

## 200V N-Ch Power MOSFET

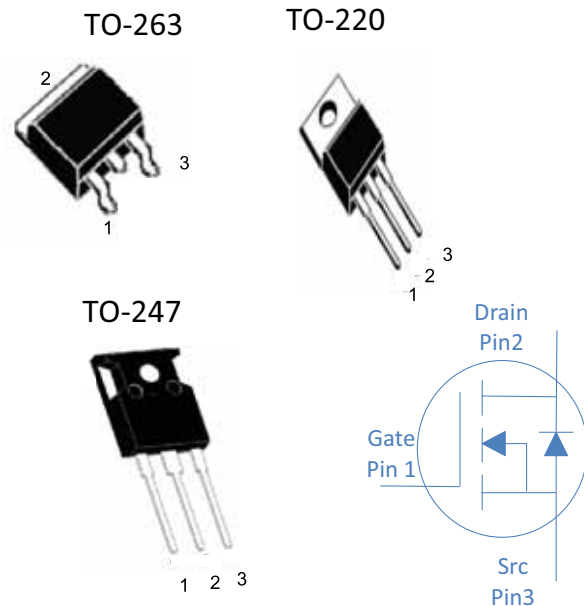
### Feature

- High Speed Power Switching
- Enhanced Body diode dv/dt capability
- 100% UIS tested
- Enhanced Avalanche Ruggedness
- Pb-free lead plating

$V_{DS}$		200	V
$R_{DS(on),typ}$	TO-263	9.1	m $\Omega$
$R_{DS(on),typ}$	TO-247	8.7	m $\Omega$
$R_{DS(on),typ}$	TO-220	9.4	m $\Omega$
$I_D$ (Silicon Limited)		132	A

### Application

- Synchronous Rectification in SMPS
- Hard Switching and High Speed Circuit
- Power Tools
- UPS
- Motor Control
- Halogen-free



Part Number	Package	Marking
RM130N200HD	TO-263	130N200
RM130N200T7	TO-247	130N200
RM130N200T2	TO-220	130N200

### Absolute Maximum Ratings at $T_j=25^\circ\text{C}$ (unless otherwise specified)

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current (Silicon Limited)	$I_D$	$T_C=25^\circ\text{C}$	132	A
		$T_C=100^\circ\text{C}$	93	
Drain to Source Voltage	$V_{DS}$	-	200	V
Gate to Source Voltage	$V_{GS}$	-	$\pm 20$	V
Pulsed Drain Current	$I_{DM}$	-	370	A
Avalanche Energy, Single Pulse	$E_{AS}$	$L=0.4\text{mH}$ , $T_C=25^\circ\text{C}$	720	mJ
Power Dissipation	$P_D$	$T_C=25^\circ\text{C}$	429	W
Operating and Storage Temperature	$T_J, T_{stg}$	-	-55 to 175	$^\circ\text{C}$

### Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Thermal Resistance Junction-Case	$R_{\theta JC}$	0.35	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	60	$^\circ\text{C}/\text{W}$

## Electrical Characteristics at $T_j=25^\circ\text{C}$ (unless otherwise specified)

Static Characteristics							
Parameter	Symbol	Conditions	Value			Unit	
			min	typ	max		
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	200	-	-	V	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2	3	4		
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS}=0V, V_{DS}=160V, T_j=25^\circ\text{C}$	-	-	1	$\mu A$	
		$V_{GS}=0V, V_{DS}=160V, T_j=100^\circ\text{C}$	-	-	100		
Gate to Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA	
Drain to Source on Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	TO-263	-	9.1	10.7	m $\Omega$
			TO-247	-	8.7	10.9	
			TO-220	-	9.4	11	
Transconductance	$g_{fs}$	$V_{DS}=5V, I_D=20A$	-	70	-	S	
Gate Resistance	$R_G$	$V_{GS}=0V, V_{DS}$ Open, $f=1\text{MHz}$	-	4.0	-	$\Omega$	

