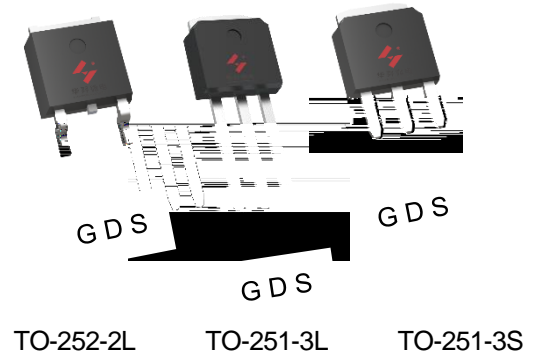


## P-Channel Enhancement Mode MOSFET

### Feature

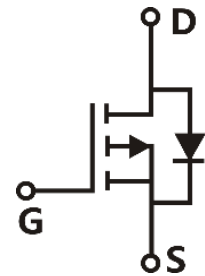
- -40V/-55A  
 $R_{DS(ON)} = 11$  @  $V_{GS} = -10V$   
 $R_{DS(ON)} = 16$  @  $V_{GS} = -4.5V$
- 100% Avalanche Tested
- 100% DVDS
- Reliable and Rugged
- Halogen Free and Green Devices Available  
 (RoHS Compliant)

### Pin Description






### Applications

- Switching application
- Li-battery protection
- Motor control



Single P-Channel MOSFET

### Ordering and Marking Information

 D	 U	 V
HYG120P04	HYG120P04	HYG120P04
XYMXXXXXX	XYMXXXXXX	XYMXXXXXX

Package Code  
 D: TO-252-2L    U: TO-251-3L    V: TO-251-3S

Date Code  
 XYMXXXXXX

Note: HUAYI halogen free products contain molding compounds/die attach materials and 100% matte tin plate Termination finish; which are fully compliant with RoHS. HUAYI halogen free products meet or exceed the halogen free requirements of IPC/JEDEC J-STD-020 for MSL classification at halogen free peak reflow temperature. HUAYI defines Green to mean halogen free (RoHS compliant) and halogen free (Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight).

HUAYI reserves the right to make changes, corrections, enhancements, modifications, and improvements to this product and/or to this document at any time without notice.

## Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit	
<b>Common Ratings</b> (Tc=25°C Unless Otherwise Noted)				
V <sub>DSS</sub>	Drain-Source Voltage	-40	V	
V <sub>GSS</sub>	Gate-Source Voltage	20	V	
T <sub>J</sub>	Junction Temperature Range	-55 to 175	°C	
T <sub>STG</sub>	Storage Temperature Range		°C	
I <sub>S</sub>	Source Current-Continuous(Body Diode)	Tc=25°C	-55	A
<b>Mounted on Large Heat Sink</b>				
I <sub>DM</sub>	Pulsed Drain Current *	Tc=25°C	-200	A
I <sub>D</sub>	Continuous Drain Current	Tc=25°C	-55	A
		Tc=100°C	-40	A
P <sub>D</sub>	Maximum Power Dissipation	Tc=25°C	80	W
		Tc=100°C	40	W
R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case		1.8	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient **		75	°C/W
E <sub>AS</sub>	Single Pulsed-Avalanche Energy ***	L=0.3mH	122	mJ

Note: \* Repetitive rating pulse width limited by max.junction temperature.

\*\* Surface mounted on 1in2 FR-4 board.

\*\*\* Limited by T<sub>Jmax</sub>, starting T<sub>J</sub>=25°C, L = 0.3mH, R<sub>θ</sub>= 25, V<sub>GS</sub> = -10V.

## Electrical Characteristics(Tc =25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HYG120P04LQ1			Unit
			Min	Typ.	Max	
<b>Static Characteristics</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> =-250 A	-40	-	-	V
I <sub>DSS</sub>	Drain-to-Source Leakage Current	V <sub>DS</sub> =-40V, V <sub>GS</sub> =0V	-	-	-1	A
		T <sub>J</sub> =125°C	-	-	-50	A

