



200V 9.1mΩ N-Ch Power MOSFET

Features

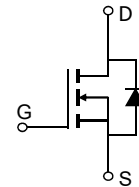
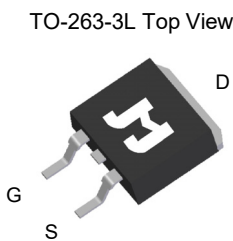
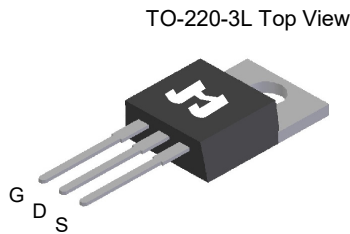
- Ultra-low ON-resistance, $R_{DS(ON)}$
- Low Gate Charge, Q_g
- 100% UIS and R_g Tested
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant

Product Summary

Parameter	Value	Unit
V_{DS}	200	V
$V_{GS(th_Typ)}$	3.3	V
I_D (@ $V_{GS} = 10V$) ⁽¹⁾	129	A
$R_{DS(ON)_Typ}$ (@ $V_{GS} = 10V$)	9.1	mΩ

Applications

- Power Management in Computing, CE, IE 4.0, Communications
- Current Switching in DC/DC & AC/DC (SR) Sub-systems
- Load Switching, Quick/Wireless Charging, Motor Driving

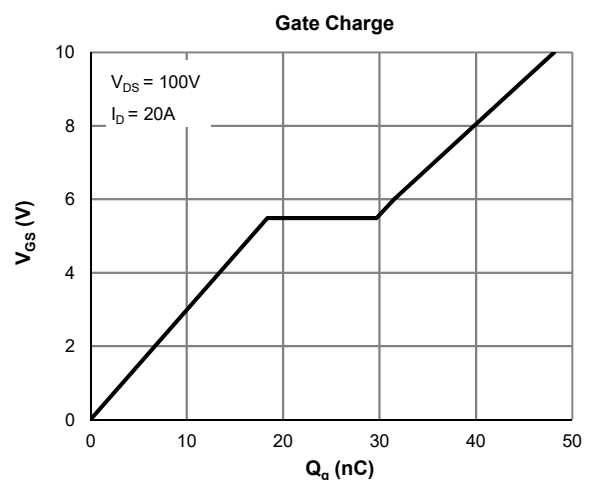
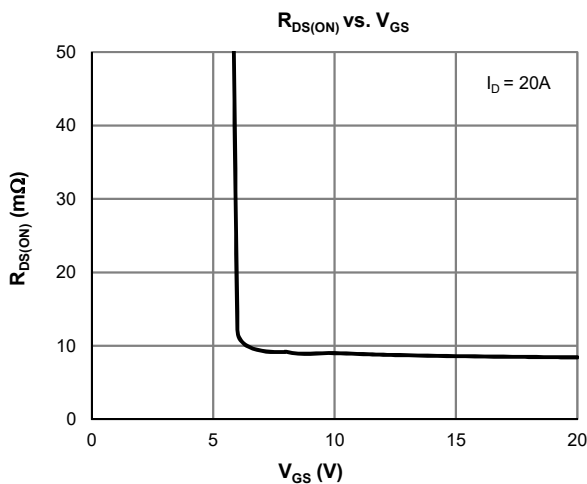


Ordering Information

Device	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JMSH2010BC-U	TO-220-3L	3	SH2010B	NA	-55 to 175	Tube	50
JMSH2010BE-13	TO-263-3L	3	SH2010B	1	-55 to 175	13-inch Reel	800

Absolute Maximum Ratings (@ $T_A = 25^\circ C$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DS}	200	V
Gate-to-Source Voltage	V_{GS}	±20	V
Continuous Drain Current ⁽¹⁾	I_D	$T_C = 25^\circ C$	129
		$T_C = 100^\circ C$	91
Pulsed Drain Current ⁽²⁾	I_{DM}	517	A
Avalanche Current ⁽³⁾	I_{AS}	41	A
Avalanche Energy ⁽³⁾	E_{AS}	841	mJ
Power Dissipation ⁽⁴⁾	P_D	$T_C = 25^\circ C$	500
		$T_C = 100^\circ C$	250
Junction & Storage Temperature Range	T_J, T_{STG}	-55 to 175	°C





