

**15A, 100V N-CHANNEL POWER MOSFET**

**GENERAL DESCRIPTION**

These N-Channel enhancement mode power field effect transistors are produced using Hi-semicon's proprietary planar stripe technology.

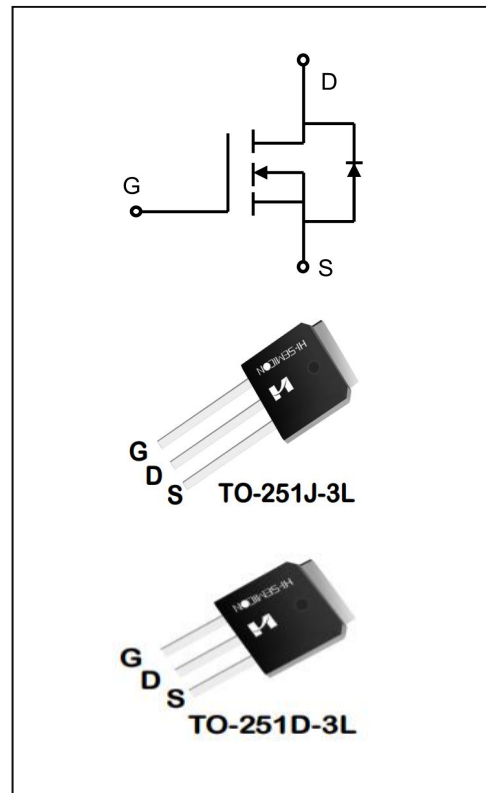
This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

**Features**

- ◆  $V_{DS}(V)=100V, I_D=15A$
- ◆  $R_{DS(ON)}$   
TYP:  $80m\Omega @ V_{GS}=10V, I_D=7.5A$

**Applications**

- ◆ Power faction correction (PFC)
- ◆ Switched mode power supplies (SMPS)
- ◆ Uninterruptible power supply (UPS)
- ◆ LED lighting power



**ORDERING INFORMATION**

Part No.	Package	Marking	Material	Packing
SFU15N10	TO-251J/D-3L	SFU15N10	Pb Free	Tube

## ABSOLUTE MAXIMUM RATINGS (T<sub>J</sub>=25°C unless otherwise noted)

Characteristics	Symbol	Ratings		Unit
		SFU15N10		
Drain-Source Voltage	V <sub>DS</sub>	100		V
Gate-Source Voltage	V <sub>GS</sub>	±20		
Drain Current	I <sub>D</sub>	T <sub>C</sub> = 25°C	15	A
		T <sub>C</sub> = 100°C	10.5	
Drain Current Pulsed (Note 1)	I <sub>DM</sub>	60		
Power Dissipation(T <sub>C</sub> =25°C) -Derate above 25°C	P <sub>D</sub>	65		W
		0.63		W/°C
Single Pulsed Avalanche Energy (Note 2)	E <sub>AS</sub>	40		mJ
Operation Junction Temperature Range	T <sub>J</sub>	-55~+150		°C
Storage Temperature Range	T <sub>stg</sub>	-55~+150		
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	TL	300		

## THERMAL CHARACTERISTICS

Characteristics	Symbol	MAX		Unit
		SFU15N10		
Thermal Resistance, Junction-to-Case	R <sub>θJC</sub>	3.4		°C/W
Thermal Resistance, Junction-to-Ambient	R <sub>θJA</sub>	62.5		

## ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B <sub>VDS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	100	--	--	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V	--	--	1.0	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =20V, V <sub>DS</sub> =0V	--	--	100	nA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V	--	--	-100	
On Characteristics						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> =250μA	1.0	2.0	3.0	V
Static Drain- Source On State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =7.5A	--	80	110	mΩ
Dynamic Characteristics						
Gate Resistance	R <sub>g</sub>	V <sub>GS</sub> =0V, f=1.0MHZ	1	1.8	10	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V V <sub>GS</sub> =0V f=1.0MHZ	--	612	--	pF
Output Capacitance	C <sub>oss</sub>		--	45.9	--	
Reverse Transfer Capacitance	C <sub>rss</sub>		--	38.4	--	
Switching Characteristics						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =50V, V <sub>GS</sub> =10V R <sub>G</sub> =3Ω, I <sub>D</sub> =10A (Note 3.4)	--	13.6	--	ns
Turn-on Rise Time	t <sub>r</sub>		--	35.2	--	

