

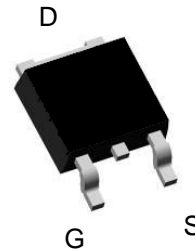
## P-Channel Enhancement Mode Field Effect Transistor

### DESCRIPTION

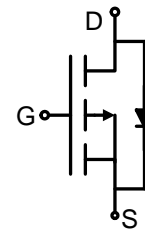
The SSFD6035 uses advanced trench technology to provide excellent  $R_{DS(ON)}$  and low gate charge. This device is suitable for use as a load switch or in PWM applications.

### GENERAL FEATURES

- $V_{DS} = -60V, I_D = -26A$   
 $R_{DS(ON)} < 40m\Omega @ V_{GS} = -10V$   
 $R_{DS(ON)} < 55m\Omega @ V_{GS} = -4.5V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package



TO-252



Schematic diagram

### Application

- PWM applications
- Load switch
- Power management

### PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
	LM6035D	TO-252	-	-	-

### ABSOLUTE MAXIMUM RATINGS(TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous@ Current-Pulsed (Note 1)	$I_D(25^\circ C)$	-26	A
	$I_D(70^\circ C)$	-20	A
	$I_{DM}$	-60	A
Maximum Power Dissipation	$P_D$	60	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 175	°C

### THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	25	°C/W
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### ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-60			V

Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-48V, V_{GS}=0V$			-1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
<b>ON CHARACTERISTICS (Note 3)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.8	-2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-20A$		31	40	m $\Omega$
		$V_{GS}=-4.5V, I_D=-20A$		42	55	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=-5V, I_D=-20A$	5			S
<b>DYNAMIC CHARACTERISTICS (Note4)</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-30V, V_{GS}=0V,$ $F=1.0MHz$		3060		PF
Output Capacitance	$C_{oss}$			300		PF
Reverse Transfer Capacitance	$C_{rss}$			205		PF
<b>SWITCHING CHARACTERISTICS (Note 4)</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=-30V, V_{GS}=-10V, R_{GEN}=3\Omega$ $I_D=1A$		14		nS
Turn-on Rise Time	$t_r$			20		nS
Turn-Off Delay Time	$t_{d(off)}$			40		nS
Turn-Off Fall Time	$t_f$			19		nS
Total Gate Charge	$Q_g$	$V_{DS}=-30V, I_D=-20A, V_{GS}=-10V$		48		nC
Gate-Source Charge	$Q_{gs}$			11		nC
Gate-Drain Charge	$Q_{gd}$			10		nC
Body Diode Reverse Recovery Time	$T_{rr}$	$I_F=-20A, di/dt=100A/\mu s$		40		nS
Body Diode Reverse Recovery Charge	$Q_{rr}$			56		nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=-1A$		-0.72	-1	V

## NOTES:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on 1in<sup>2</sup> 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 testing.

