

## 100V N-Ch Power MOSFET

### Feature

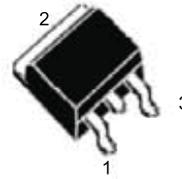
- High Speed Power Switching
- Enhanced Body diode dv/dt capability
- 100% UIS tested, 100% Rg Tested
- Pb-free lead plating

### Application

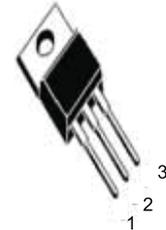
- Synchronous Rectification in SMPS
- Hard Switching and High Speed Circuit
- DC/DC in Telecoms and Industrial
- Halogen-free

$V_{DS}$			100	V
$R_{DS(on),typ}$	TO-263	$V_{GS}=10V$	2.2	m $\Omega$
$R_{DS(on),typ}$	TO-247	$V_{GS}=10V$	2.4	m $\Omega$
$R_{DS(on),typ}$	TO-220	$V_{GS}=10V$	2.5	m $\Omega$
$I_D$			180	A

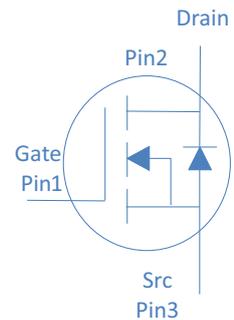
TO-263



TO-220



TO-247



Part Number	Package	Marking
RM180N100AHD	TO-263	180N100
RM180N100AT7	TO-247	180N100
RM180N100AT2	TO-220	180N100

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

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current (Package Limited)	$I_D$	$T_C=25^\circ\text{C}$	180	A
Drain to Source Voltage	$V_{DS}$	-	100	V
Gate to Source Voltage	$V_{GS}$	-	$\pm 20$	V
Pulsed Drain Current	$I_{DM}$	-	800	A
Avalanche Energy, Single Pulse	$E_{AS}$	$L=0.4\text{mH}, T_C=25^\circ\text{C}$	720	mJ
Power Dissipation	$P_D$	$T_C=25^\circ\text{C}$	341	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-Ambient	$R_{\theta JA}$	60	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction-Case	$R_{\theta JC}$	0.44	$^\circ\text{C}/\text{W}$

## Electrical Characteristics at T<sub>j</sub>= 25°C (unless otherwise specified)

Static Characteristics							
Parameter	Symbol	Conditions	Value			Unit	
			min	typ	max		
Drain to Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	100	-	-	V	
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA	2.0	3.0	4.0		
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =100V, T <sub>j</sub> =25°C	-	-	1	μA	
		V <sub>GS</sub> =0V, V <sub>DS</sub> =100V, T <sub>j</sub> =100°C	-	-	100		
Gate to Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA	
Drain to Source on Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	TO-263	-	2.2	2.7	mΩ
Drain to Source on Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	TO-247	-	2.4	2.9	mΩ
Drain to Source on Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	TO-220	-	2.5	3	mΩ
Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =20A		-	75	-	S
Gate Resistance	R <sub>G</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> Open, f=1MHz		-	1.5	-	Ω

Dynamic Characteristics						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =50V, f=1MHz	-	7684	-	pF
Output Capacitance	C <sub>oss</sub>		-	114	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	21	-	
Total Gate Charge	Q <sub>g</sub> (10V)	V <sub>DD</sub> =50V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V	-	106	-	nC
Gate to Source Charge	Q <sub>gs</sub>		-	24	-	
Gate to Drain (Miller) Charge	Q <sub>gd</sub>		-	22	-	
Turn on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =50V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V, R <sub>G</sub> =10Ω,	-	28	-	ns
Rise time	t <sub>r</sub>		-	22	-	
Turn off Delay Time	t <sub>d(off)</sub>		-	52	-	
Fall Time	t <sub>f</sub>		-	13	-	

Reverse Diode Characteristics						
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>F</sub> =20A	-	0.9	1.2	V
Reverse Recovery Time	t <sub>rr</sub>	V <sub>R</sub> =50V, I <sub>F</sub> =20A, dI <sub>F</sub> /dt=500A/μs	-	65	-	ns
Reverse Recovery Charge	Q <sub>rr</sub>		-	455	-	nC