Dynamic Characteristics						
Input Capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=100V, f=1\text{MHz}$	-	4970	-	pF
Output Capacitance	$C_{oss}$		-	420	-	
Reverse Transfer Capacitance	$C_{rss}$		-	7.5	-	
Total Gate Charge	$Q_g$	$V_{DD}=100V, I_D=20A, V_{GS}=10V$	-	56	-	nC
Gate to Source Charge	$Q_{gs}$		-	18	-	
Gate to Drain (Miller) Charge	$Q_{gd}$		-	5	-	
Turn on Delay Time	$t_{d(on)}$	$V_{DD}=100V, I_D=20A, V_{GS}=10V,$ $R_G=10\Omega,$	-	16	-	ns
Rise time	$t_r$		-	22	-	
Turn off Delay Time	$t_{d(off)}$		-	38	-	
Fall Time	$t_f$		-	10	-	

Reverse Diode Characteristics						
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_F=20A$	-	0.9	-	V
Reverse Recovery Time	$t_{rr}$	$V_R=100V, I_F=20A, di_F/dt=100A/\mu s$	-	140	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	630	-	nC

# RATING AND CHARACTERISTICS CURVES (RM130N200T7(T2)(HD))

Fig 1. Typical Output Characteristics

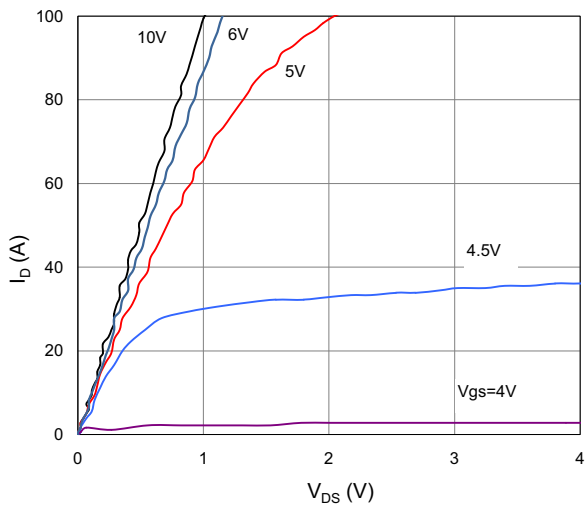


Figure 2. On-Resistance vs. Gate-Source Voltage

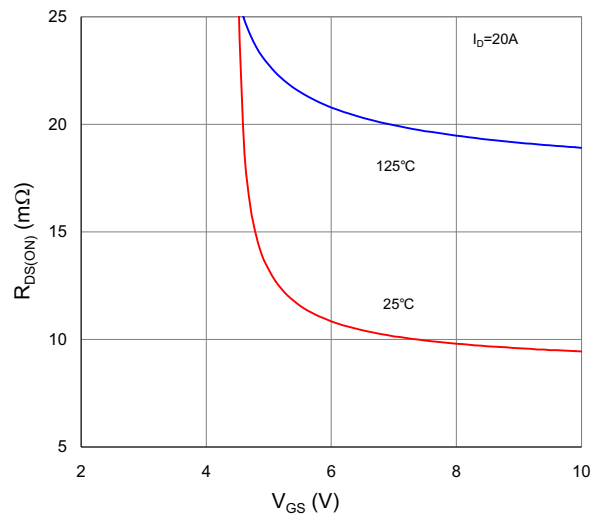


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

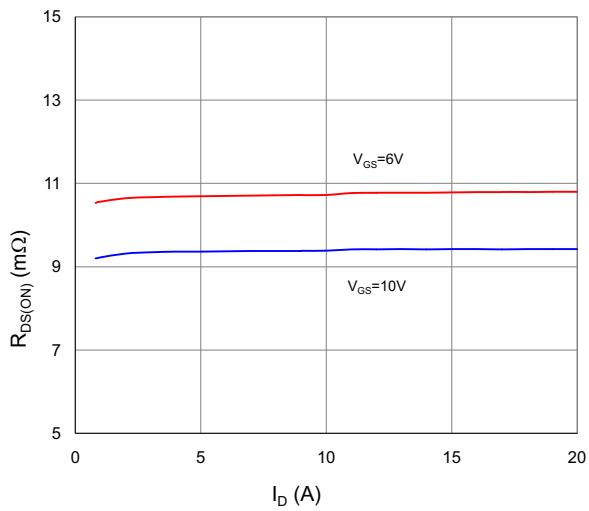


Figure 4. Normalized On-Resistance vs. Junction Temperature

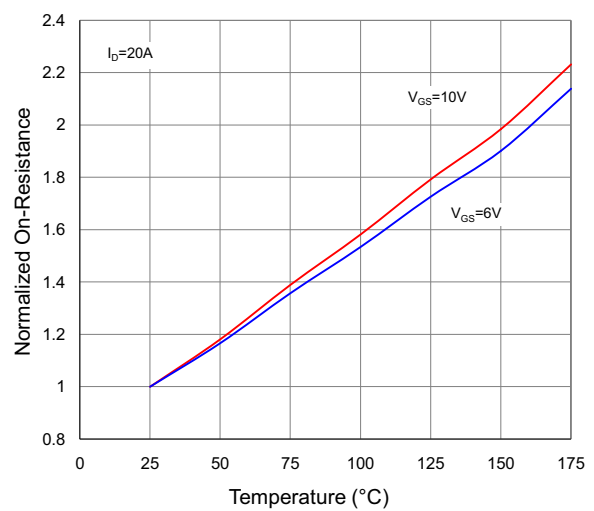


Figure 5. Typical Transfer Characteristics

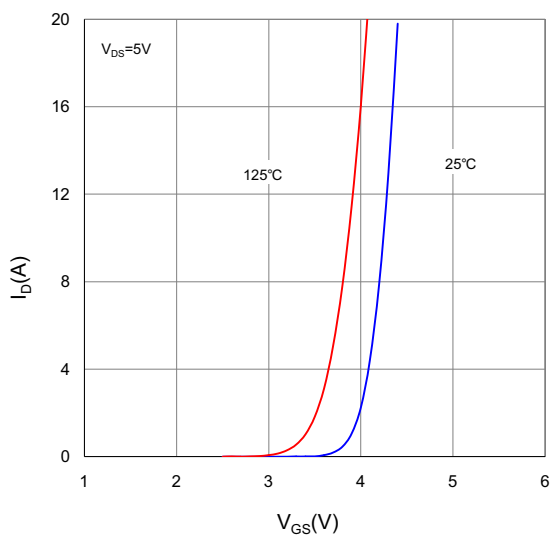
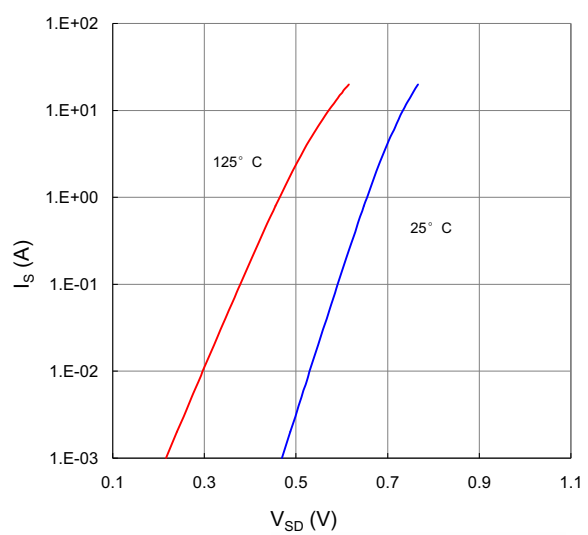


