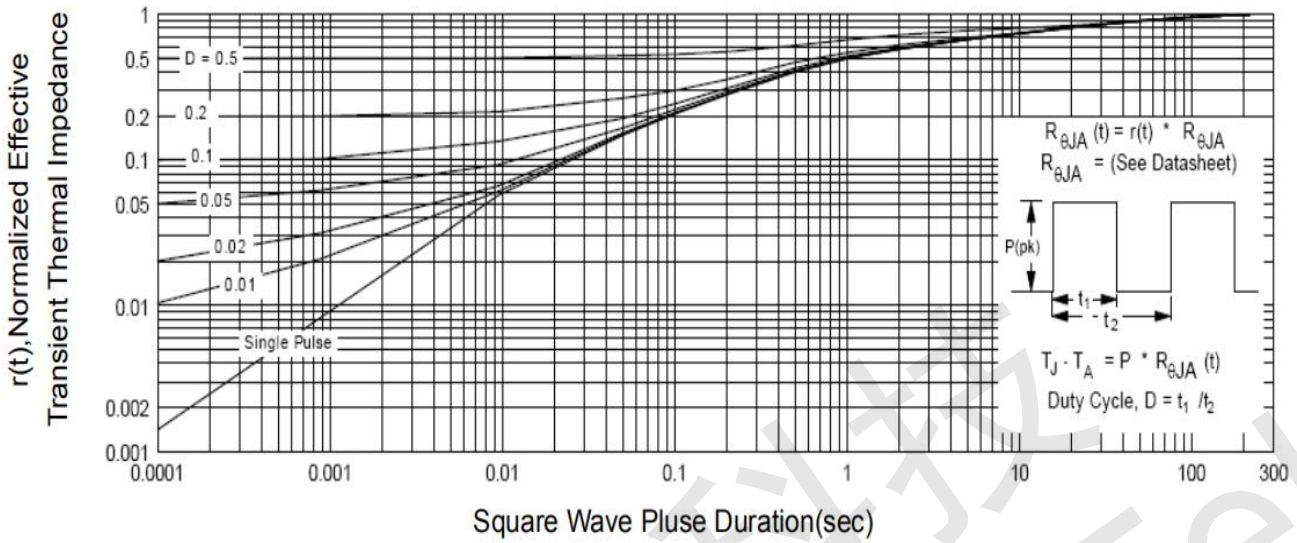
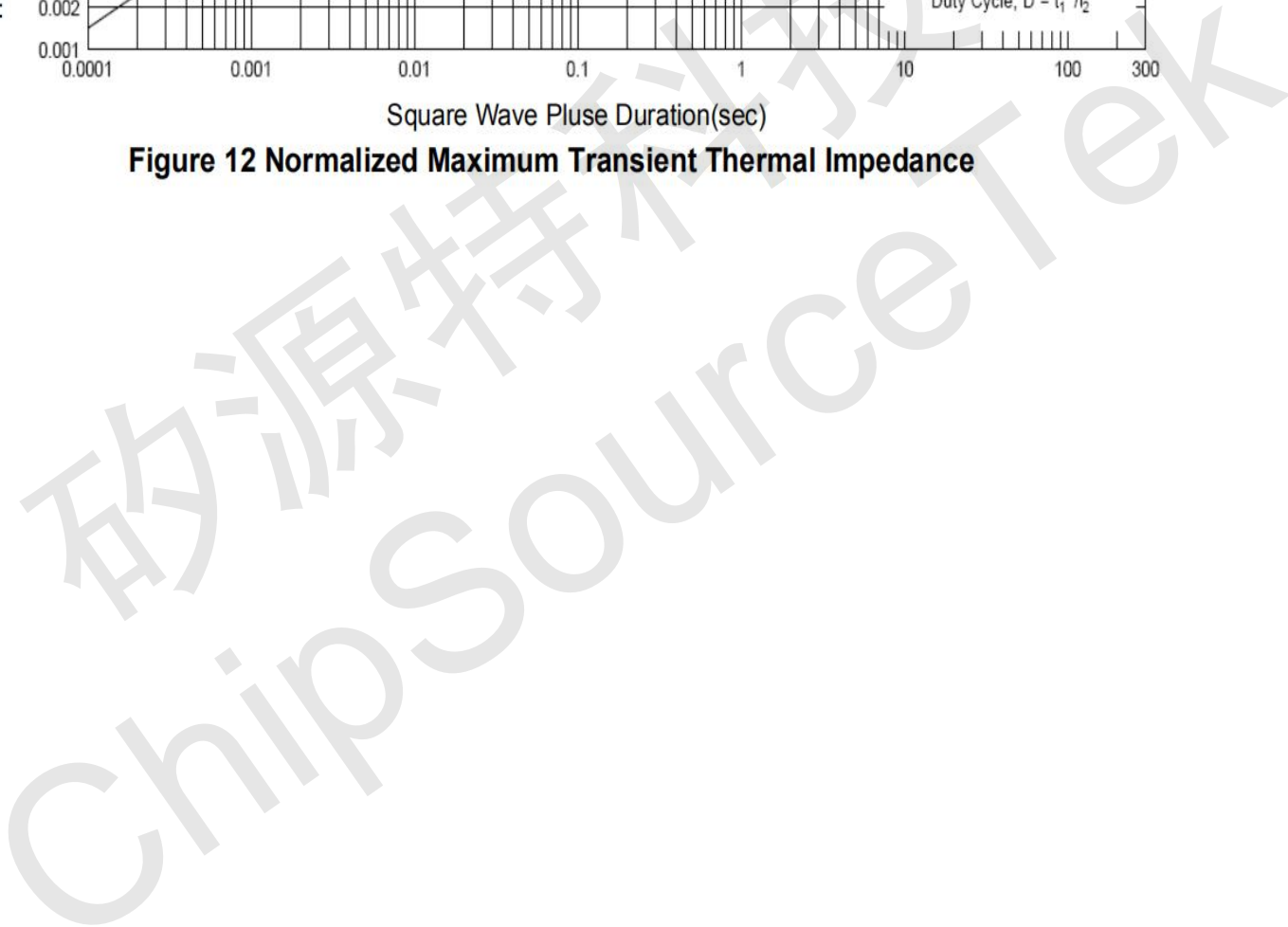