# RATING AND CHARACTERISTICS CURVES (RM180N100AT2(HD)(T7))

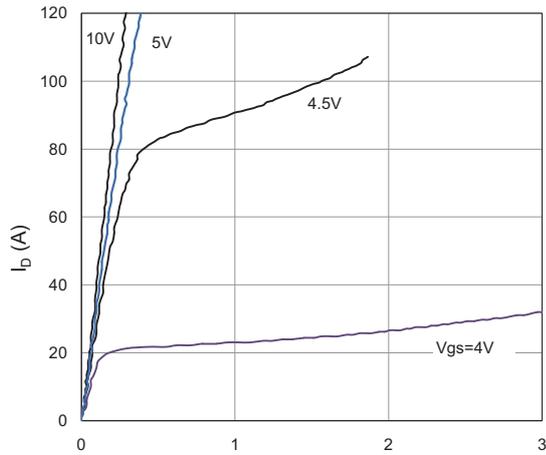


Fig 1. Typical Output Characteristics

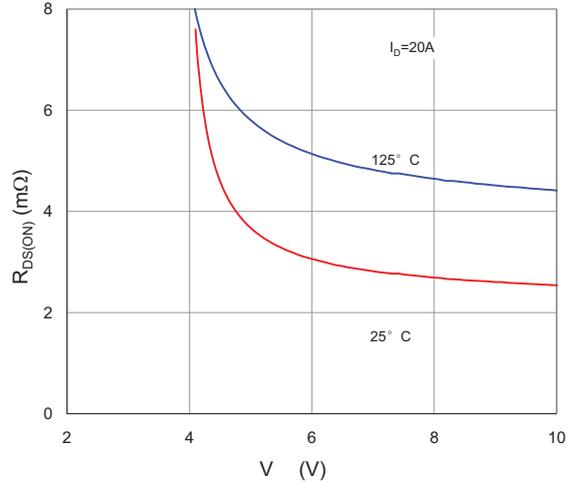


Figure 2. On-Resistance vs. Gate-Source voltage

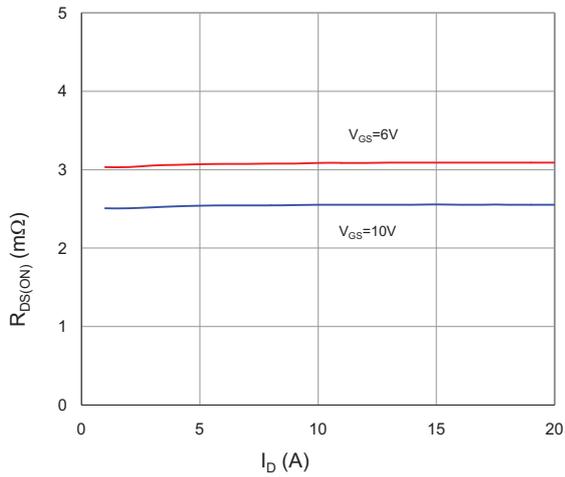


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

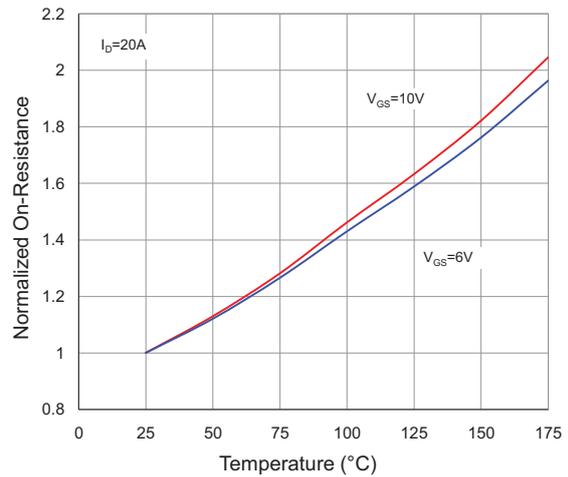


Figure 4. Normalized On-Resistance vs. Junction Temperature

