



## MX3N10G

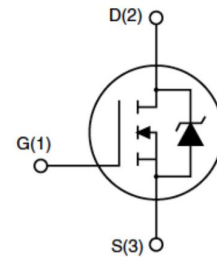
### N-Channel Enhancement Mode Power MOSFET

#### General Features

$V_{DS} = 100V$ ,  $I_D = 2.2A$

$V_{GS} = 4.5V$   $R_{DS(ON)}(Typ.) = 260m\Omega$

$V_{GS} = 10V$   $R_{DS(ON)}(Typ.) = 250m\Omega$

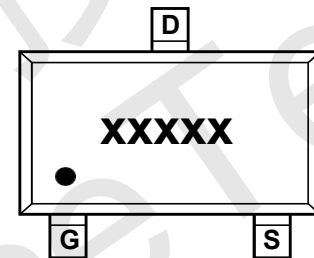


Schematic diagram

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

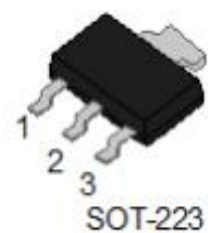
#### Application

1. Uninterruptible Power Supply(UPS)
2. Hard Switched and High Frequency Circuits
3. Power Switching application



Marking and pin assignment

#### Package



#### Absolute Maximum Ratings ( $T_A = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	Max.			Units		
		SOT-23	SOT89-3	SOT-223			
$V_{DSS}$	Drain-Source Voltage	100			V		
$V_{GSS}$	Gate-Source Voltage	$\pm 20$			V		
$I_D$	Continuous Drain Current	$T_C = 25^\circ C$		2.2	A		
		$T_C = 100^\circ C$		1.5	A		
$I_{DM}$	Pulsed Drain Current <sup>note1</sup>	12			A		
$P_D$	Power Dissipation	$T_A = 25^\circ C$		2.5	3.9	5	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	50	32	25	$^\circ C/W$		
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150			$^\circ C$		



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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	100	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =100V, V <sub>GS</sub> = 0V,	-	-	1.0	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V	-	-	±100	nA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	1.8	3.0	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance note2	V <sub>GS</sub> =10V, I <sub>D</sub> =2A	-	250	280	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =1A	-	260	310	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =3A	-	1.1	-	S
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =50V, V <sub>GS</sub> = 0V, f = 1.0MHz	-	330	-	pF
C <sub>oss</sub>	Output Capacitance		-	88	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	15	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =50V, I <sub>D</sub> =1A, V <sub>GS</sub> =10V	-	5.2	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	1.0	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	1.4	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =50V, R <sub>L</sub> =39Ω, R <sub>G</sub> =1Ω, V <sub>GS</sub> =10V	-	14	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	54	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	18	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	11	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	3	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	12	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> = 0V, I <sub>S</sub> =1A	-	-	1.2	V