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

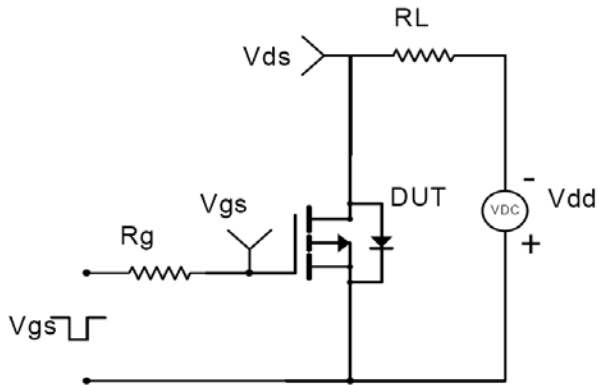


Figure 1: Switching Test Circuit

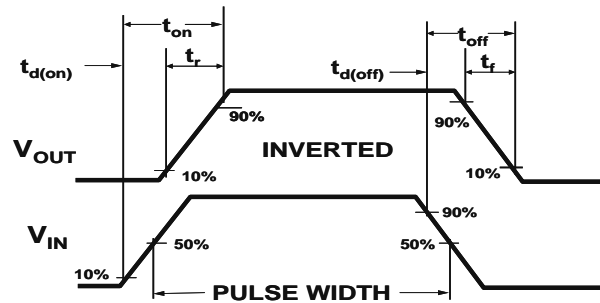


Figure 2: Switching Waveforms

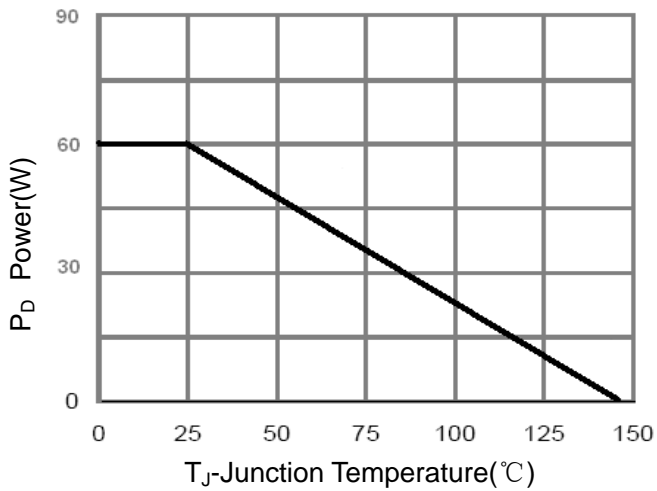


Figure 3 Power Dissipation