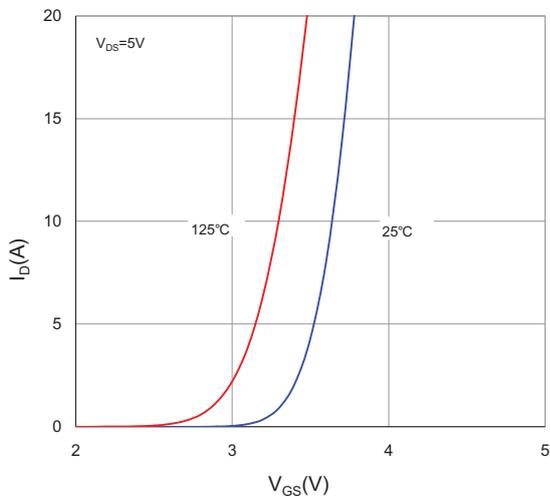


Figure 5. Typical Transfer Characteristics

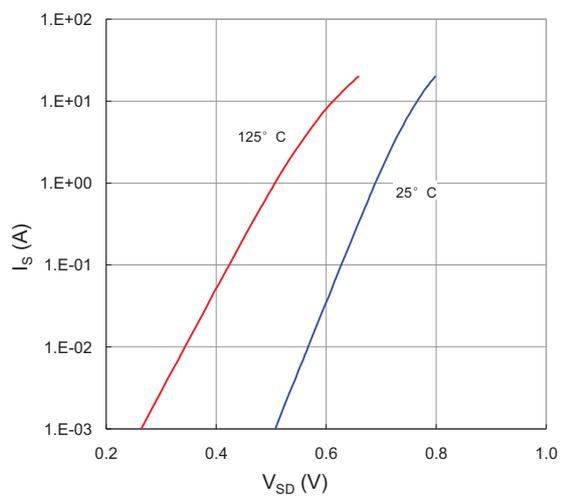


Figure 6. Typical Source-Drain Diode Forward Voltage

# RATING AND CHARACTERISTICS CURVES (RM180N100AT2(HD)(T7))

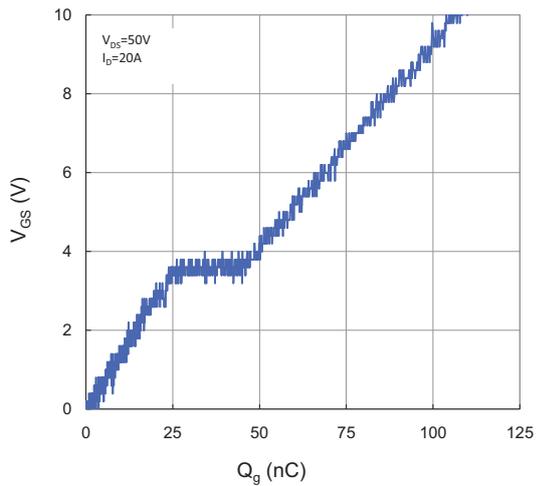


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

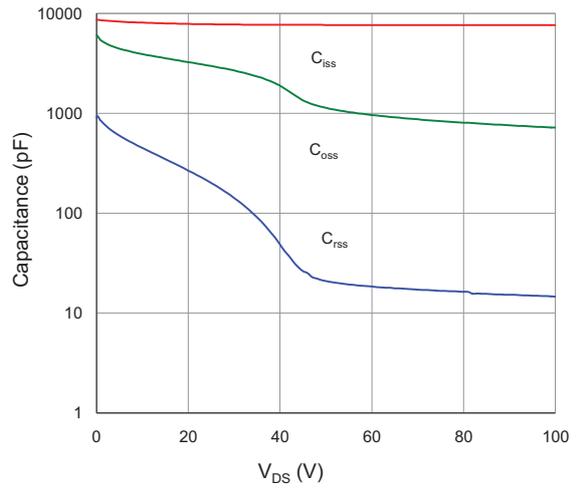