## Electrical Characteristics (Cont.) (Tc =25°C Unless Otherwise Noted)

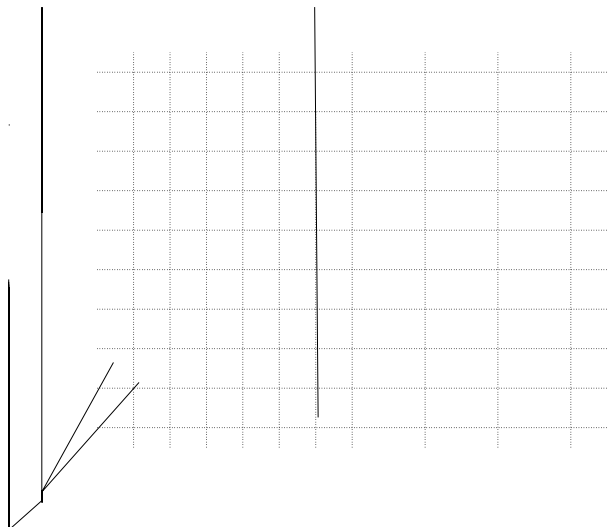
Symbol	Parameter	Test Conditions	HYG120P04LQ1			Unit
			Min	Typ.	Max	

**Dynamic Characteristics**

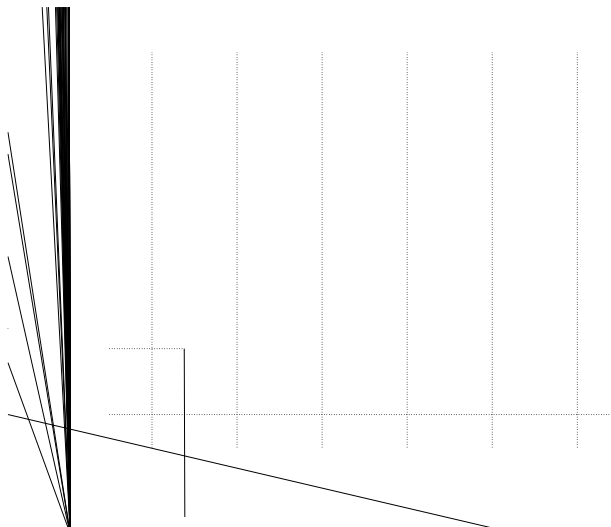
R<sub>G</sub> Gate Resistance 15.6 reW\* nsistav

