

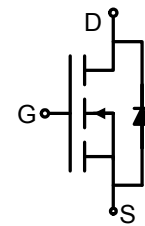
## N-Channel Enhancement Mode Power MOSFET

### Description

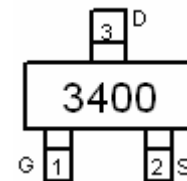
The AO3400A uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

### General Features

- $V_{DS} = 30V, I_D = 5.8A$   
 $R_{DS(ON)} < 59m\Omega @ V_{GS}=2.5V$   
 $R_{DS(ON)} < 45m\Omega @ V_{GS}=4.5V$   
 $R_{DS(ON)} < 41m\Omega @ V_{GS}=10V$
- High power and current handing capability
- Lead free product is acquired
- Surface mount package
- PWM applications
- Load switch
- Power management



Schematic diagram



Marking and pin assignment



SOT-23 top view

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
3400	AO3400A	SOT-23	Ø180mm	8 mm	3000 units

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Drain Current-Continuous	$I_D$	5.8	A
Drain Current-Pulsed <sup>(Note 1)</sup>	$I_{DM}$	30	A
Maximum Power Dissipation	$P_D$	1.4	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ C$

### Thermal Characteristic

Thermal Resistance, Junction-to-Ambient <sup>(Note 2)</sup>	$R_{\theta JA}$	89	$^\circ C/W$
---	-----------------	----	--------------

### Electrical Characteristics ( $T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	33	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=30V, V_{GS}=0V$	-	-	1	$\mu A$

Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics</b> (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.7	0.9	1.4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=2.5V, I_D=4A$	-	45	59	m $\Omega$
		$V_{GS}=4.5V, I_D=5A$	-	31	45	m $\Omega$
		$V_{GS}=10V, I_D=5.8A$	-	28	41	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=5A$	10	-	-	S
<b>Dynamic Characteristics</b> (Note 4)						
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$	-	820	-	PF
Output Capacitance	$C_{oss}$		-	99	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	77	-	PF
<b>Switching Characteristics</b> (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V, R_L=2.7\Omega$ $V_{GS}=10V, R_{GEN}=3\Omega$	-	3.3	-	nS
Turn-on Rise Time	$t_r$		-	4.8	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	26	-	nS
Turn-Off Fall Time	$t_f$		-	4	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=15V, I_D=5.8A,$ $V_{GS}=4.5V$	-	9.5	-	nC
Gate-Source Charge	$Q_{gs}$		-	1.5	-	nC
Gate-Drain Charge	$Q_{gd}$		-	3	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=5.8A$	-	-	1.2	V
Diode Forward Current (Note 2)	$I_S$		-	-	5.8	A