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

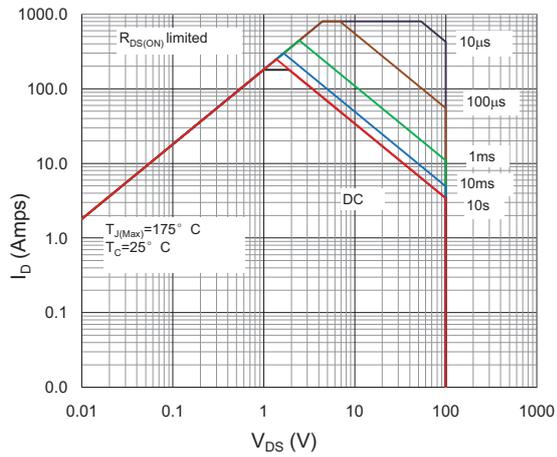


Figure 9. Maximum Safe Operating Area

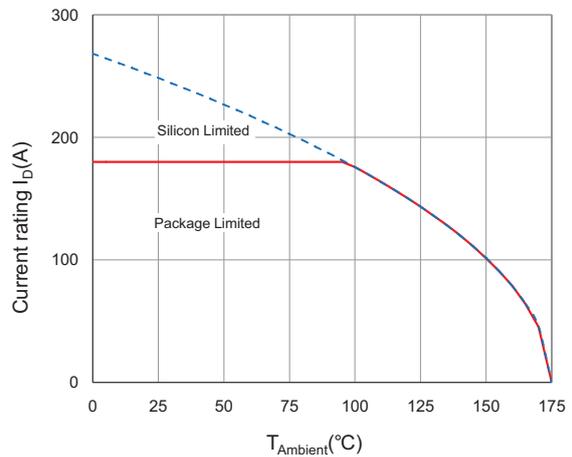


Figure 10. Maximum Drain Current vs. Case Temperature

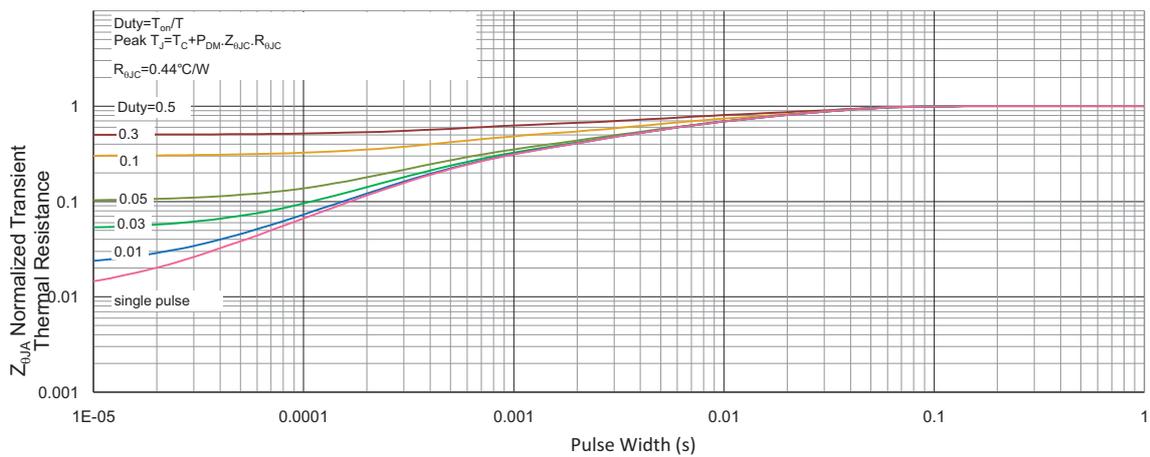
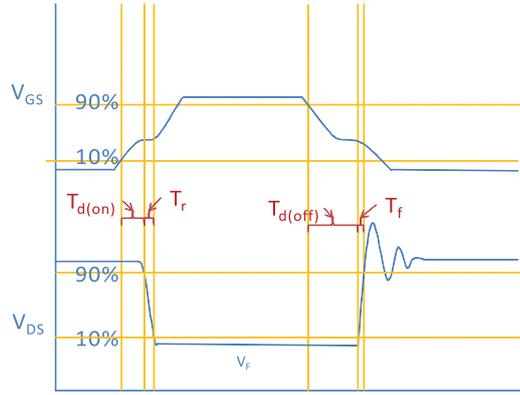
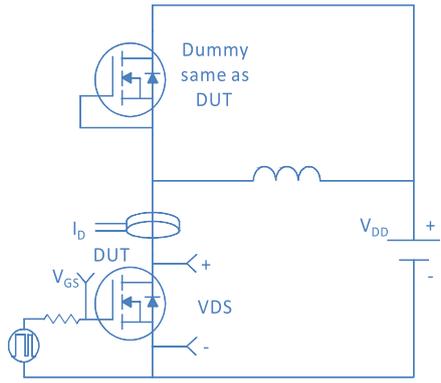
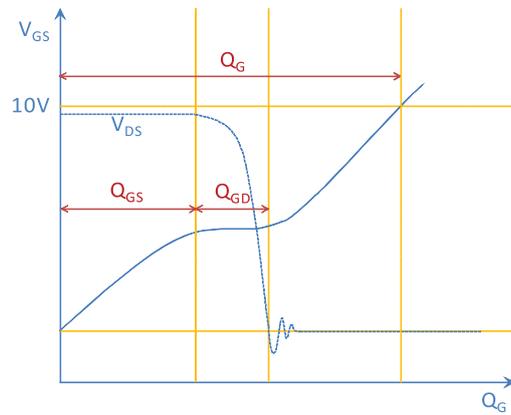
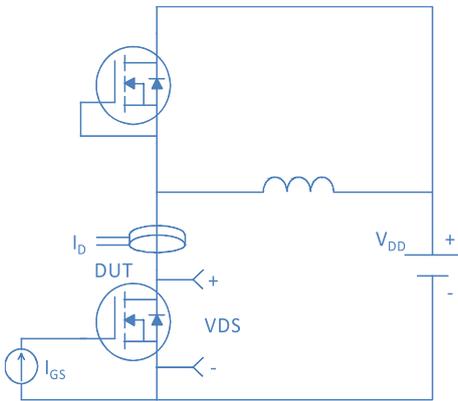