Figure 6. Typical Source-Drain Diode Forward Voltage



# RATING AND CHARACTERISTICS CURVES (RM130N200T7(T2)(HD))

Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

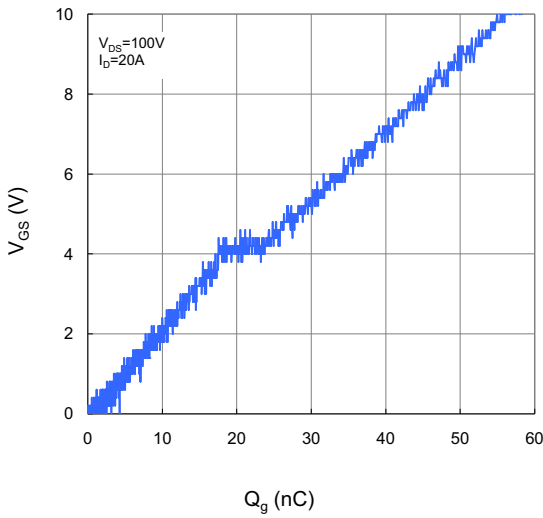


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

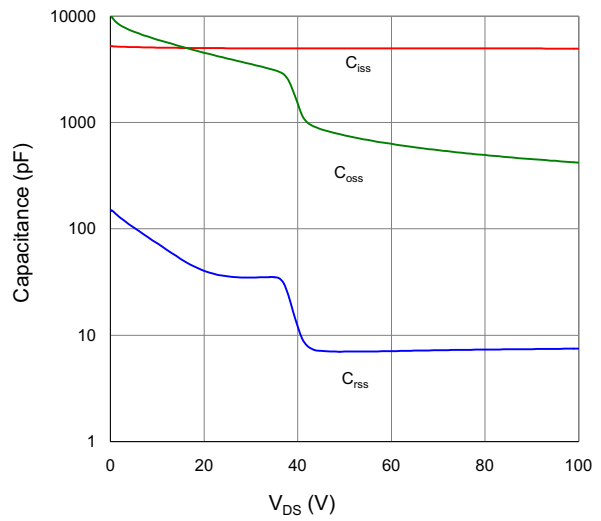


Figure 9. Maximum Safe Operating Area

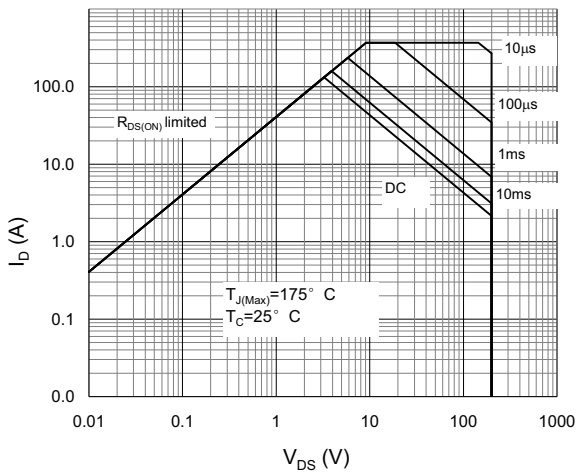


Figure 10. Maximum Drain Current vs. Case Temperature

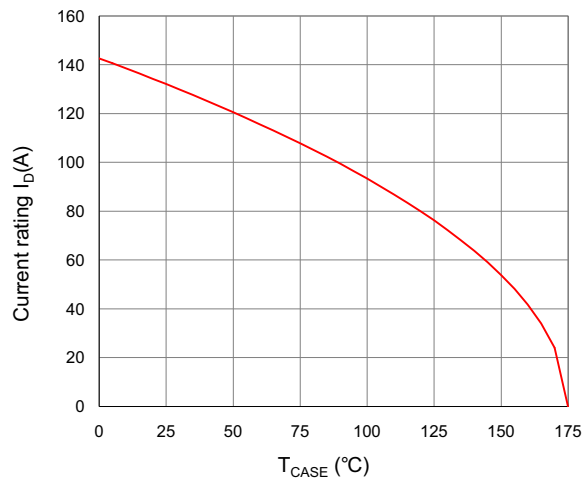
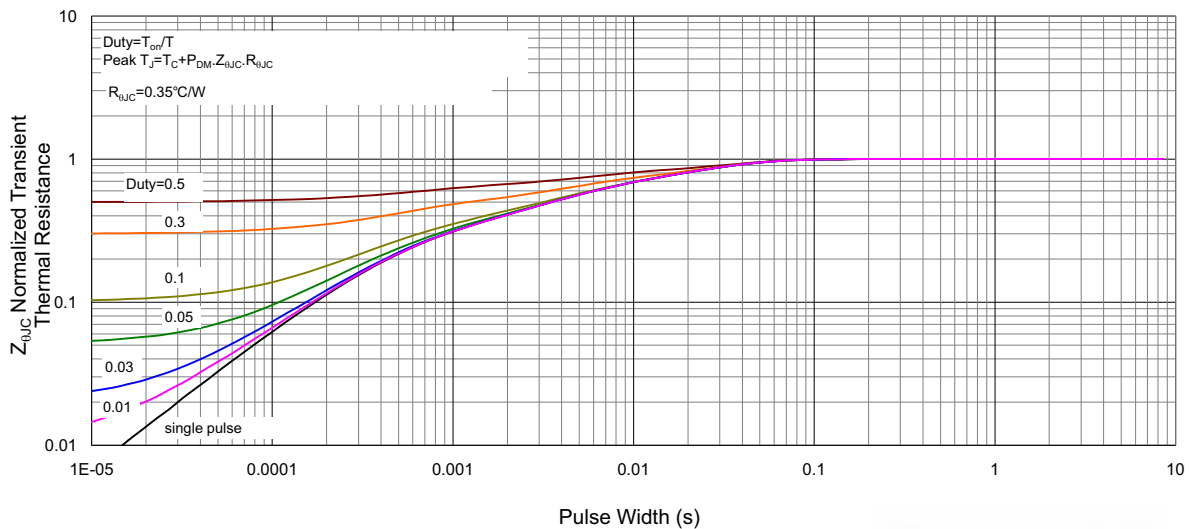
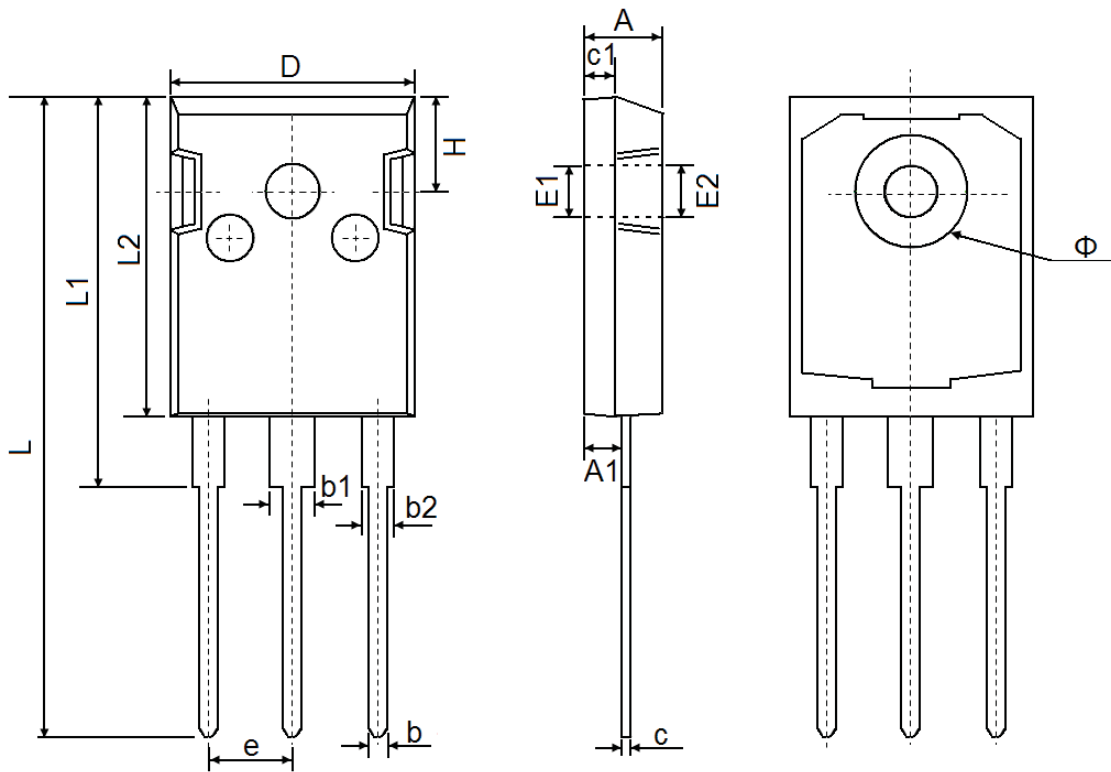