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width≤300μs, Duty Cycles≤2%

### 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



## MX3N10G

### Typical Performance Characteristics

Figure 1: Output Characteristics

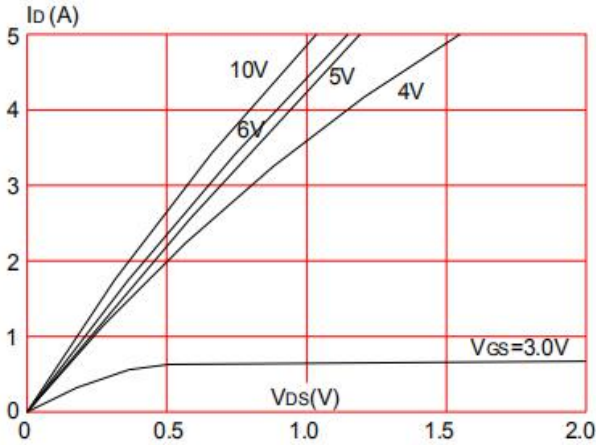


Figure 2: Typical Transfer Characteristics

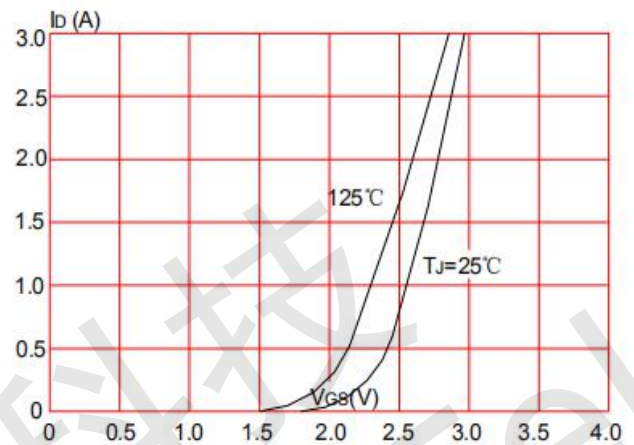


Figure 3: On-resistance vs. Drain Current

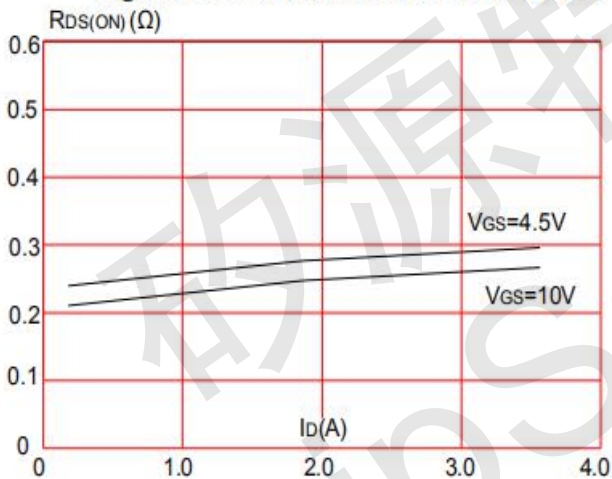


Figure 4: Body Diode Characteristics

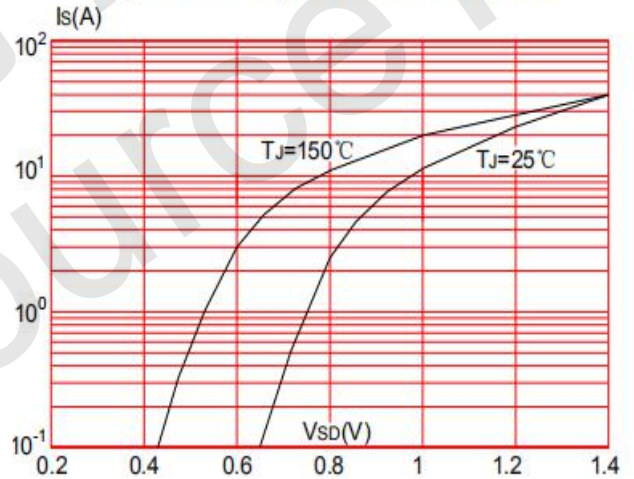


Figure 5: Gate Charge Characteristics

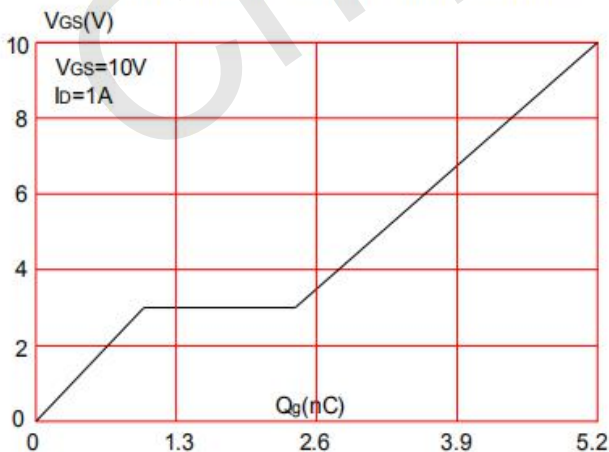
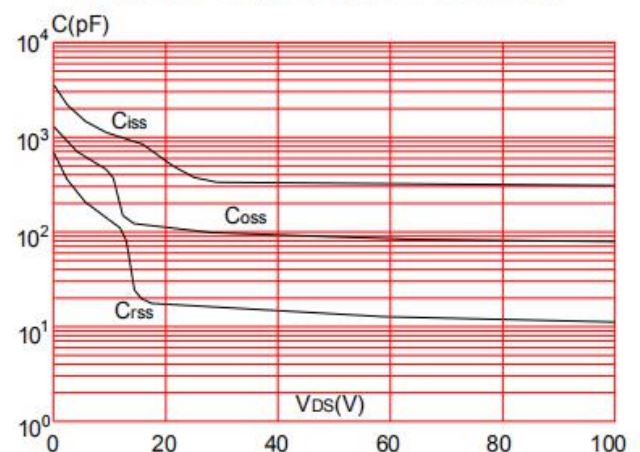