**Typical Operating Characteristics**

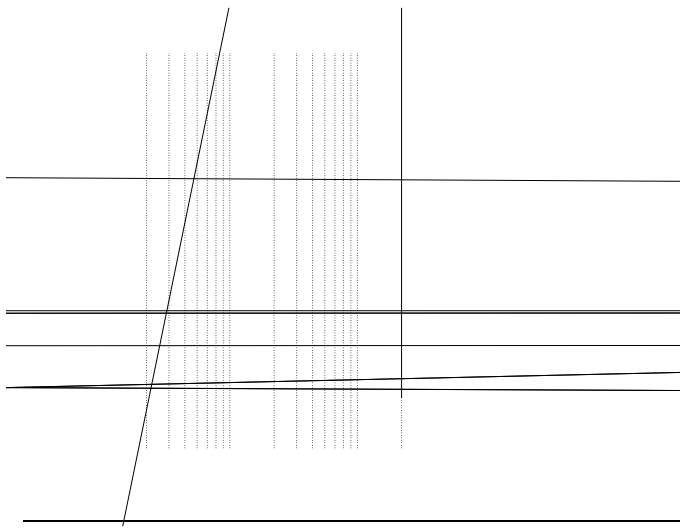
**Figure 1: Power Dissipation**



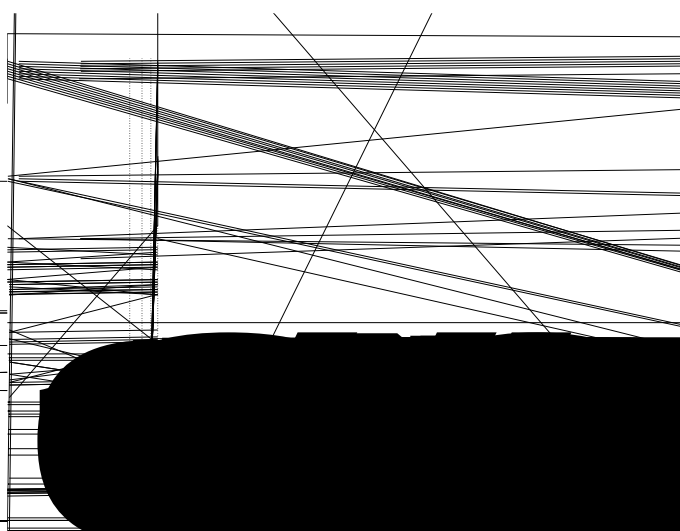
**Figure 2: Drain Current**



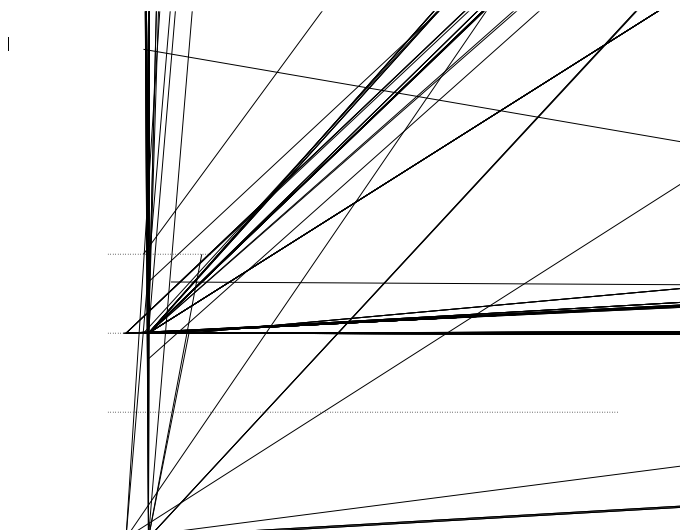
**Figure 3: Safe Operation Area**



**Figure 4: Thermal Transient Impedance**



**Figure 5: Output Characteristics**

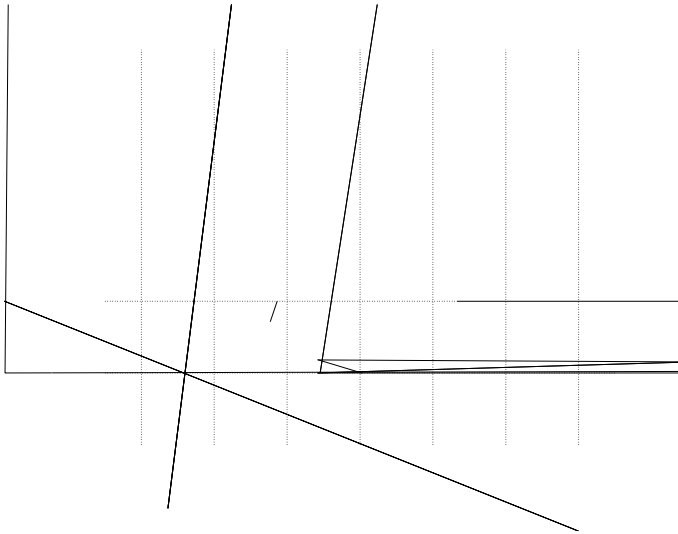