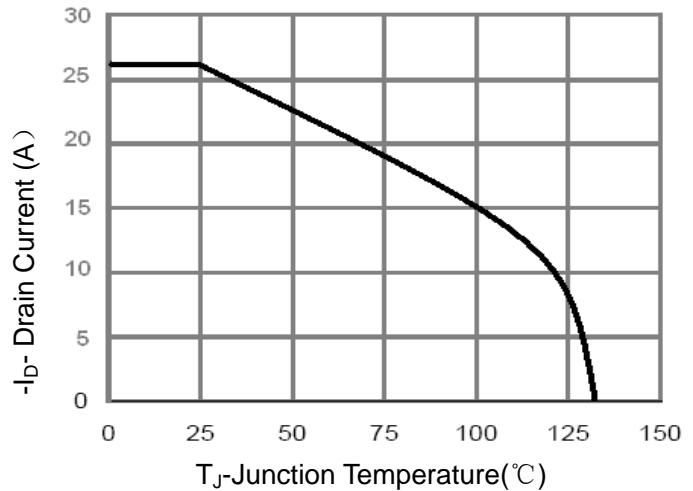


Figure 4 Drain Current

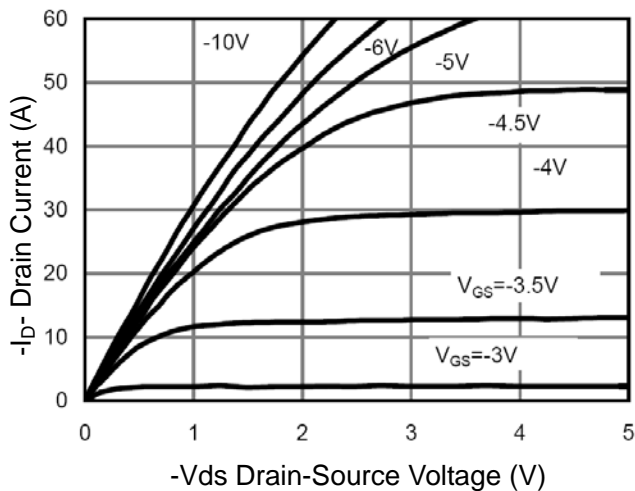


Figure 5 Output CHARACTERISTICS

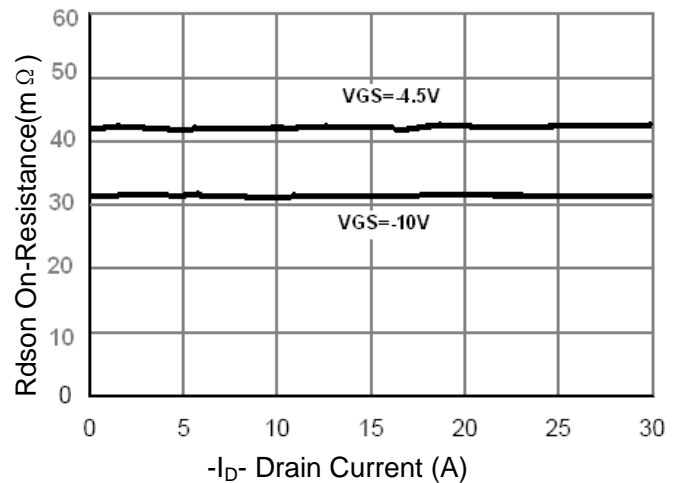


Figure 6 Drain-Source On-Resistance

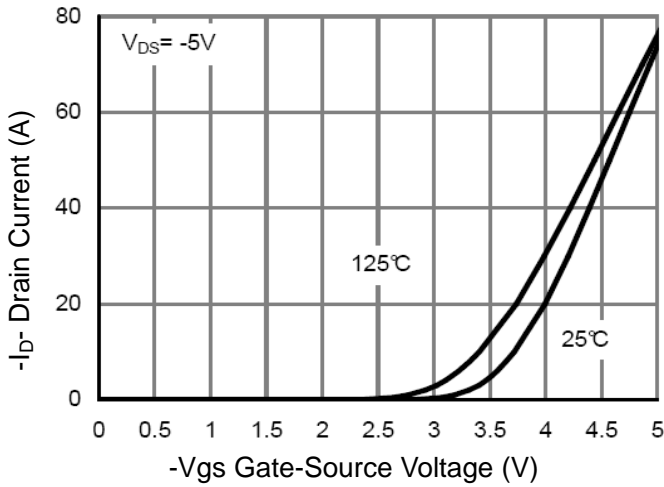


Figure 7 Transfer Characteristics