Turn-off Delay Time	$t_{d(off)}$	$V_{DD}=50V, V_{GS}=10V$ $R_G=3\Omega, I_D=10A$ (Note 3.4)	--	45.3	--	ns
Turn-off Fall Time	$t_f$		--	11.2	--	
Total Gate Charge	$Q_g$	$V_{DS}=50V, I_D=10A$ $V_{GS}=10V$ (Note 3.4)	--	19.8	--	nc
Gate-Source Charge	$Q_{gs}$		--	6.6	--	
Gate-Drain Charge	$Q_{gd}$		--	11.6	--	

**SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS**

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	$I_S$	Integral Reverse P-N Junction Diode in the MOSFET	--	--	15	A
Pulsed Source Current	$I_{SM}$		--	--	60	
Diode Forward Voltage	$V_{SD}$	$I_S=10A, V_{GS}=0V$	--	0.9	1.2	V

- 1.Pulse width limited by maximum junction temperature
- 2.L=1mH,  $V_{DD}=50V, V_G=10V, R_G=25$  , starting  $T_J=25^\circ C$
- 3.Pulse Test: Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$
- 4.Essentially independent of operating temperature

Typical Performance Characteristics

Figure 1. Output Characteristics

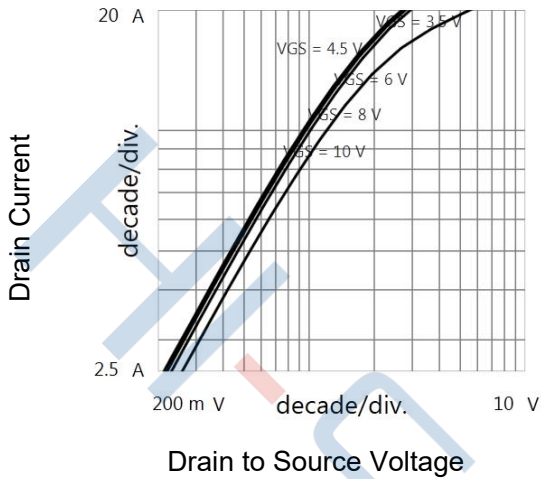


Figure 2. Drain to source Resistance vs Gate to Source Voltage

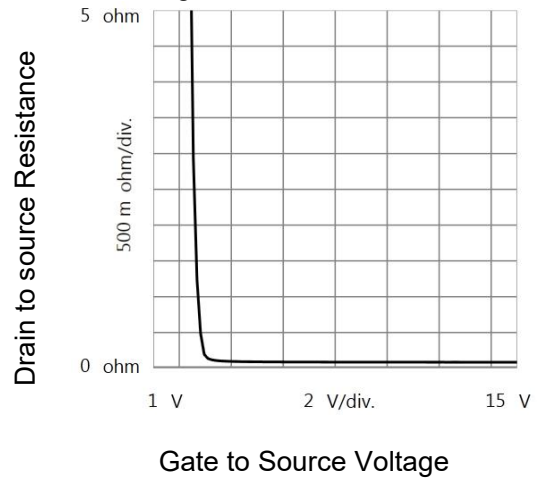


Figure 3. Drain to source Resistance vs Drain Current

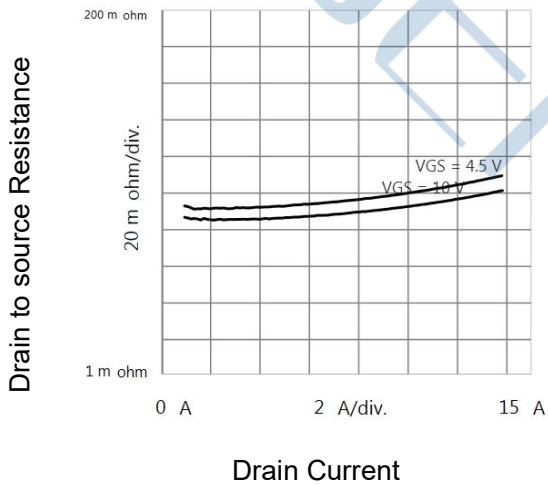


Figure 4. Body Diode Forward Characteristics

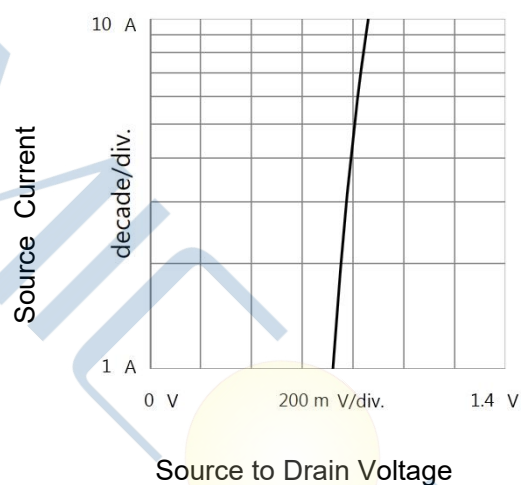


Figure 5. Capacitances

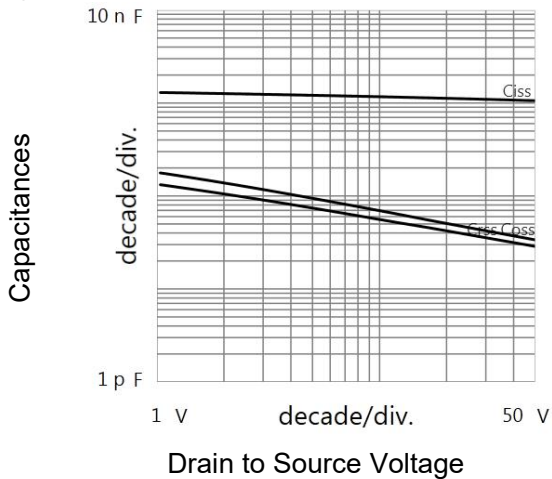
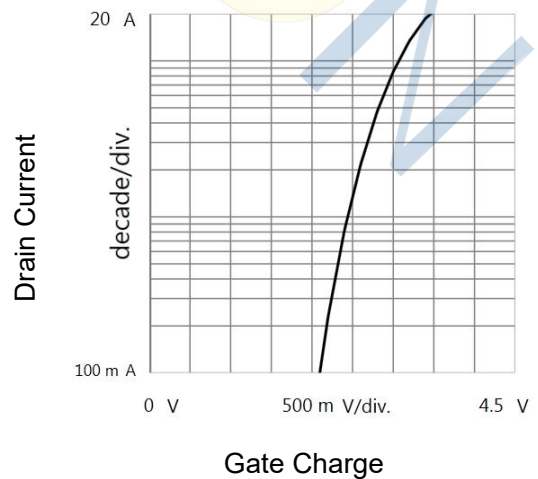
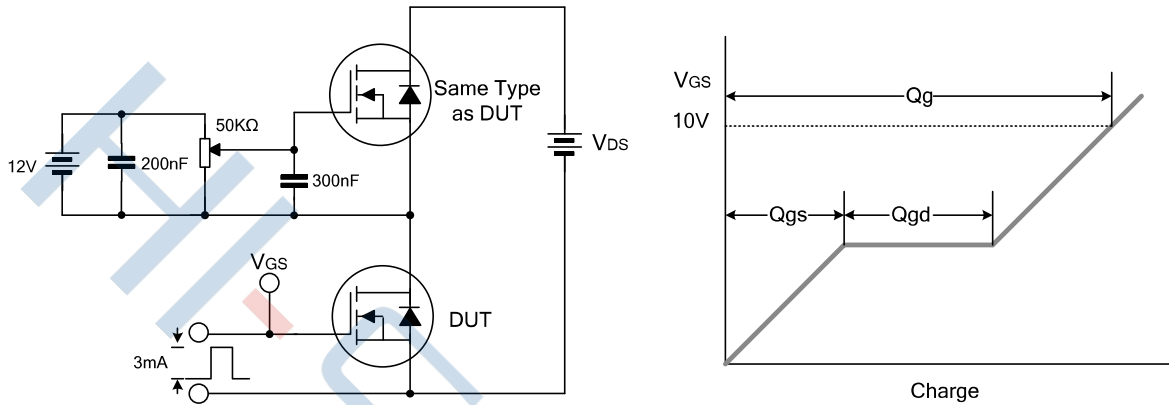