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient

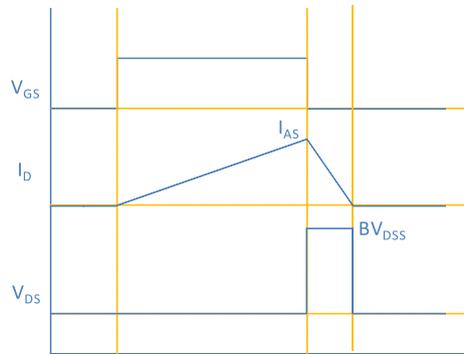
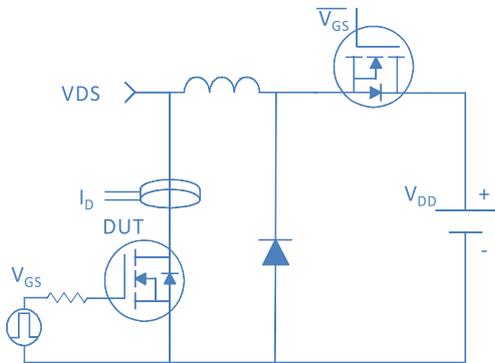
### Inductive switching Test



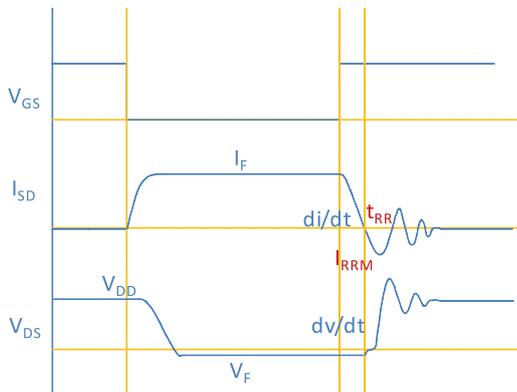
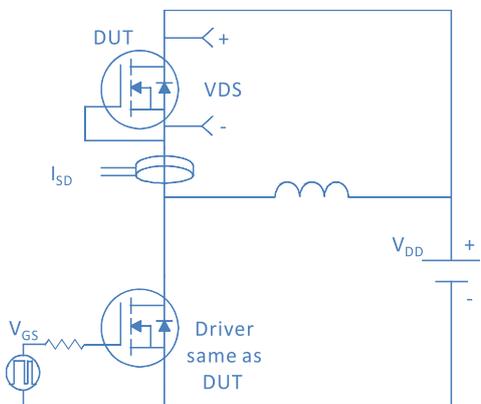
### Gate Charge Test