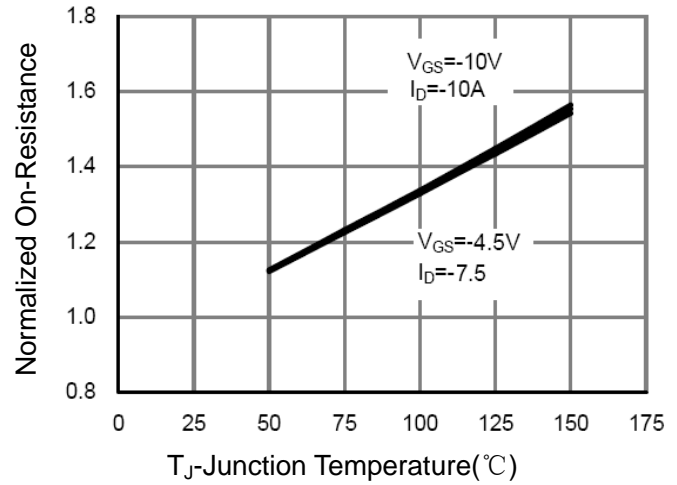


Figure 8 Drain-Source On-Resistance

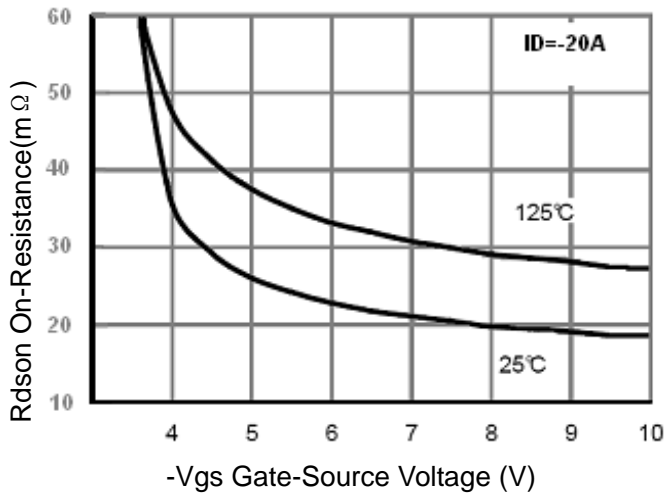


Figure 9  $R_{DS(on)}$  vs  $V_{GS}$

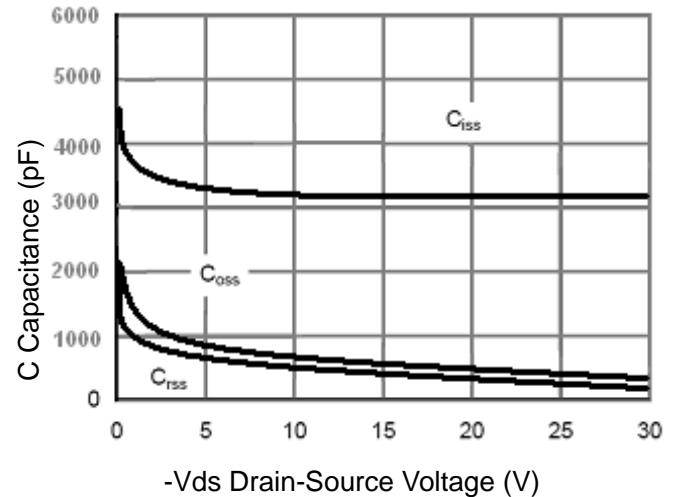


Figure 10 Capacitance vs  $V_{DS}$

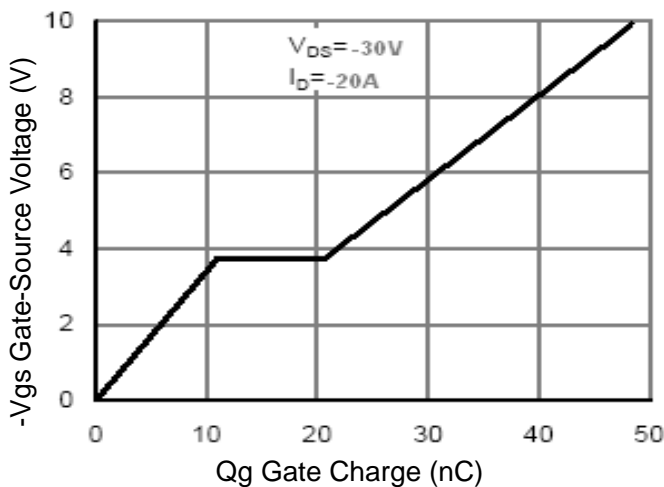