**Figure 6: Drain-Source On Resistance**

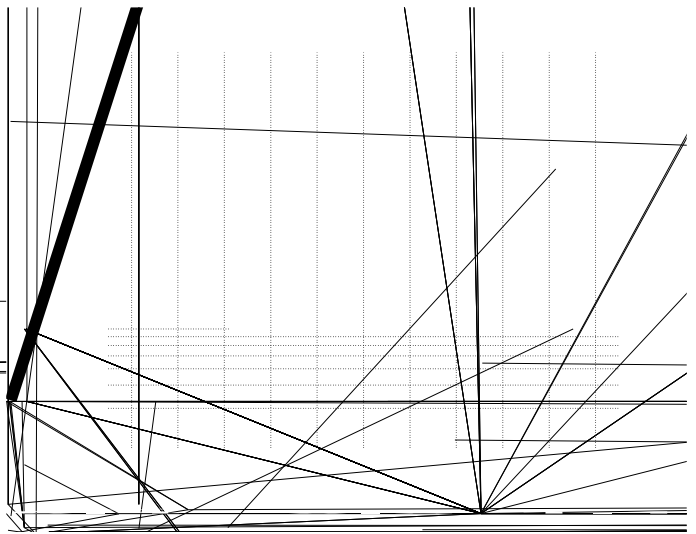


**Typical Operating Characteristics(Cont.)**

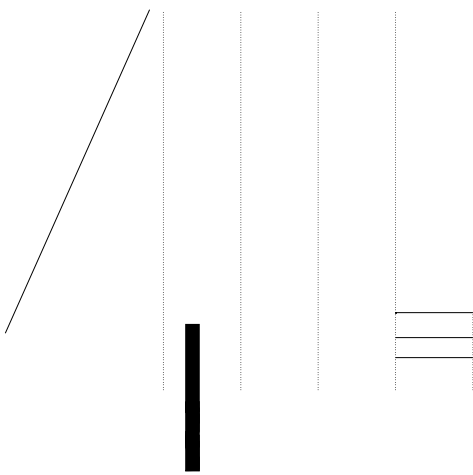
**Figure 7: On-Resistance vs. Temperature**



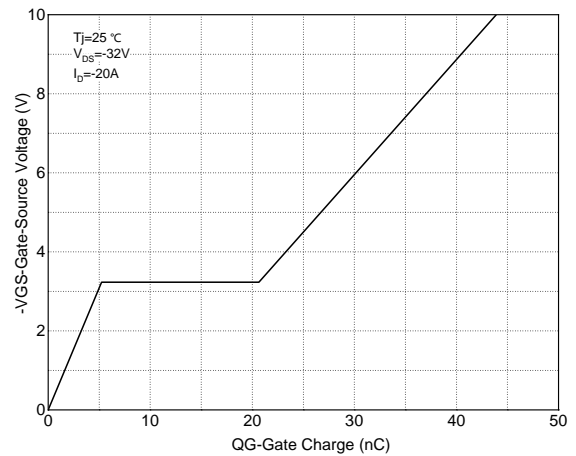
**Figure 8: Source-Drain Diode Forward**



**Figure 9: Capacitance Characteristics**



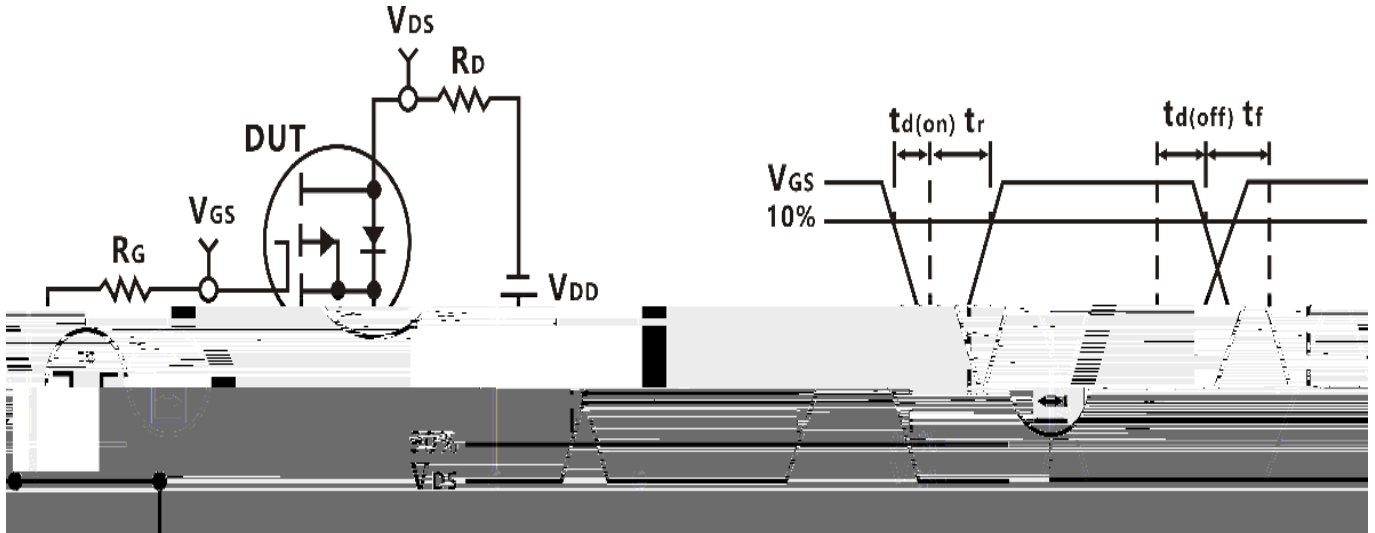
**Figure 10: Gate Charge Characteristics**