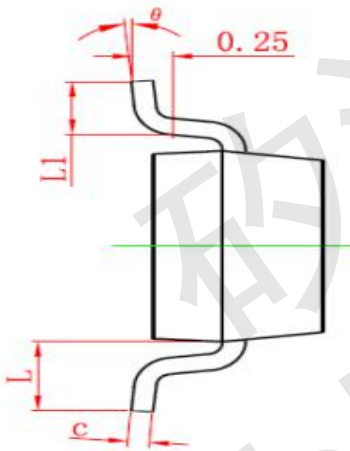
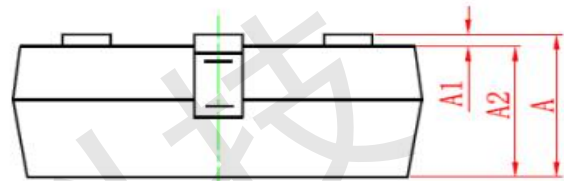
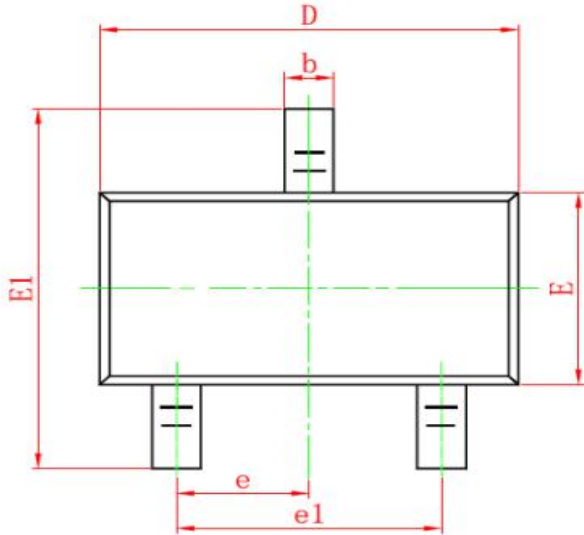
Figure 12 Normalized Maximum Transient Thermal Impedance





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SOT-23-3L Package Information



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950 TYP	
e1	1.800	2.000
L	0.550 REF	
L1	0.300	0.500
theta	0°	8°

Notes

1. All dimensions are in millimeters.
2. Tolerance $\pm 0.10\text{mm}$ (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.