Electrical Characteristics (@ $T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
STATIC PARAMETERS							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	200			V	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 160\text{V}, V_{GS} = 0\text{V}$			1.0	μA	
			$T_J = 55^\circ\text{C}$		5.0		
Gate-Body Leakage Current	I_{GSS}	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$			± 100	nA	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	2.5	3.3	4.5	V	
Static Drain-Source ON-Resistance	$R_{DS(ON)}$	$V_{GS} = 10\text{V}, I_D = 20\text{A}$	TO-263-3L		9.1	10.7	$\text{m}\Omega$
			TO-220-3L		9.4	10.9	$\text{m}\Omega$
Forward Transconductance	g_{FS}	$V_{DS} = 5\text{V}, I_D = 20\text{A}$		55		S	
Diode Forward Voltage	V_{SD}	$I_S = 1\text{A}, V_{GS} = 0\text{V}$		0.67	1.0	V	
Diode Continuous Current	I_S	$T_C = 25^\circ\text{C}$			129	A	
DYNAMIC PARAMETERS ⁽⁶⁾							
Input Capacitance	C_{iss}	$V_{GS} = 0\text{V}, V_{DS} = 100\text{V}, f = 1\text{MHz}$		3318		pF	
Output Capacitance	C_{oss}			436		pF	
Reverse Transfer Capacitance	C_{rss}			41		pF	
Gate Resistance	R_g	$V_{GS} = 0\text{V}, V_{DS} = 0\text{V}, f = 1\text{MHz}$		3.4		Ω	
SWITCHING PARAMETERS ⁽⁶⁾							
Total Gate Charge (@ $V_{GS} = 10\text{V}$)	Q_g	$V_{GS} = 0 \text{ to } 10\text{V}$ $V_{DS} = 100\text{V}, I_D = 20\text{A}$		48		nC	
Total Gate Charge (@ $V_{GS} = 6.0\text{V}$)	Q_g			32		nC	
Gate Source Charge	Q_{gs}			18.3		nC	
Gate Drain Charge	Q_{gd}			11.3		nC	
Turn-On DelayTime	$t_{D(on)}$	$V_{GS} = 10\text{V}, V_{DS} = 100\text{V}$ $R_L = 5.0\Omega, R_{GEN} = 6\Omega$		18.3		ns	
Turn-On Rise Time	t_r			27		ns	
Turn-Off DelayTime	$t_{D(off)}$			38		ns	
Turn-Off Fall Time	t_f			19.4		ns	
Body Diode Reverse Recovery Time	t_{rr}		$I_F = 15\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$		130		ns
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F = 15\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$		667		nC	

Thermal Performance

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	60	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.30	0.36	$^\circ\text{C}/\text{W}$

Notes:

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under $T_{J_Max} = 175^\circ\text{C}$.
3. This single-pulse measurement was taken under the following condition [$L = 1\text{mH}, V_{GS} = 10\text{V}, V_{DD} = 100\text{V}$] while its value is limited by $T_{J_Max} = 175^\circ\text{C}$.
4. The power dissipation P_D is based on $T_{J_Max} = 175^\circ\text{C}$.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Electrical & Thermal Characteristics