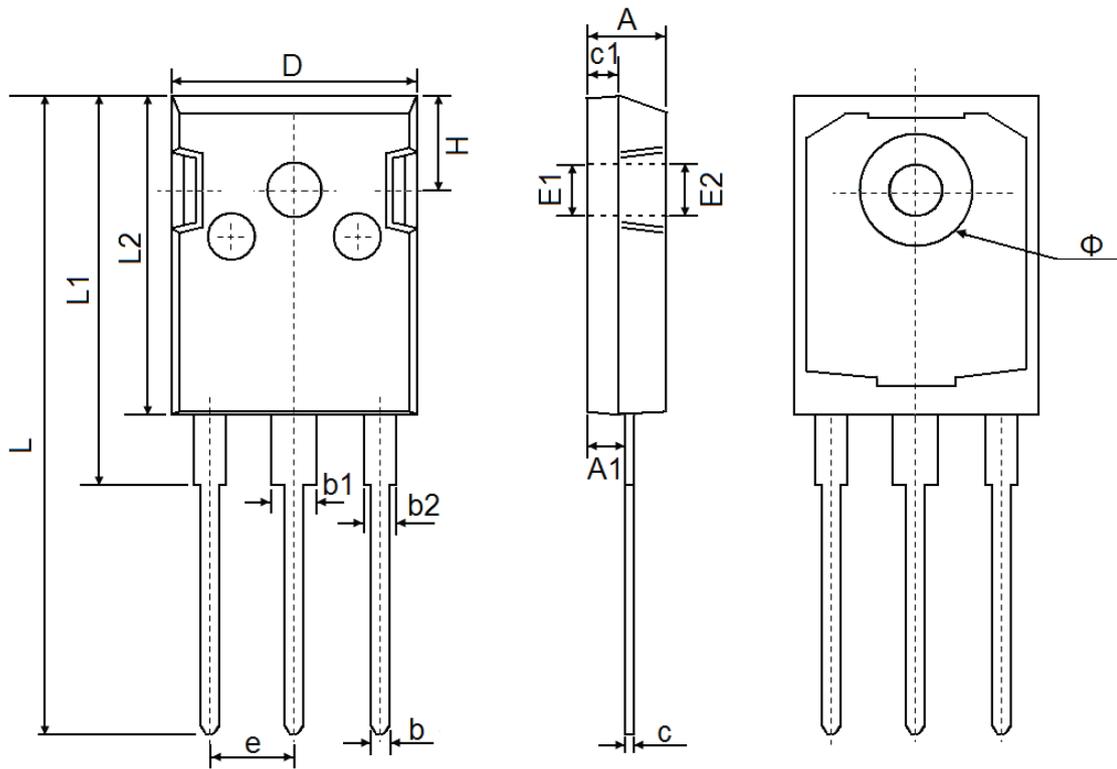
### Uclamped Inductive Switching (UIS) Test