## Notes:

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

Typical Electrical and Thermal Characteristics

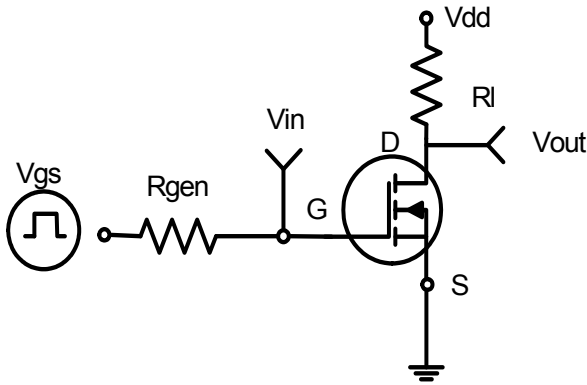


Figure 1: Switching Test Circuit

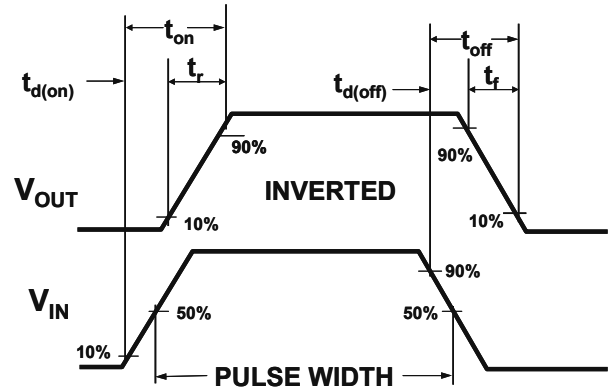


Figure 2: Switching Waveforms

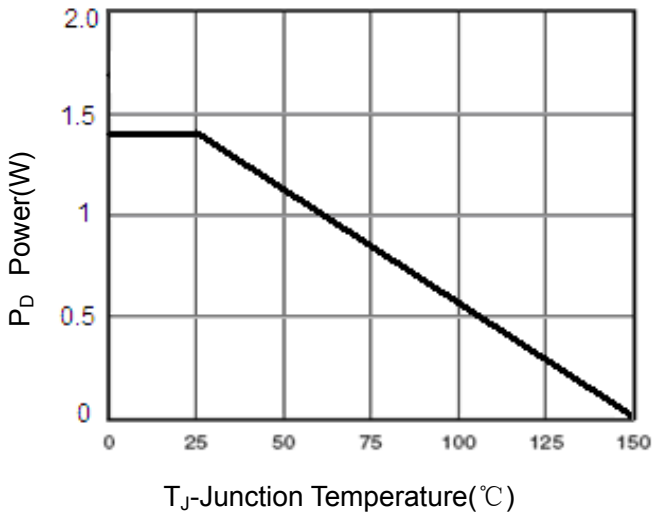