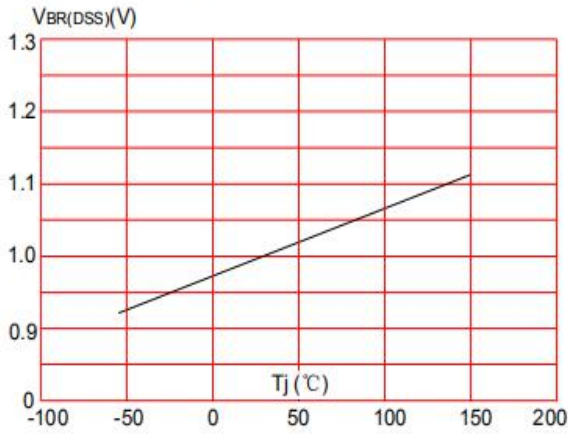
Figure 6: Capacitance Characteristics



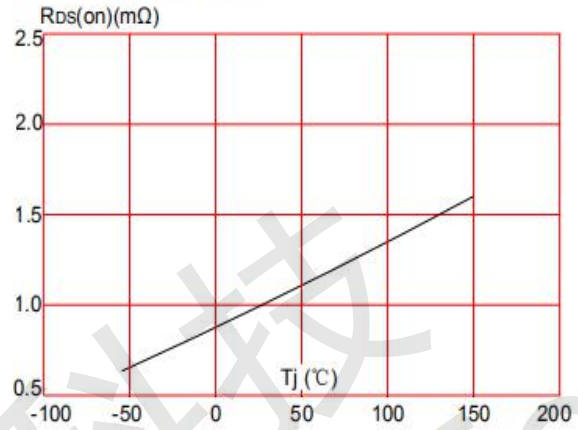


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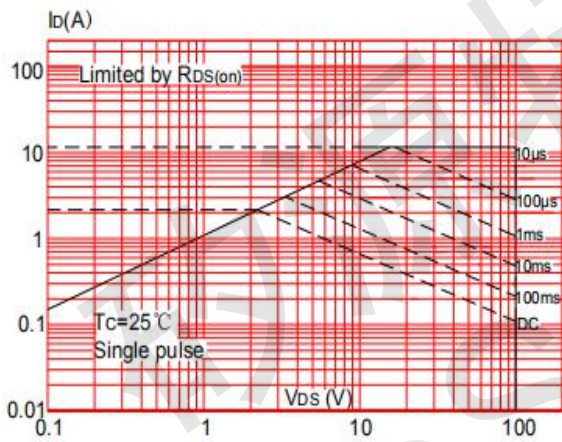
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



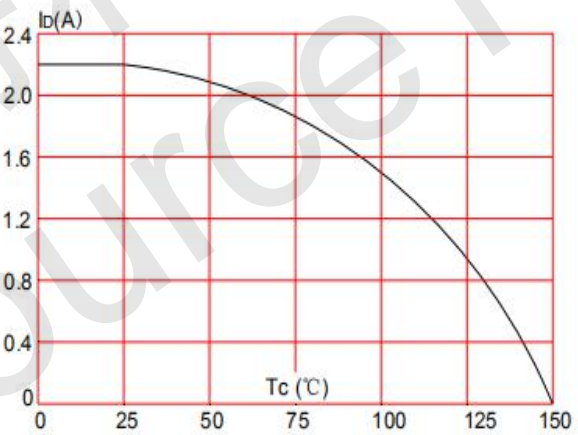
**Figure 8:** Normalized on Resistance vs. Junction Temperature



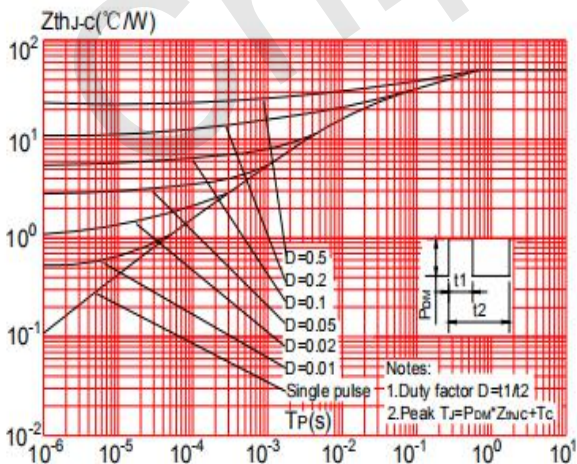
**Figure 9:** Maximum Safe Operating Area



