GPT081N20NTB

200V N-Channel MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
200V	8.3mΩ@10V	125A

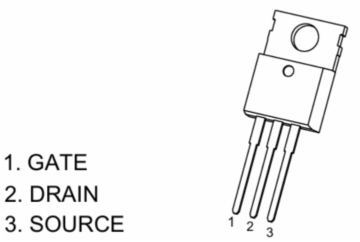
Feature

- Split Gate Trench Technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- Low Gate Resistance
- 100% UIS Tested

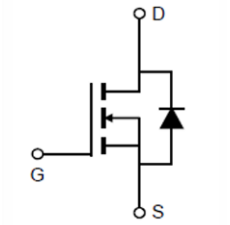
Application

- Load Switching
- Motor Driving
- Power Management
- Current Switching

TO-220-3L-C



Schematic diagram



Package Marking and Ordering Information

Part Number	Package	Marking	Packing	Reel Size	Tape Width	Qty
GPT081N20NTB	TO-220-3L-C	T081N20N	Tube	NA	NA	50pcs

ABSOLUTE MAXIMUM RATINGS (T_A = 25℃ unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	200	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current[1]	T_C = 25℃	I_D	158	A
	T_C = 100℃	I_D	100	A
Pulsed Drain Current[2]		I_{DM}	632	A
Single Pulsed Avalanche Current[3]		I_{AS}	75	A
Single Pulsed Avalanche Energy[3]		E_{AS}	1406	mJ
Power Dissipation[5]	T_C = 25℃	P_D	481	W
Thermal Resistance from Junction to Ambient[6]		$R_{\theta JA}$	60	℃/W
Thermal Resistance from Junction to Case		$R_{\theta JC}$	0.26	℃/W
Junction Temperature		T_J	150	℃
Storage Temperature		T_{STG}	-55~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS (T_A = 25℃ unless otherwise noted)z

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	200			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 200V, V_{GS} = 0V			1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
On Characteristics[4]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2	3.3	4	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A		8.3	10	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = 100V, V_{GS} = 0V, f = 250kHz		4940		pF
Output Capacitance	C_{oss}			510		
Reverse Transfer Capacitance	C_{rss}			8		
Gate Resistance	R_g	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz		1.3		Ω
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS} = 100V, V_{GS} = 10V, I_D = 50A		63		nC
Gate-Source Charge	Q_{gs}			23.6		
Gate-Drain Charge	Q_{gd}			9.3		
Gate Plateau Voltage	$V_{plateau}$			4.9		V
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 100V, V_{GS} = 10V, I_D = 50A, R_G = 10Ω		50		ns
Turn-On Rise Time	t_r			95		
Turn-Off Delay Time	$t_{d(off)}$			60		
Turn-Off Fall Time	t_f			16		
Source-Drain Diode Characteristics						
Diode Forward Voltage[4]	V_{SD}	V_{GS} = 0V, I_S = 20A			1.2	V
Diode Continuous Forward Current[1]	I_S	T_C = 25℃			158	A
Diode Pulse Forward Current[2]	I_{SM}	T_C = 25℃			632	A
Diode Reverse Recovery Time	t_{rr}	I_F = 50A, dI/dt = 200A/μs		120		ns
Diode Reverse Recovery Charge	Q_{rr}	I_F = 50A, dI/dt = 200A/μs		1160		nC

Notes :

1.The maximum current rating is limited by package.And device mounted on a large heatsink

2.Pulse Test : Pulse Width ≤ 10μs, duty cycle ≤ 1%.

3.E_{AS} condition: V_{DD} = 100V, V_{GS} = 10V, L = 0.5mH, R_G = 25Ω Starting T_J = 25°C.

4.Pulse Test : Pulse Width ≤ 300μs, duty cycle ≤ 2%.

5.The power dissipation P_D is limited by $T_{J(MAX)}$ = 175°C.And device mounted on a large heatsink

6.Device mounted on $1in^2$ FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C.