Figure 3 Power Dissipation

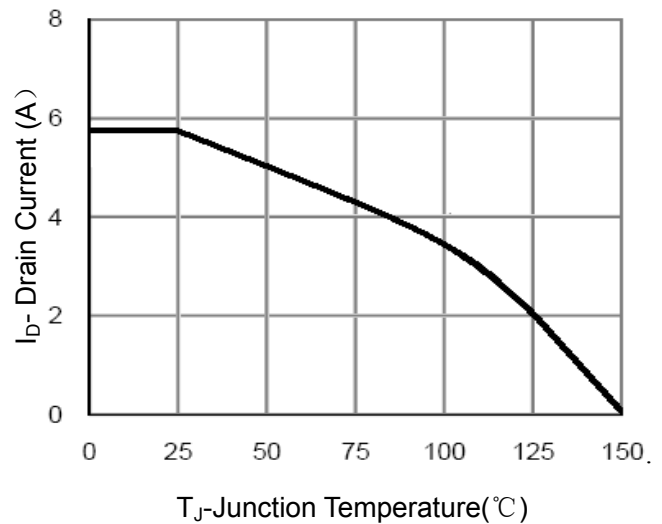


Figure 4 Drain Current

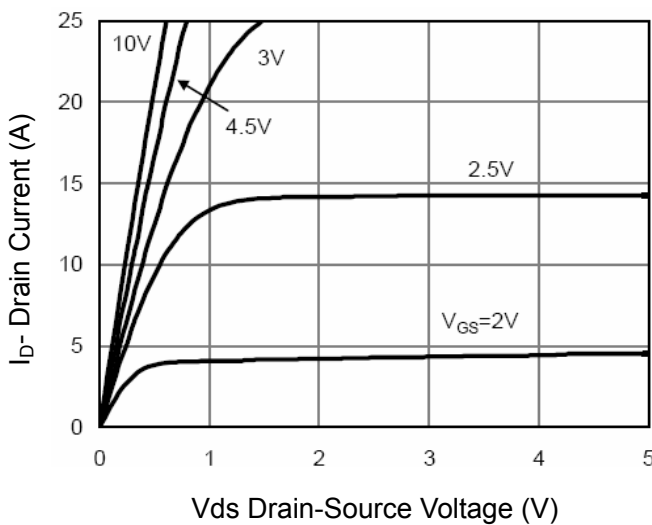


Figure 5 Output Characteristics

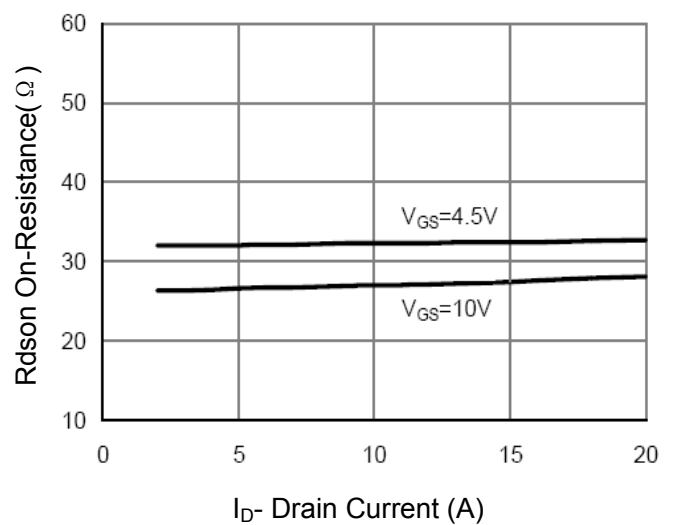
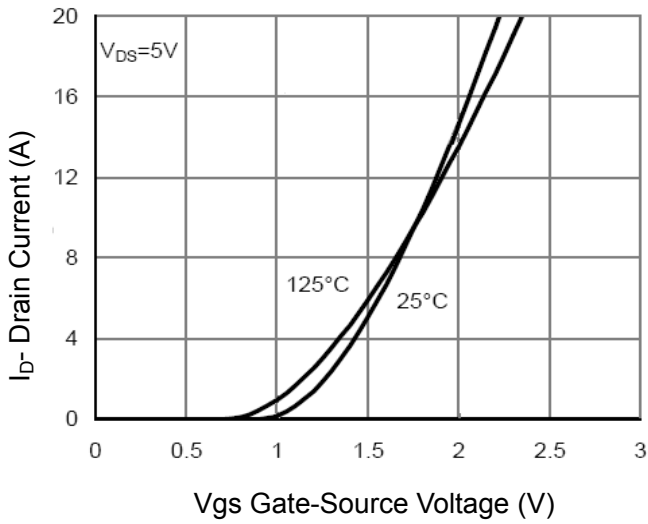
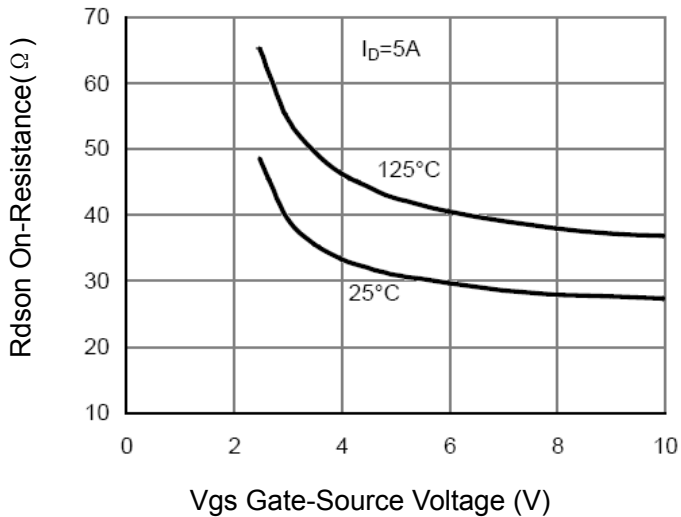