Figure 6. Transfer Characters

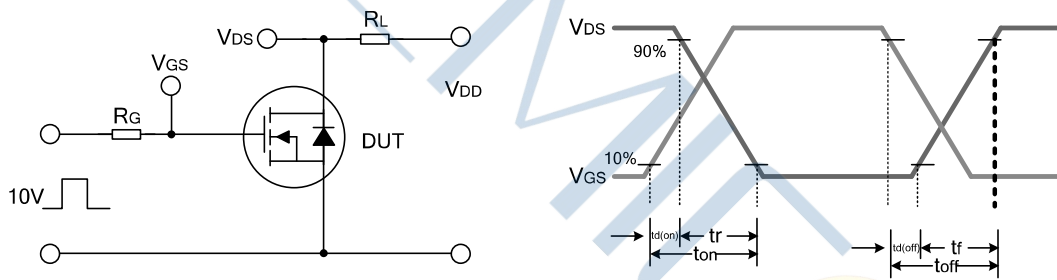


Test Circuit

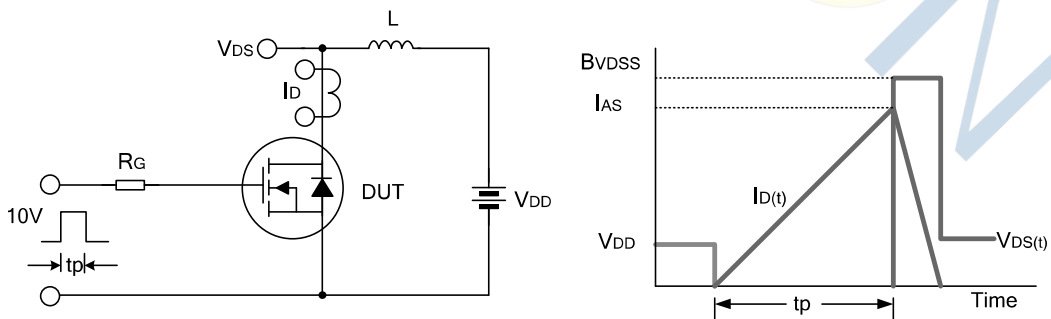
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform