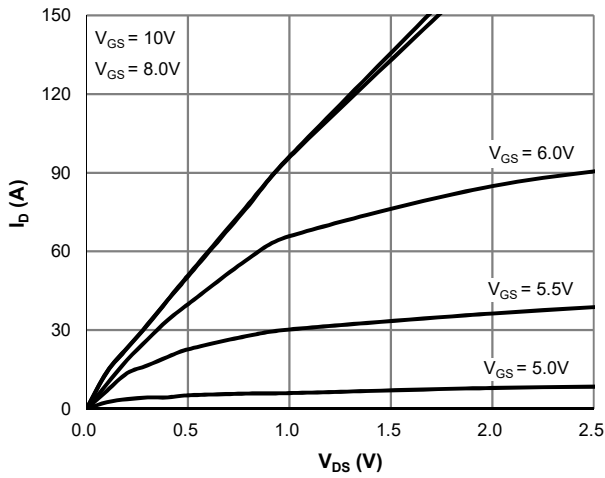


Figure 1: Saturation Characteristics

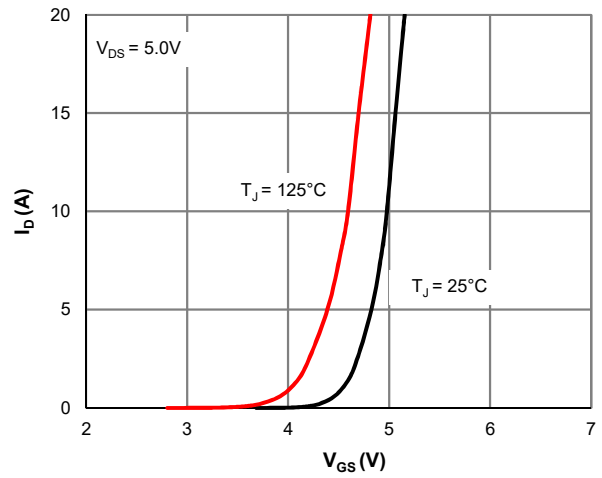


Figure 2: Transfer Characteristics

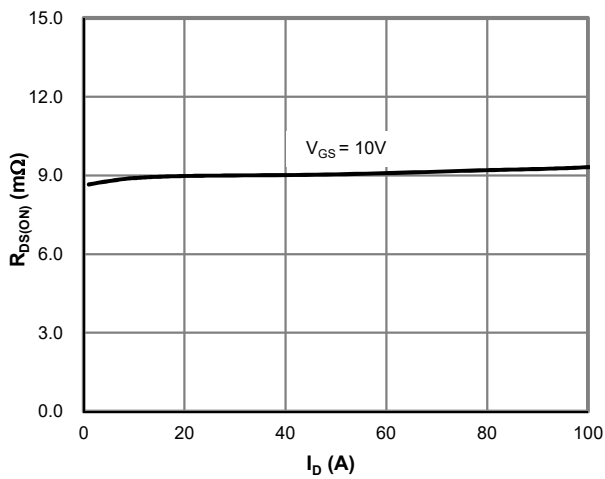


Figure 3: $R_{DS(ON)}$ vs. Drain Current

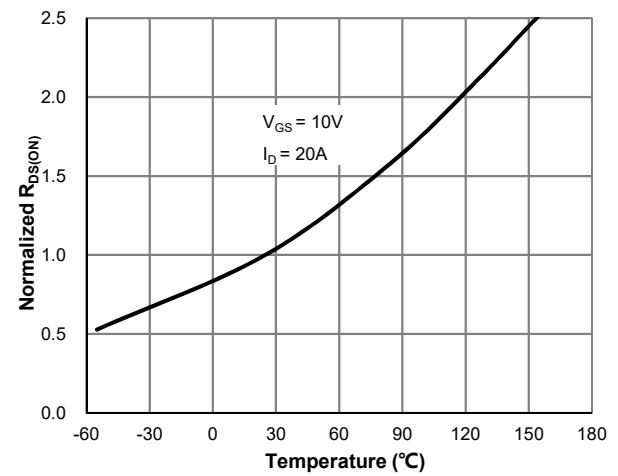


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

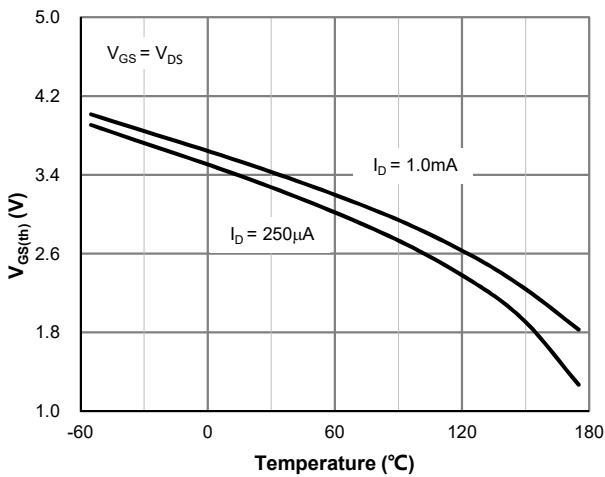


Figure 5: $V_{GS(th)}$ vs. Junction Temperature

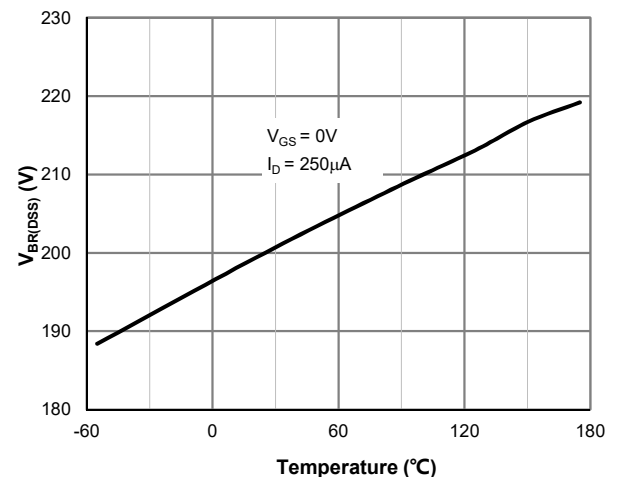