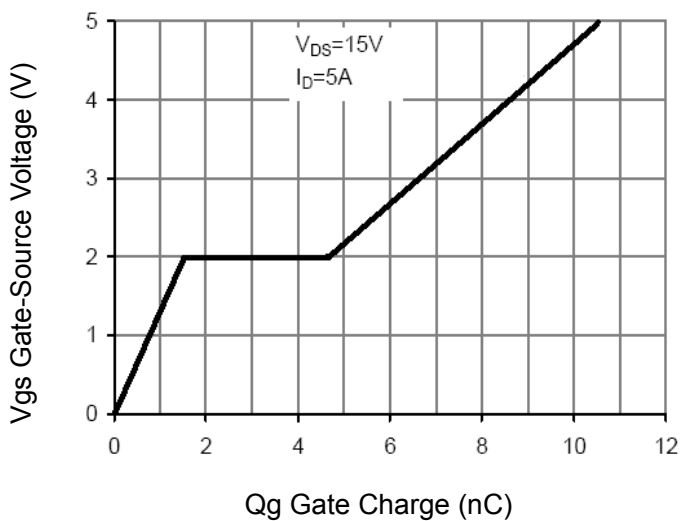
Figure 6 Drain-Source On-Resistance



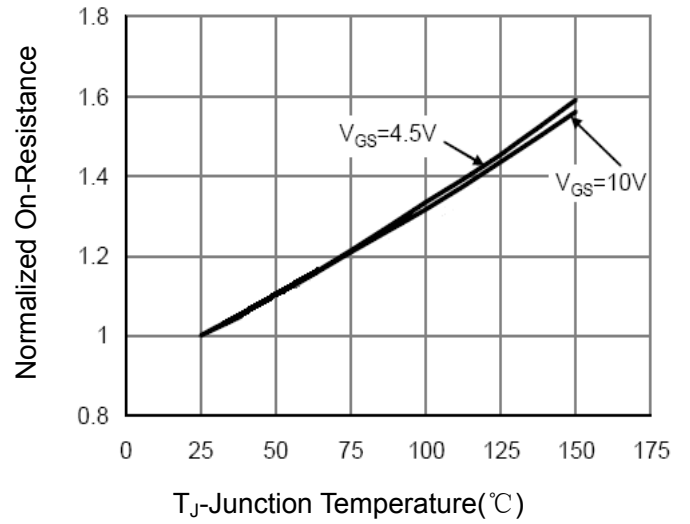
**Figure 7 Transfer Characteristics**



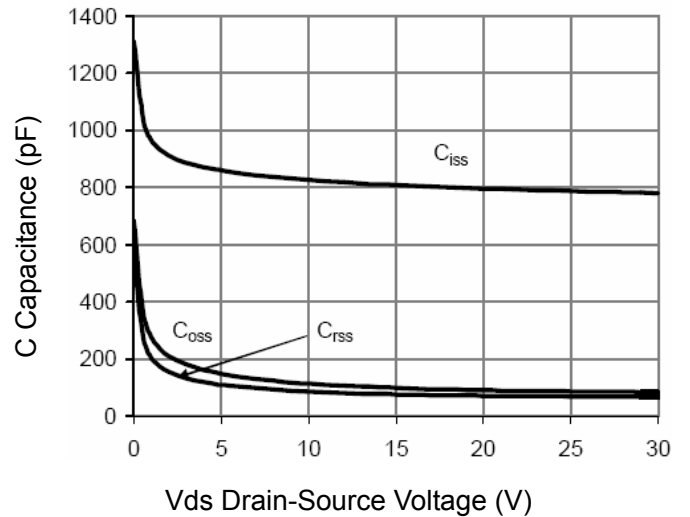
**Figure 9 Rdson vs Vgs**



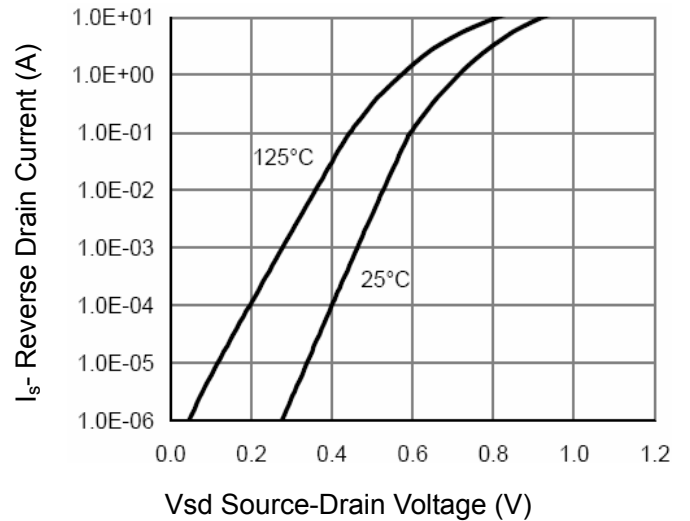
**Figure 11 Gate Charge**



**Figure 8 Drain-Source On-Resistance**



**Figure 10 Capacitance vs Vds**



**Figure 12 Source- Drain Diode Forward**

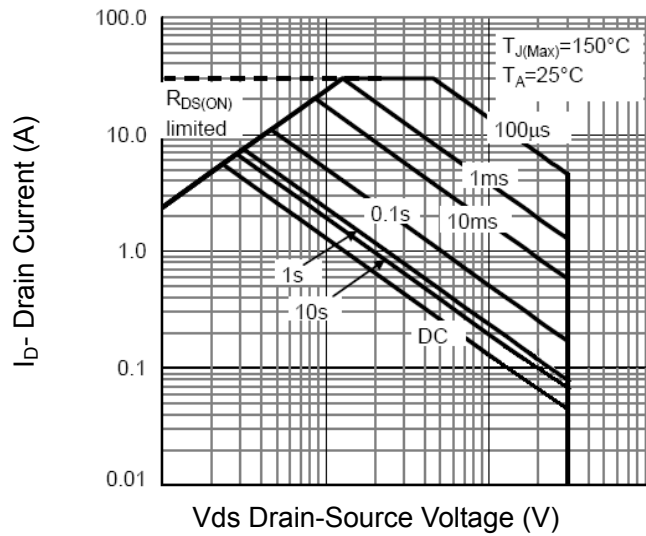


Figure 13 Safe Operation Area