Figure 11 Gate Charge

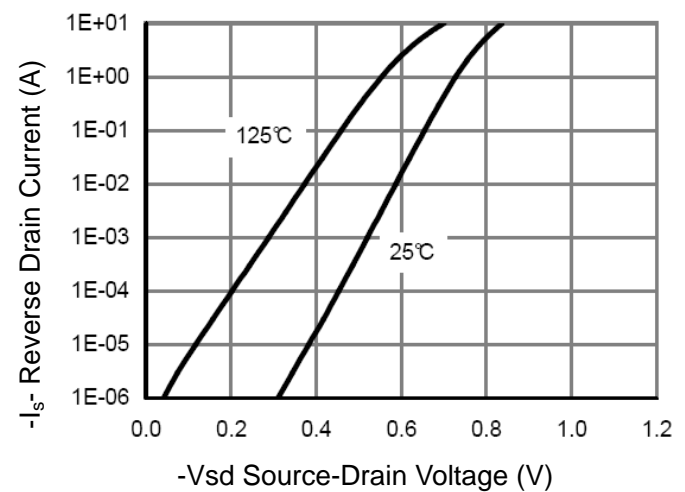


Figure 12 Source- Drain Diode Forward

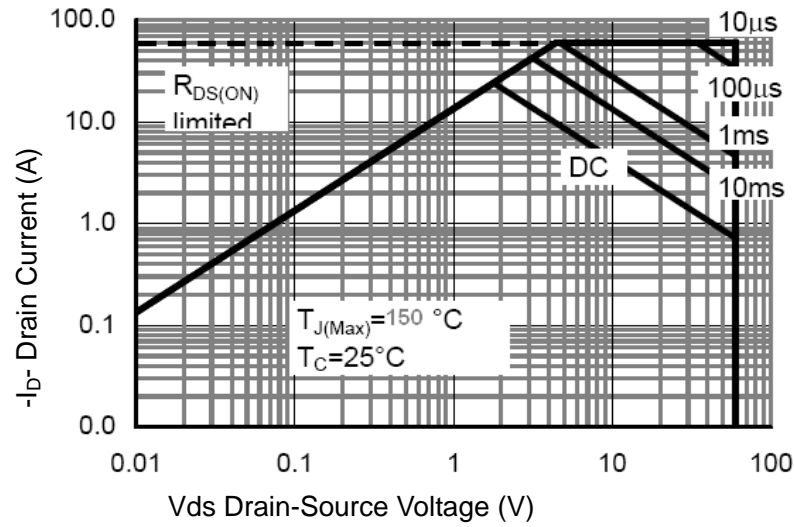


Figure 13 Safe Operation Area

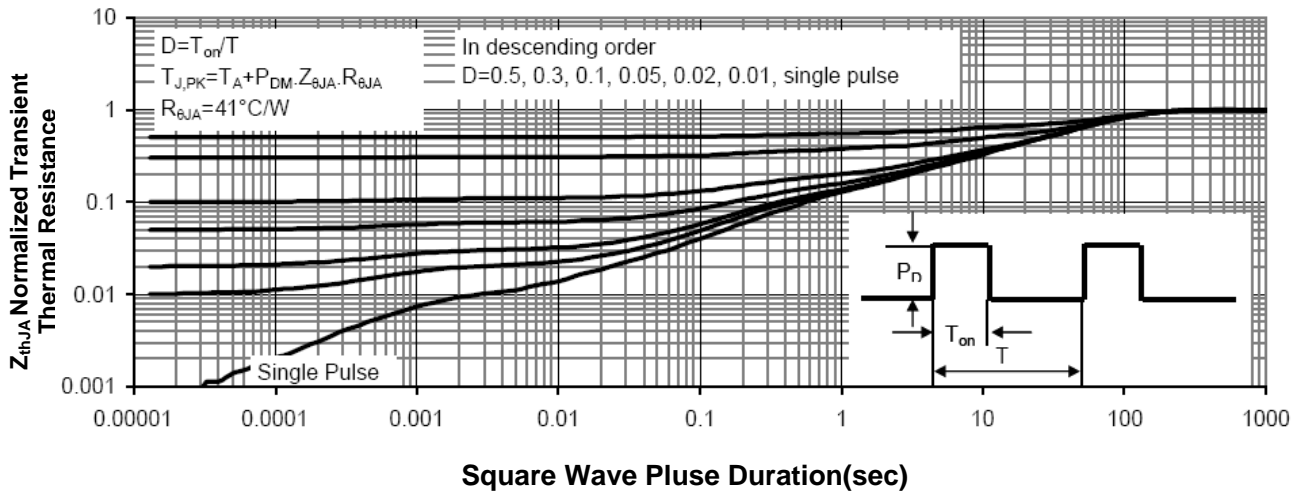
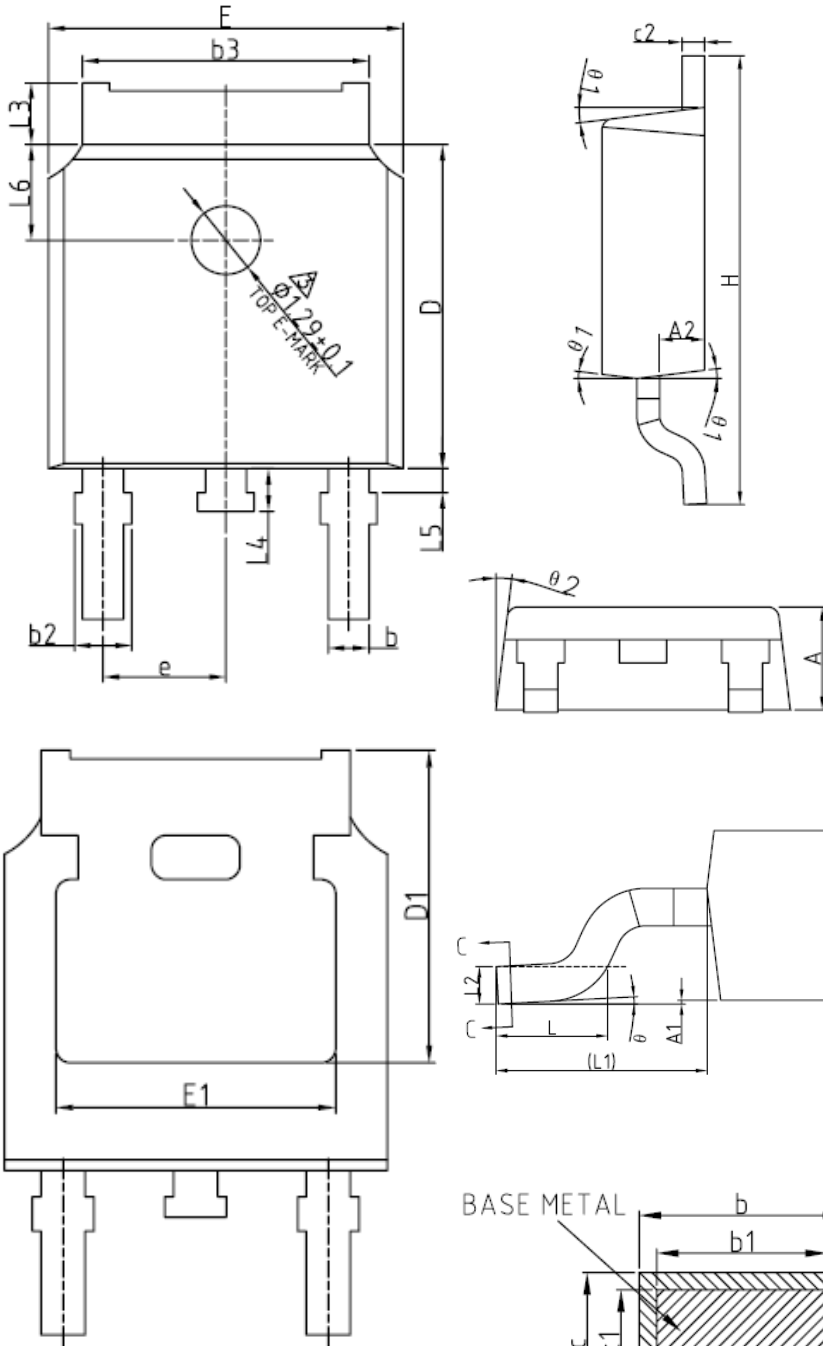