Figure 6: $V_{BR(DSS)}$ vs. Junction Temperature

Typical Electrical & Thermal Characteristics

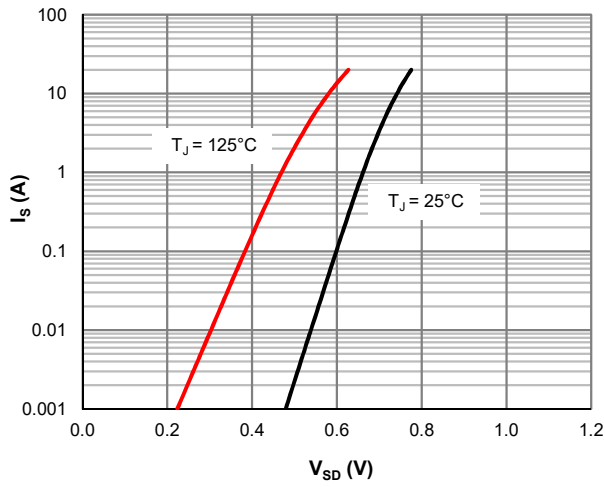


Figure 7: Body-Diode Characteristics

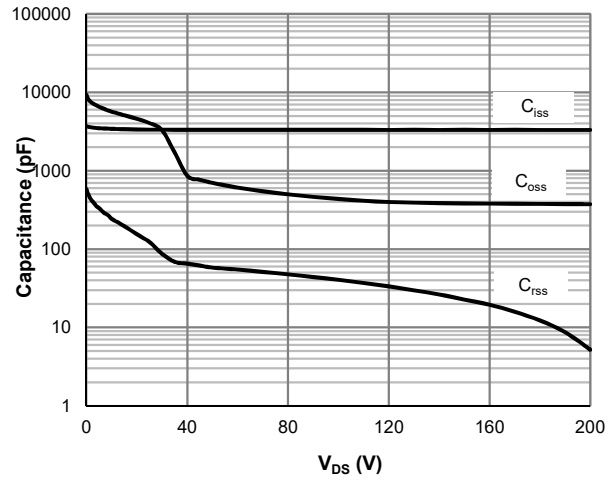


Figure 8: Capacitance Characteristics

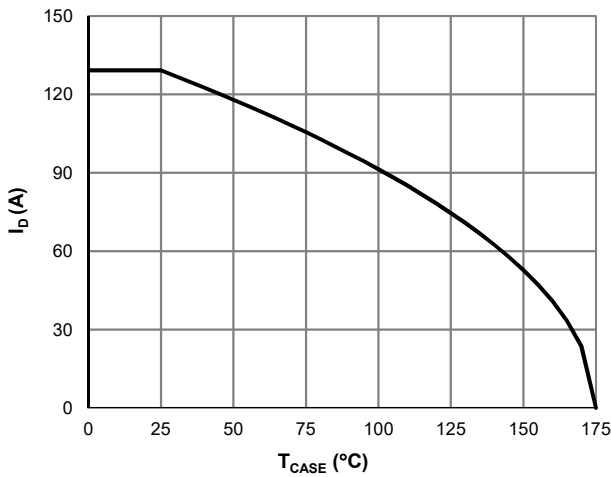


Figure 9: Current De-rating

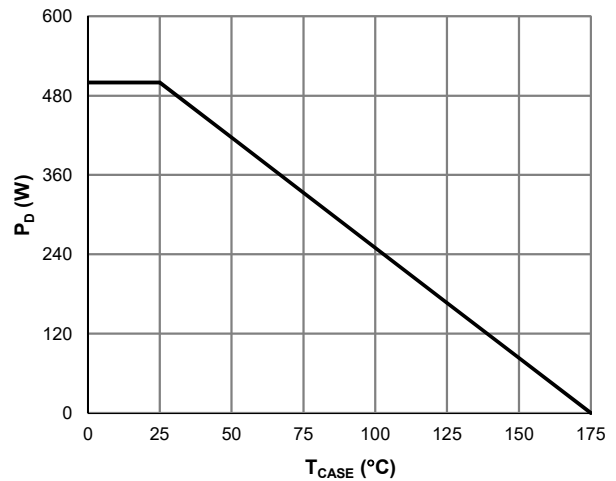


Figure 10: Power De-rating

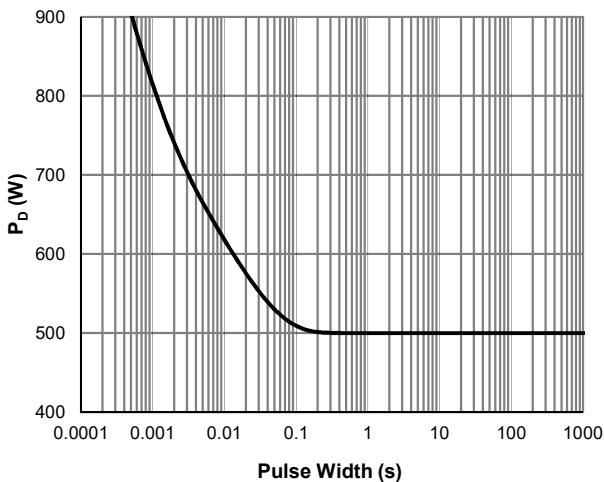