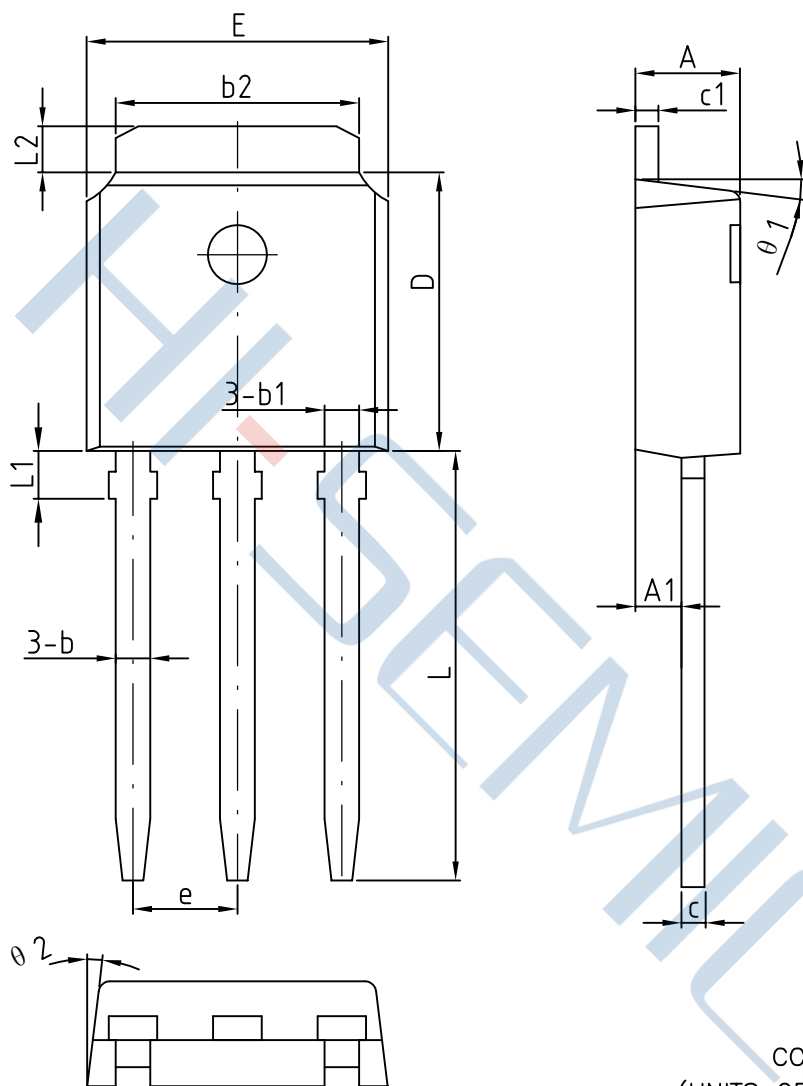


Unclamped Inductive Switching Test Circuit & Waveform



Package Dimensions of TO-251J-3L

Unit:mm

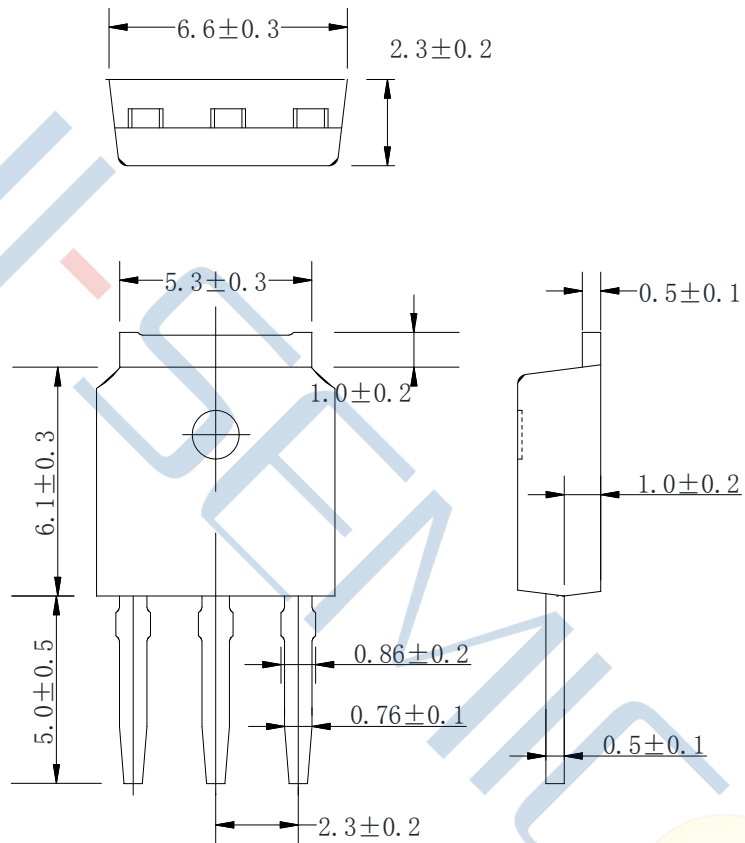


COMMON DIMENSIONS  
(UNITS OF MEASURE=MILLIMETER)