Figure 14 Normalized Maximum Transient Thermal Impedance



■ TO-252 Package information



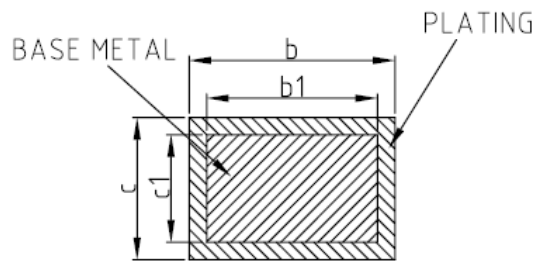
Dimensions in Millimeters

UNITS:mm

SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0	—	0.10
A2	0.90	1.01	1.10
b	0.72	—	0.85
b1	0.71	0.76	0.81
b2	0.72	—	0.90
b3	5.13	5.33	5.46
c	0.47	—	0.60
c1	0.46	0.51	0.56
c2	0.47	—	0.60
D	6.00	6.10	6.20
D1	5.25	—	—
E	6.50	6.60	6.70
E1	4.70	—	—
e	2.186	2.286	2.386
H	9.80	10.10	10.40
L	1.40	1.50	1.70
L1	2.90REF		
L2	0.51BSC		
L3	0.90	—	1.25
L4	0.60	0.80	1.00
L5	0.15	—	0.75
L6	1.80REF		
θ	0°	—	8°
θ 1	5°	7°	9°
θ 2	5°	7°	9°

NOTES:

1. Dimensions are inclusive of plating
2. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 6 mils.
3. Dimension L is measured in gauge plane.
4. 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