Figure 11: Single Pulse Power Rating, Junction-to-Case

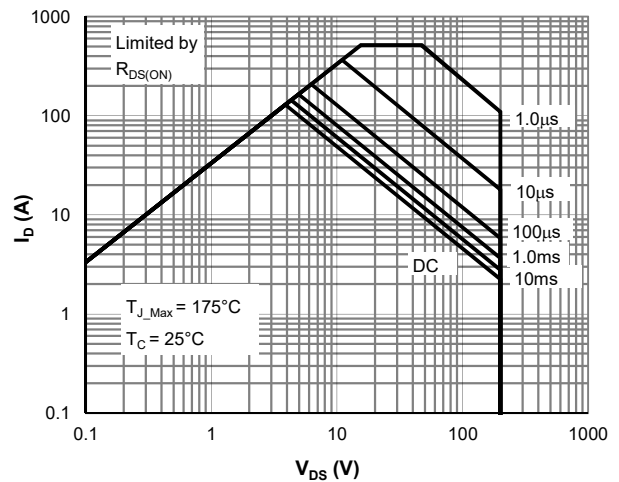


Figure 12: Maximum Safe Operating Area



Typical Electrical & Thermal Characteristics

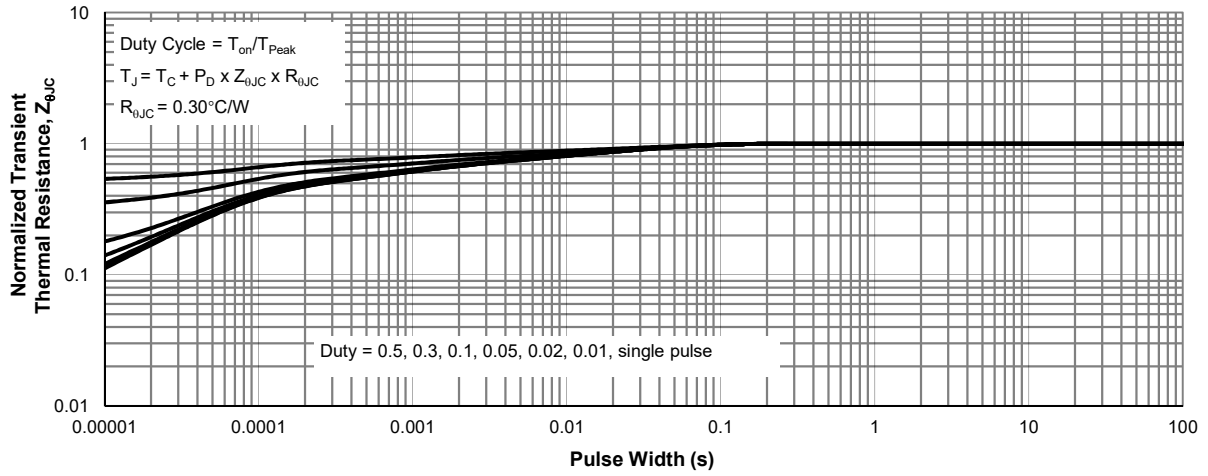
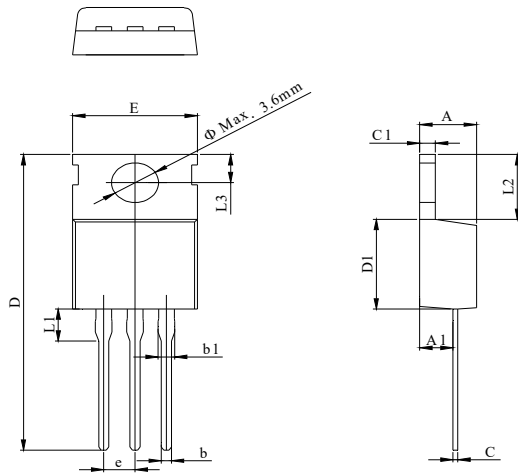


Figure 13: Normalized Maximum Transient Thermal Impedance

TO-220-3L Package Information

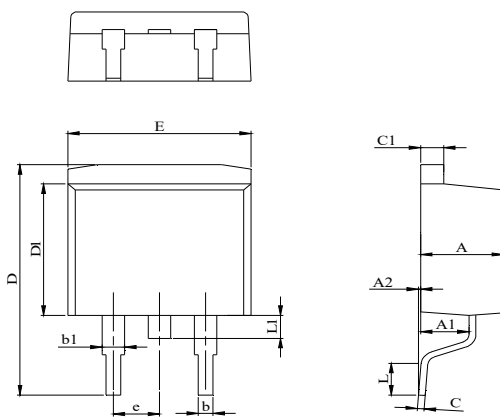
Package Outline



DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	4.24		4.70
A1	2.20		3.00
b	0.70		0.95
b1	1.14		1.70
C	0.40		0.60
C1	1.15		1.40
D	28.00		29.80
D1	8.80		9.90
E	9.70		10.50
L1			3.80
L2	6.25		6.90
L3	2.40		3.00
e		2.54 BSC	

TO-263-3L Package Information

Package Outline



DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	4.24		4.77
A1	2.30		2.89
A2	0.00	0.10	0.25
b	0.70		0.96
b1	1.17		1.70
C	0.30		0.60
C1	1.15		1.42
D	14.10		15.88
D1	8.50		9.60
E	9.78		10.36
L	1.78		2.79
L1			1.75
e		2.54	

Recommend Soldering Footprint