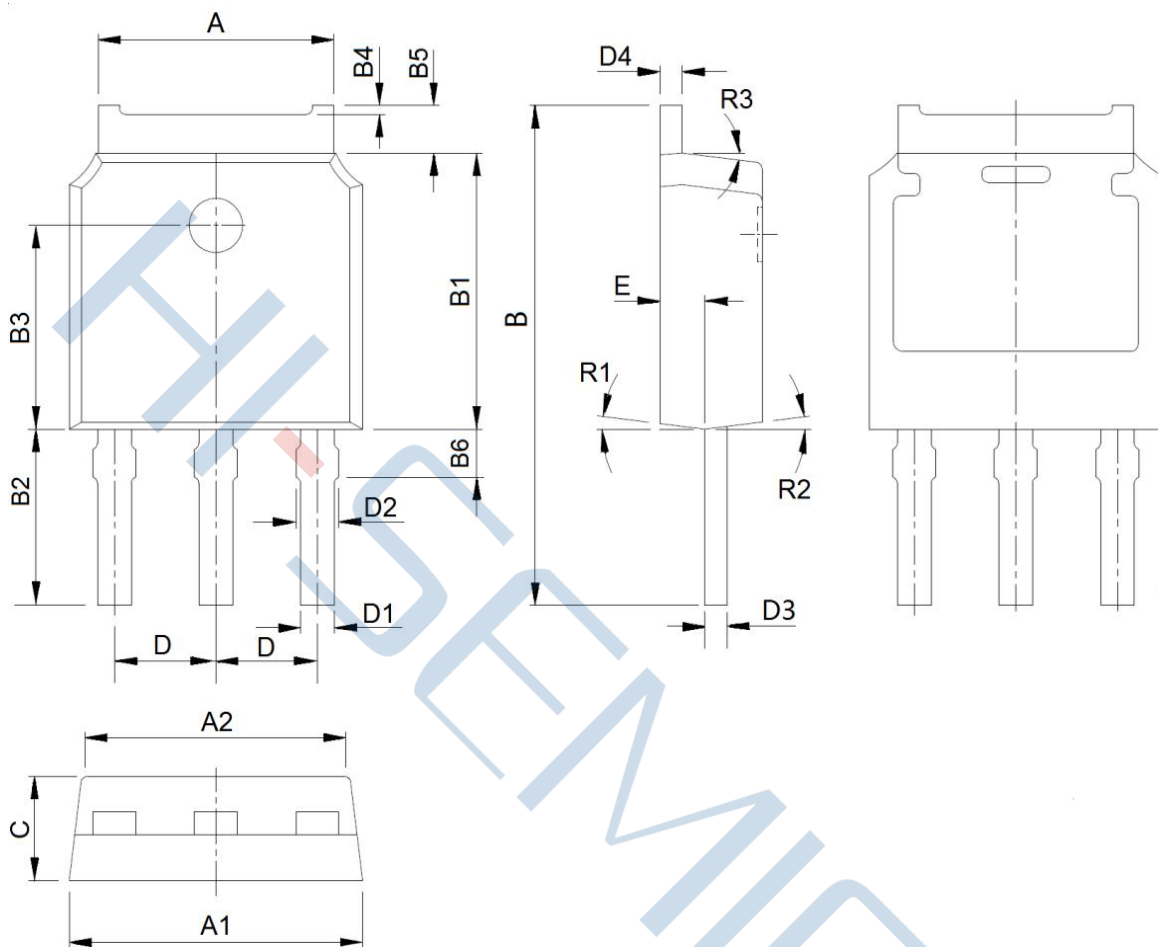
SYMBOL	MIN	NOM	MAX
A	2.2	2.30	2.38
A1	0.90	1.01	1.10
b	0.71	0.76	0.86
b1	-	0.76	TV
b2	5.13	5.33	5.46
c	0.46	0.50	0.60
c1	0.46	0.50	0.60
D	6.00	6.10	6.20
E	6.50	6.60	6.70
e	2.286BSC		
L	9.10	9.40	9.70
L1	1.05		
L2	0.90	-	1.25
θ 1	7°		
θ 2	7°		

Package Dimensions of TO-251D-3L

Unit:mm



Package Dimensions of TO-251D-3L



Symbol	Dimensions (mm)	Symbol	Dimensions (mm)	Symbol	Dimensions (mm)
A	5.3±0.2	B4	0.1 (typ.)	D3	0.5±0.08
A1	6.6±0.2	B5	0.95±0.1	D4	0.5±0.08
A2	5.8±0.2	B6	1.05 (typ.)	E	1.01±0.15
B	11.5±0.5	C	2.3±0.15	R1	7° (typ.)
B1	6.1±0.2	D	2.286 (typ.)	R2	7° (typ.)
B2	4.0±0.5	D1	0.76±0.1	R3	7° (typ.)
B3	4.5±0.15	D2	0.91±0.1		



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