### Diode Recovery Test

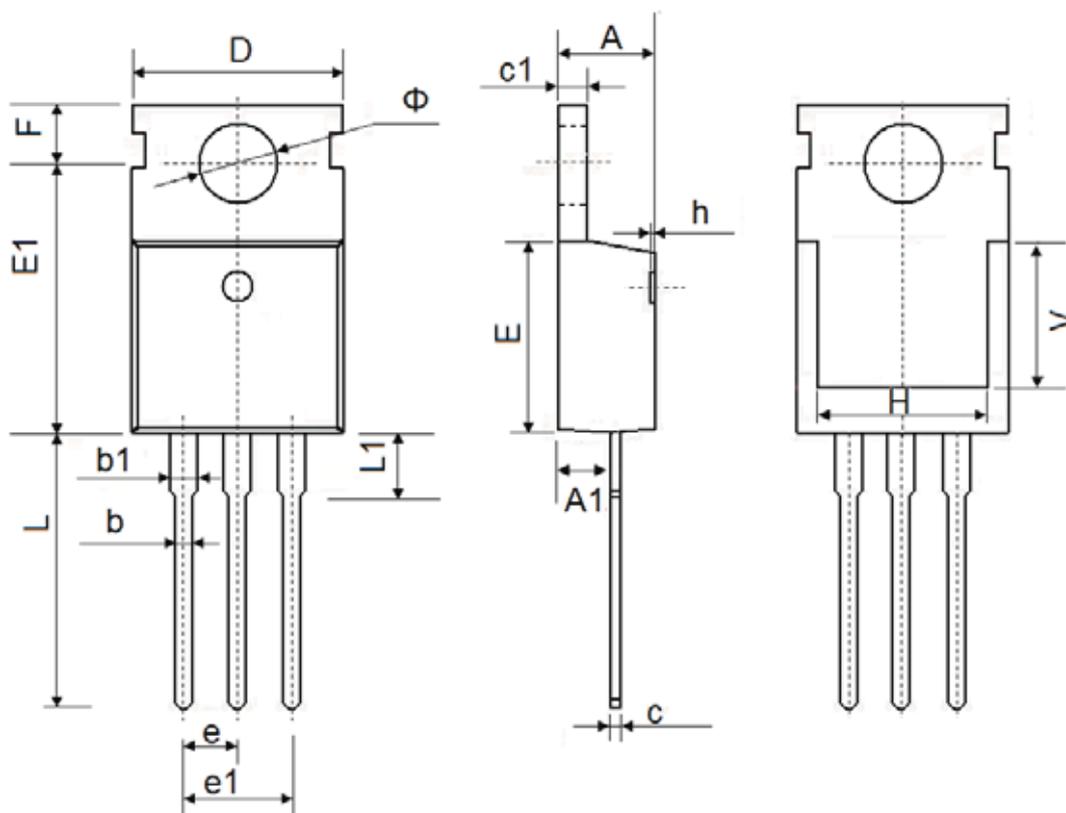


# TO-247 Package Information



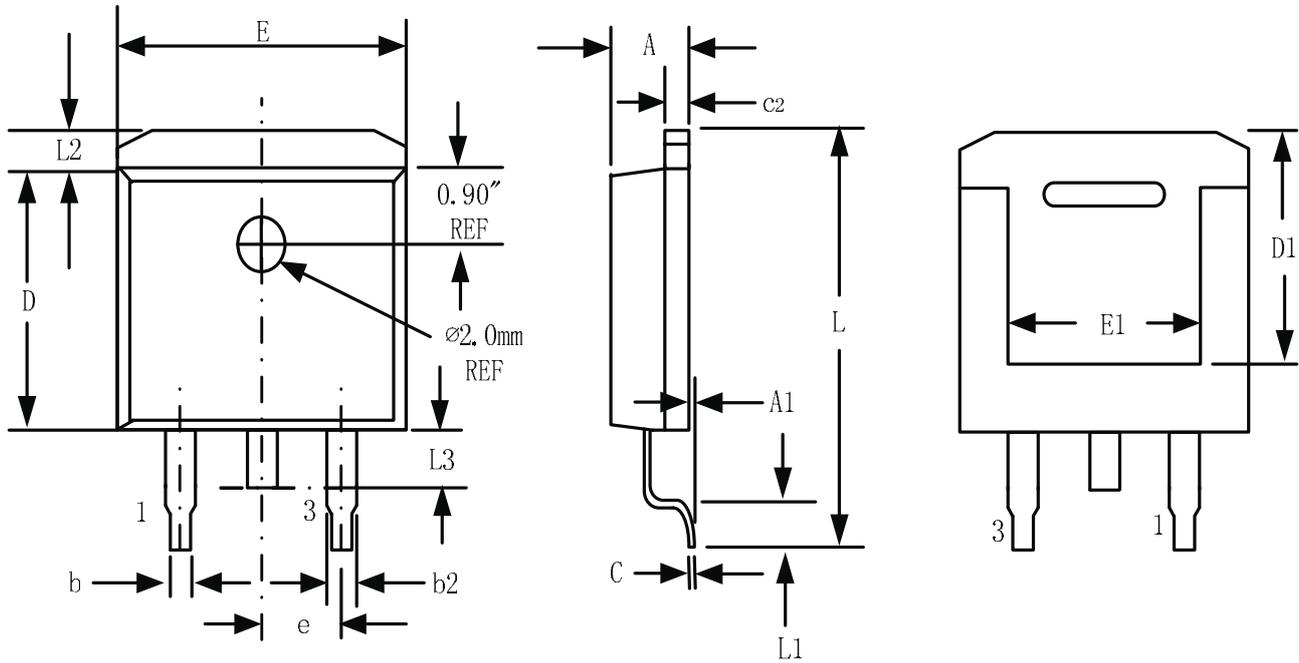
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.850	5.150	0.191	0.200
A1	2.200	2.600	0.087	0.102
b	1.000	1.400	0.039	0.055
b1	2.800	3.200	0.110	0.126
b2	1.800	2.200	0.071	0.087
c	0.500	0.700	0.020	0.028
c1	1.900	2.100	0.075	0.083
D	15.450	15.750	0.608	0.620
E1	3.500 REF		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.	
$\Phi$	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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