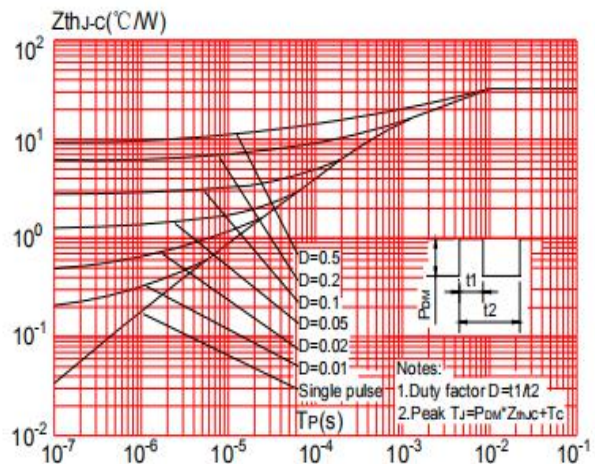
**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient (SOT-23)



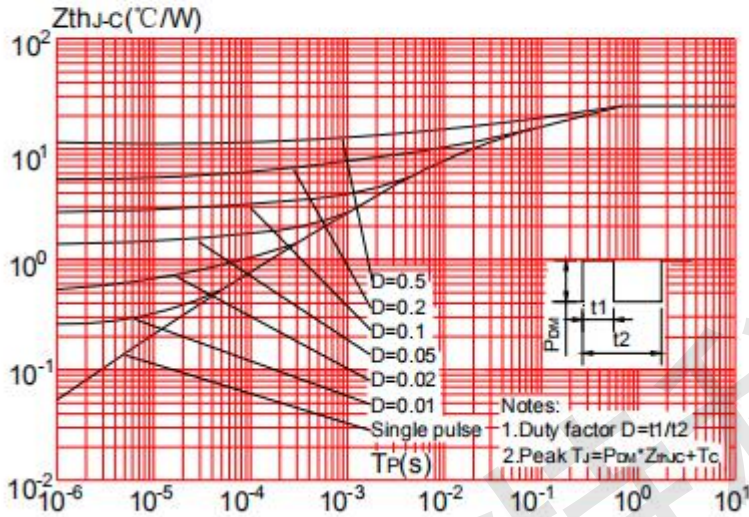
**Figure.12:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient (SOT89-3)