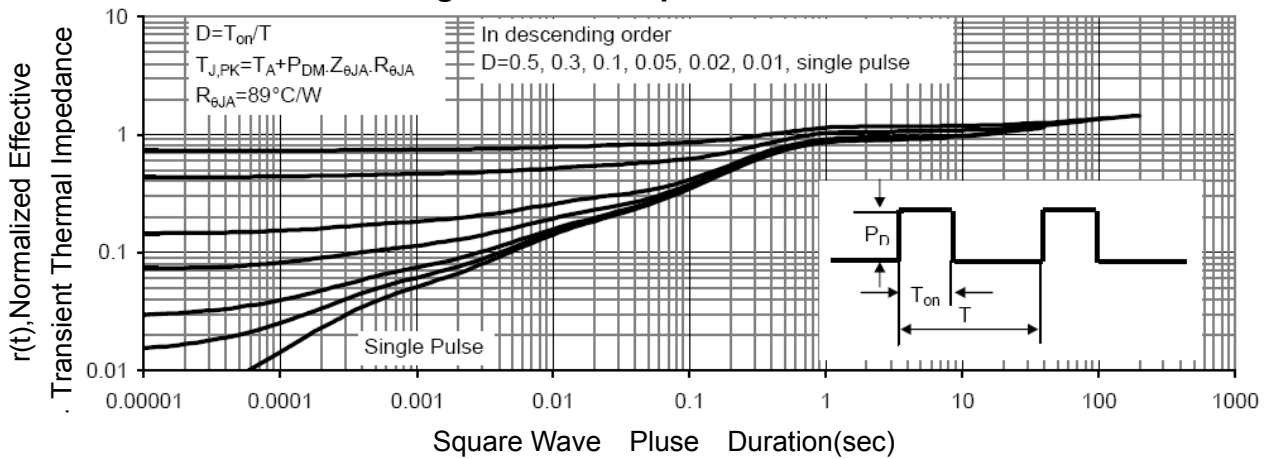
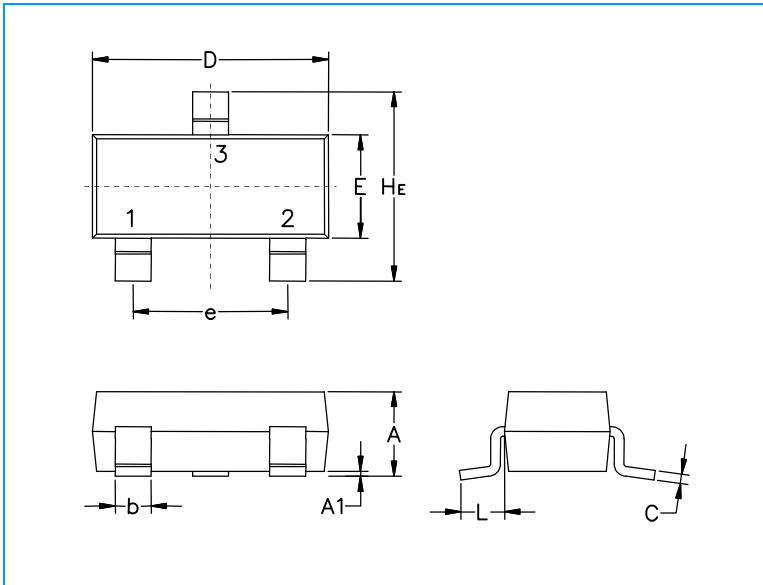
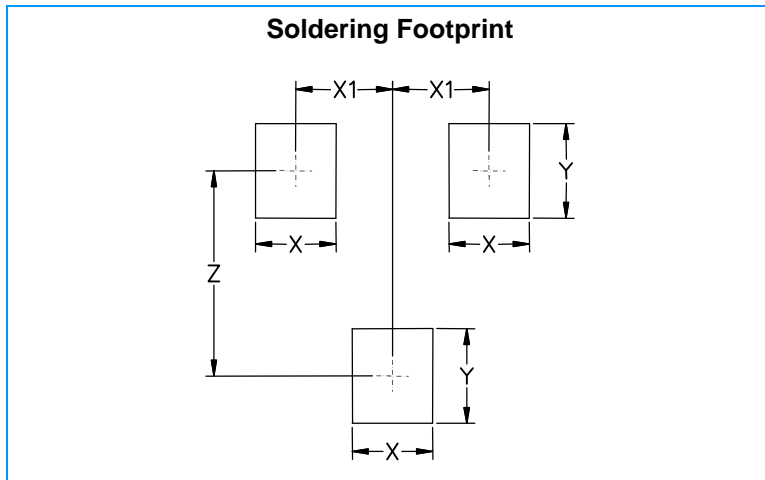


Figure 14 Normalized Maximum Transient Thermal Impedance

## SOT-23 Package Outline & Dimensions



Symbol	Millimeters			Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
<b>A</b>	0.89	1.00	1.11	0.035	0.040	0.044
<b>A1</b>	0.01	0.06	0.10	0.001	0.002	0.004
<b>b</b>	0.37	0.44	0.50	0.15	0.18	0.020
<b>c</b>	0.09	0.13	0.18	0.003	0.005	0.007
<b>D</b>	2.80	2.90	3.04	0.110	0.114	0.120
<b>E</b>	1.20	1.30	1.40	0.047	0.051	0.055
<b>e</b>	1.78	1.90	2.04	0.070	0.075	0.081
<b>L</b>	0.35	0.54	0.69	0.014	0.021	0.029
<b>H<sub>E</sub></b>	2.10	2.40	2.64	0.083	0.094	0.104



Symbol	Millimeters	Inches
<b>X</b>	0.80	0.031
<b>X1</b>	0.95	0.037
<b>Y</b>	0.90	0.035
<b>Z</b>	2.00	0.079

### 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.

Shanghai Leiditech Electronic Co.,Ltd  
 Email: sale1@leiditech.com  
 Tel : +86- 021 50828806  
 Fax : +86- 021 50477059