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case

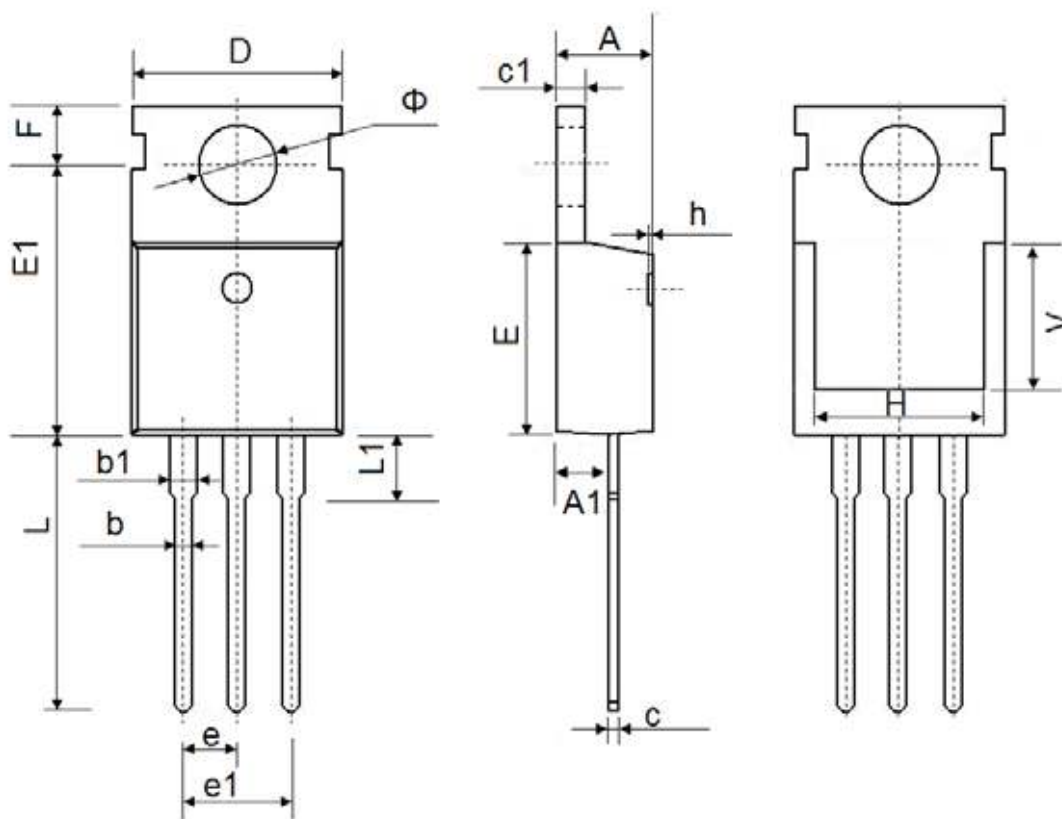


# TO-247 Package Information



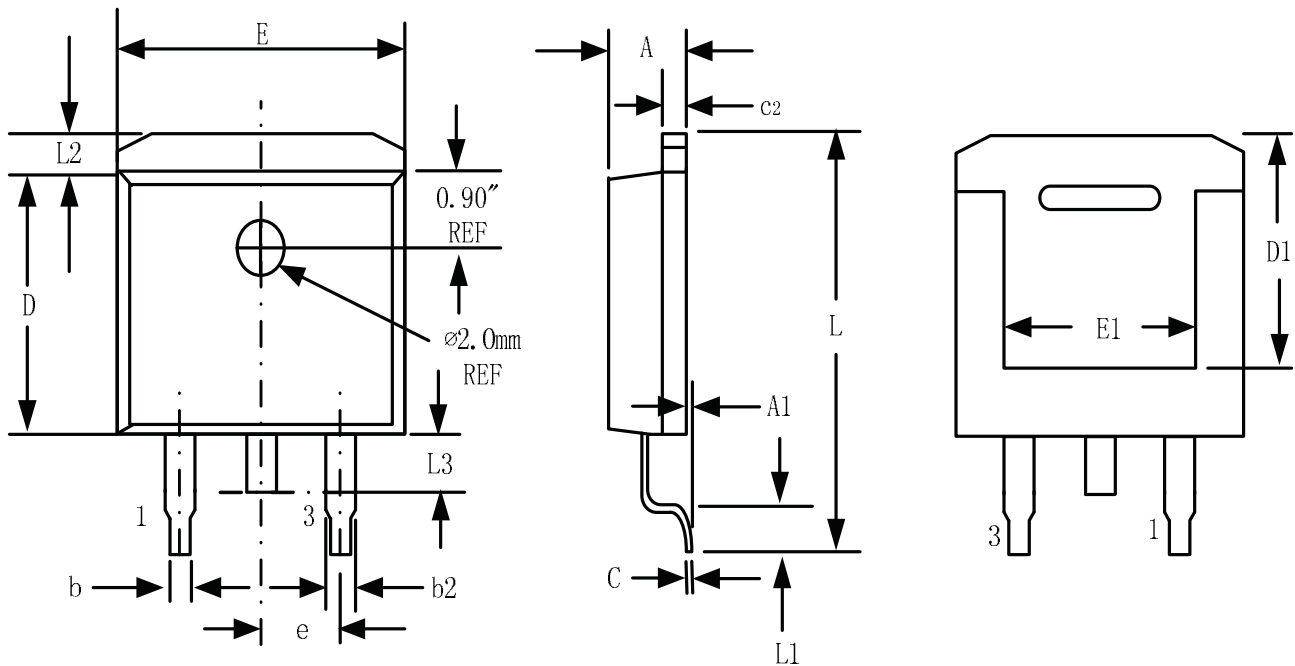
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.850	5.150	0.191	0.200
A1	2.200	2.600	0.087	0.102
b	1.000	1.400	0.039	0.055
b1	2.800	3.200	0.110	0.126
b2	1.800	2.200	0.071	0.087
c	0.500	0.700	0.020	0.028
c1	1.900	2.100	0.075	0.083
D	15.450	15.750	0.608	0.620
E1	3.500 REF		0.138 REF	
E2	3.600 REF		0.142 REF	
L	40.900	41.300	1.610	1.626
L1	24.800	25.100	0.976	0.988
L2	20.300	20.600	0.799	0.811
$\phi$	7.100	7.300	0.280	0.287
e	5.450 TYP		0.215 TYP	
H	5.980 REF		0.235 REF	

## TO-220-3L-C Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.9500	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	7.500 REF.		0.295 REF.	
Φ	3.400	3.800	0.134	0.150

# TO-263-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.32	4.57	0.170	0.180
A1	-	0.25		0.010
b	0.71	0.94	0.028	0.037
b2	1.15	1.40	0.045	0.055
c	0.46	0.61	0.018	0.024
c2	1.22	1.40	0.048	0.055
D	8.89	9.40	0.350	0.370
D1	8.01	8.23	0.315	0.324
E	10.04	10.28	0.395	0.405
E1	7.88	8.08	0.310	0.318
e	2.54 BSC		0.100 BSC	
L	14.73	15.75	0.580	0.620
L1	2.29	2.79	0.090	0.110
L2	1.15	1.39	0.045	0.055
L3	1.27	1.77	0.050	0.070

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