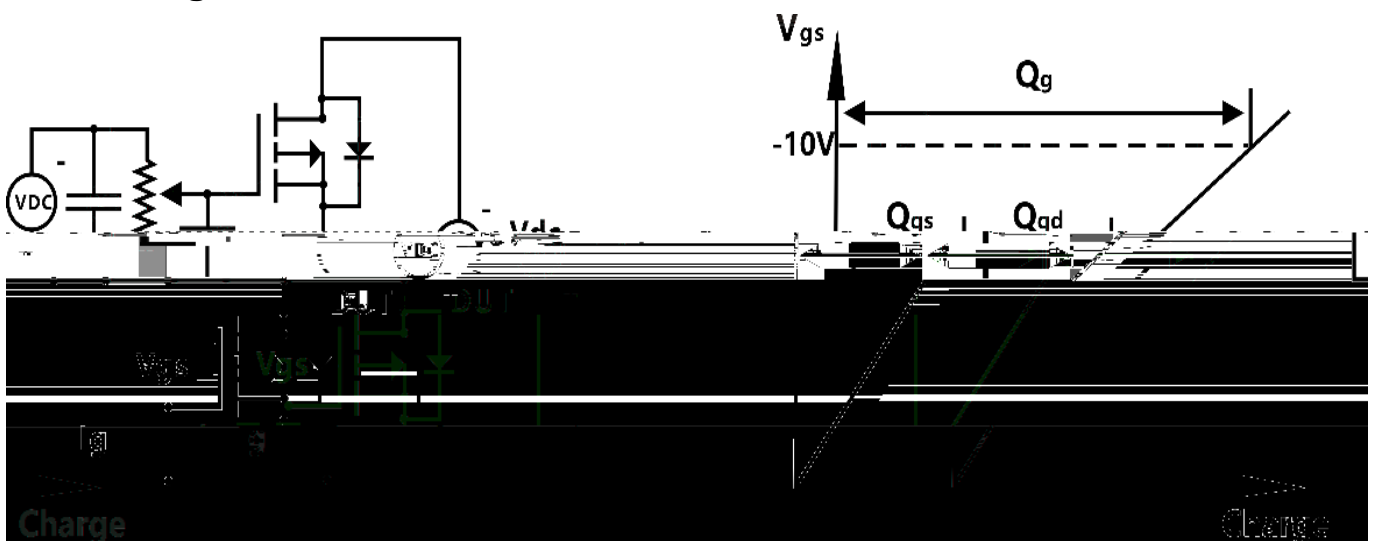
**Avalanche Test Circuit**



**Switching Time Test Circuit**



**Gate Charge Test Circuit**



## Device Per Unit

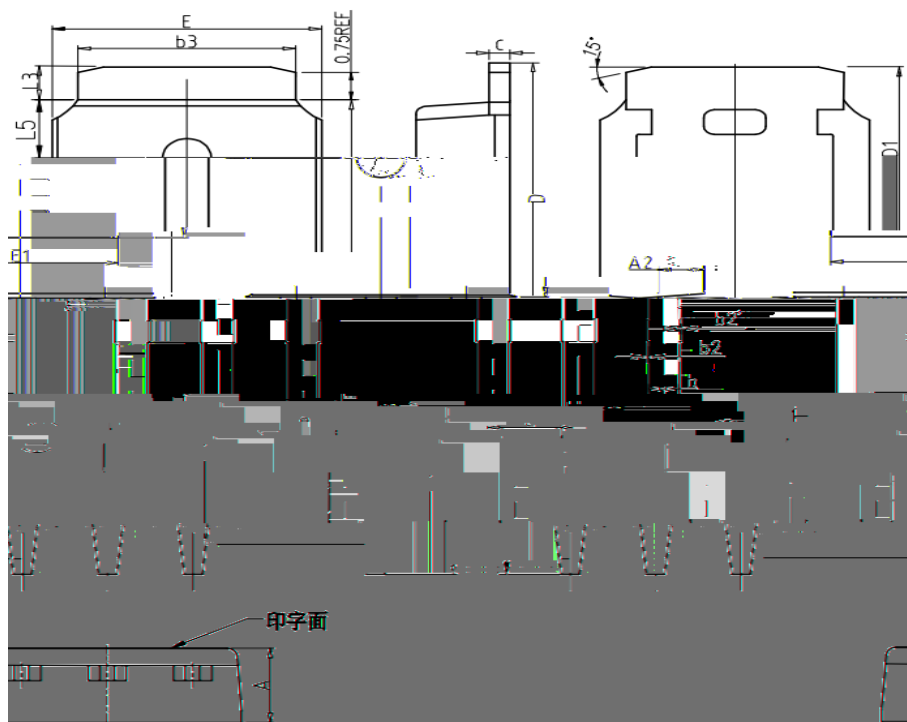
Package Type	Unit	Quantity
TO-252-2L	Tube	75
TO-252-2L	Reel	2500
TO-251-3L	Tube	75
TO-251-3S	Tube	75