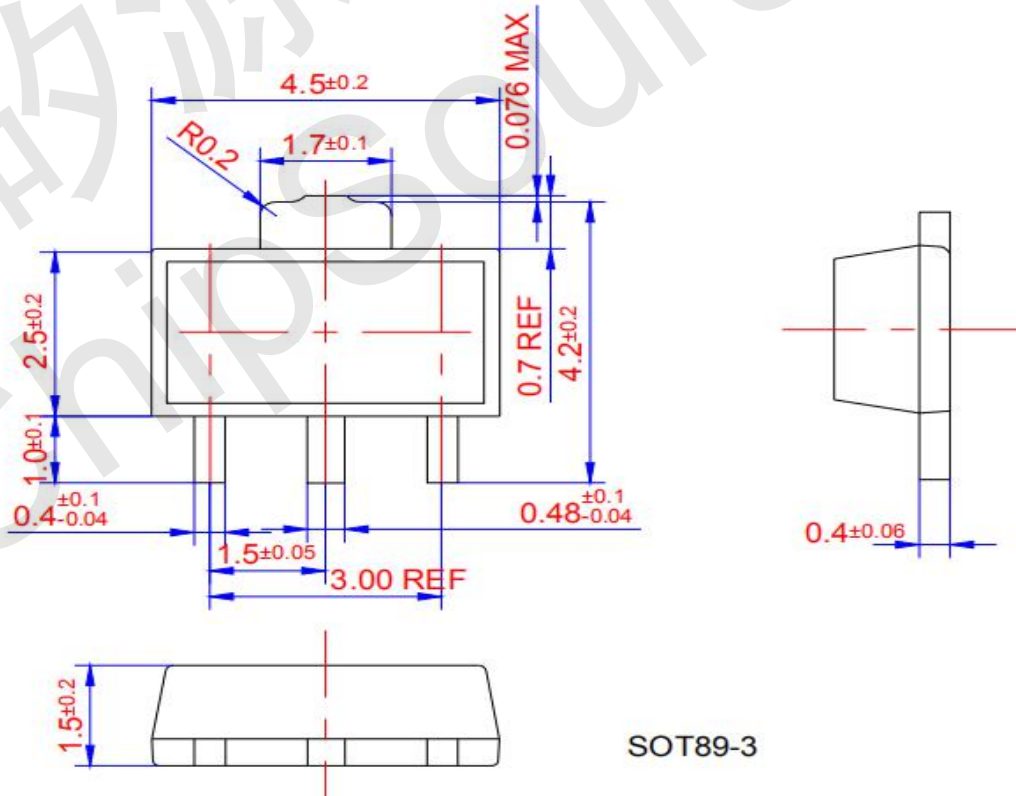


# MX3N10G

**Figure.13: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient (SOT-223)**

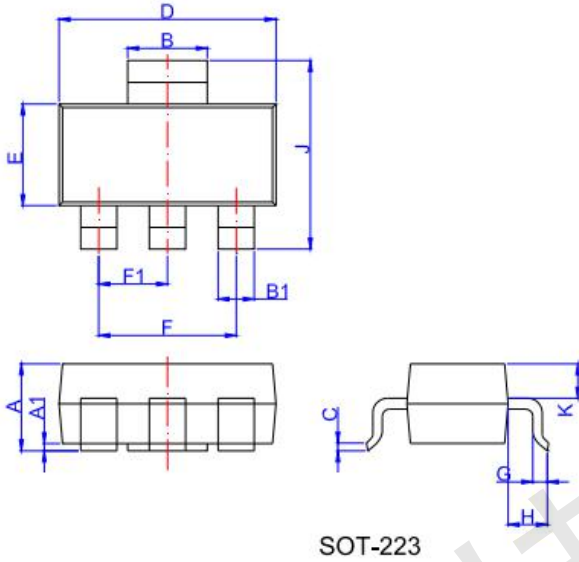


## Package Mechanical Data





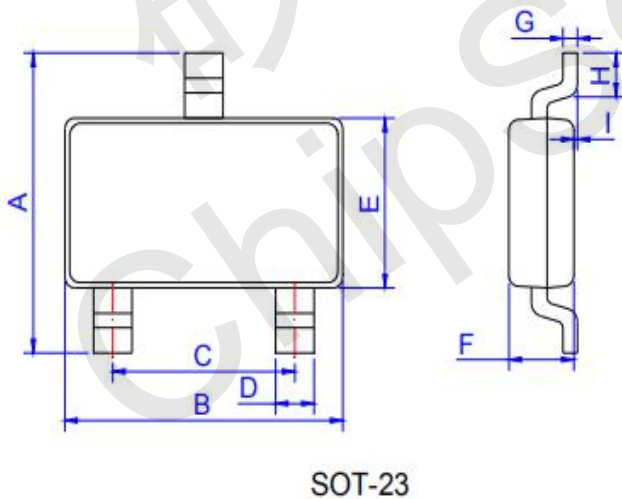
## MX3N10G



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	1.5	1.6	1.8	0.059	0.063	0.071
A1	0.01	0.06	0.10	0.001	0.002	0.004
B	2.9	3.0	3.1	0.114	0.118	0.122
B1	0.6	0.7	0.8	0.024	0.028	0.031
C	0.22	0.26	0.32	0.009	0.010	0.013
D	6.3	6.5	6.7	0.248	0.256	0.264
E	3.3	3.5	3.7	0.130	0.138	0.146
F		4.6			0.181	
F1		2.3			0.091	
G	0.7	0.9	1.1	0.028	0.035	0.043
H	1.5	1.75	2.0	0.059	0.069	0.079
J	6.7	7.0	7.3	0.264	0.276	0.287
K	0.8	0.9	1.0	0.031	0.035	0.039

### Reel Specification-SOT-223

### SOT-23-3L Package Information



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.30	2.40	2.50	0.091	0.095	0.098
B	2.80	2.90	3.00	0.110	0.114	0.118
C	1.90 REF			0.075 REF		
D	0.35	0.40	0.45	0.014	0.016	0.018
E	1.20	1.30	1.40	0.047	0.051	0.055
F	0.90	1.00	1.10	0.035	0.039	0.043
G		0.10	0.15		0.004	0.006
H	0.20			0.008		
I	0		0.10	0		0.004

### 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.