## Package Information

TO-252-2L

COMMON DIMENSIONS			
SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.40
A1	0.00	-	0.20
A2	0.97	1.07	1.17
b	0.68	0.78	0.90

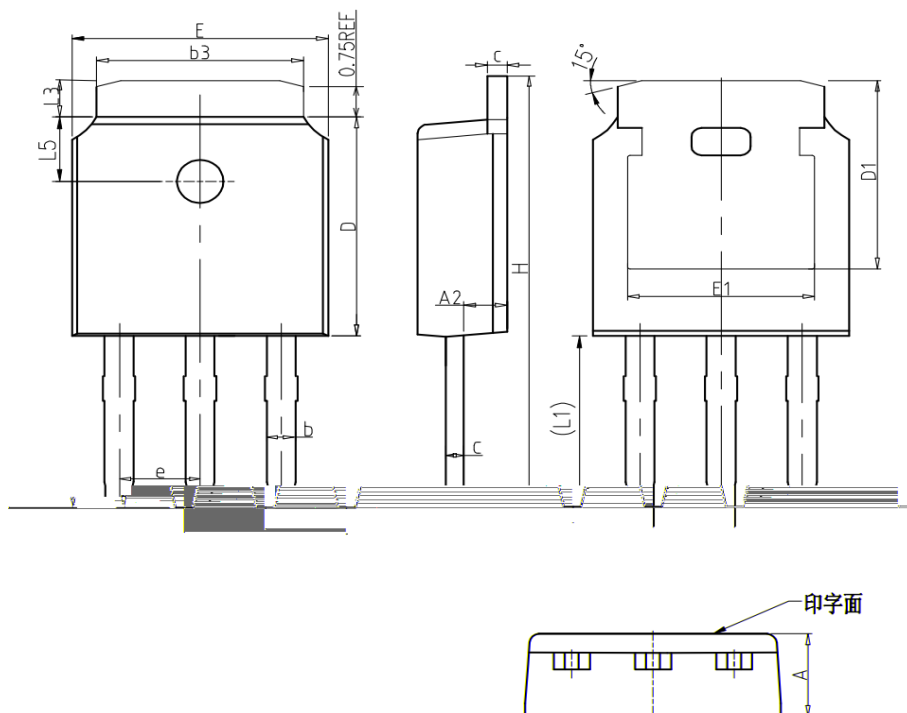
TO-251-3L



COMMON DIMENSIONS			
SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.40
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b2	0.00	0.04	0.10
b2'	0.00	0.04	0.10
b3	5.20	5.33	5.50
c	0.43	0.53	0.63
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.80
E1	4.63	-	-
e	2.286BSC		
H	16.22	16.52	16.82
L1	9.15	9.40	9.65
L3	0.88	1.02	1.28
L5	1.65	1.80	1.95



TO-251-3S



COMMON DIMENSIONS			
SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.40
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b3	5.20	5.33	5.50
c	0.43	0.53	0.63
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.80
E1	4.63	-	-
e	2.286BSC		
H	10.00	11.22	11.44
L1	3.90	4.10	4.30
L3	0.88	1.02	1.28
L5	1.65	1.80	1.95

## Classification Profile

## Classification Reflow Profiles

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Profile Feature

Sn-Pb Eutectic Assembly

Pb-Free Assembly