Typical Characteristics

Figure 1. Typ. Output Characteristics

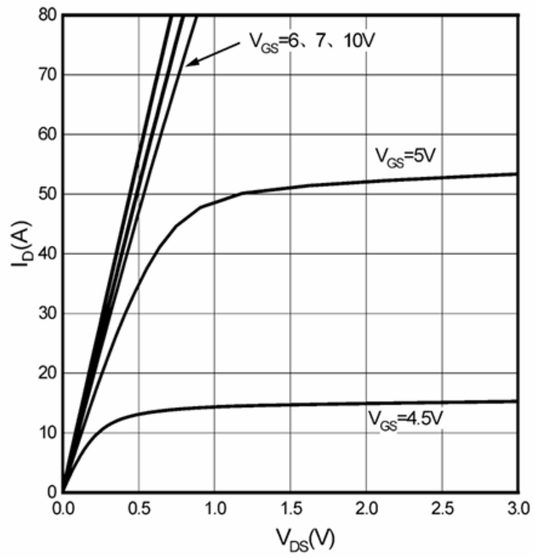


Figure 2. Transfer Characteristics

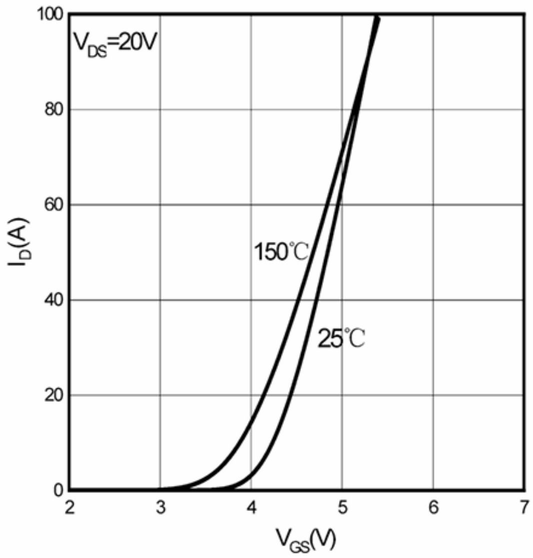


Figure 3. On-Resistance vs. Drain Current

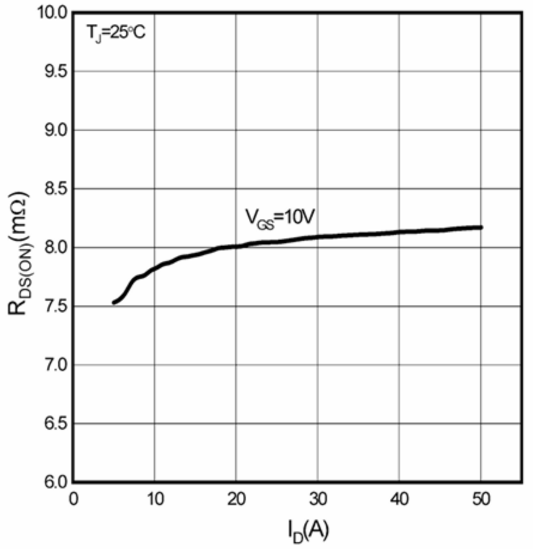


Figure 4.On-Resistance vs.Temperature

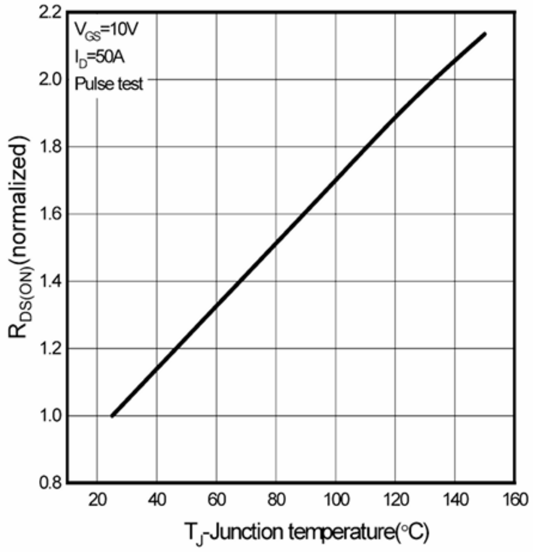


Figure 5.Breakdown Voltage vs.Temperature

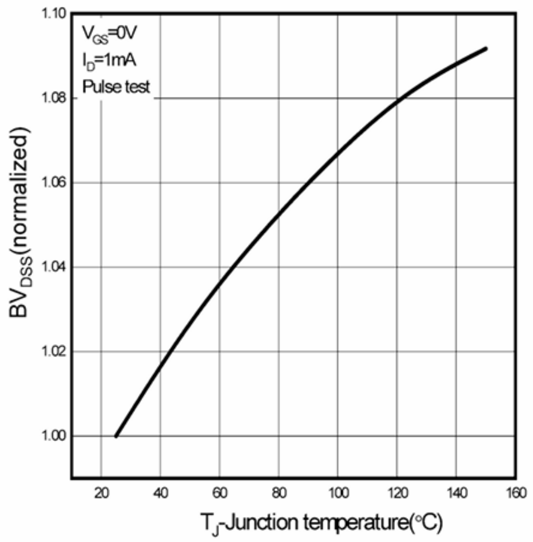


Figure 6.Threshold Voltage vs.Temperature

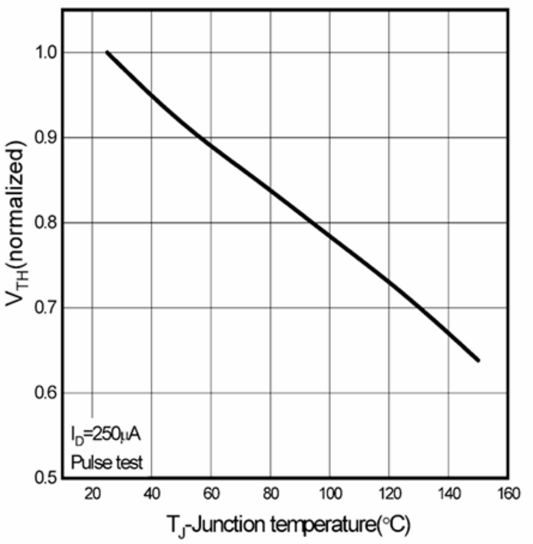


Figure 7.Rds(on) vs. Gate Voltage

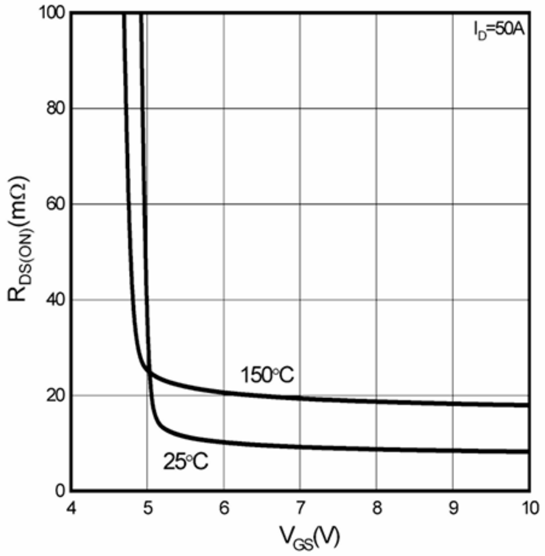


Figure 8.Body-Diode Characteristics

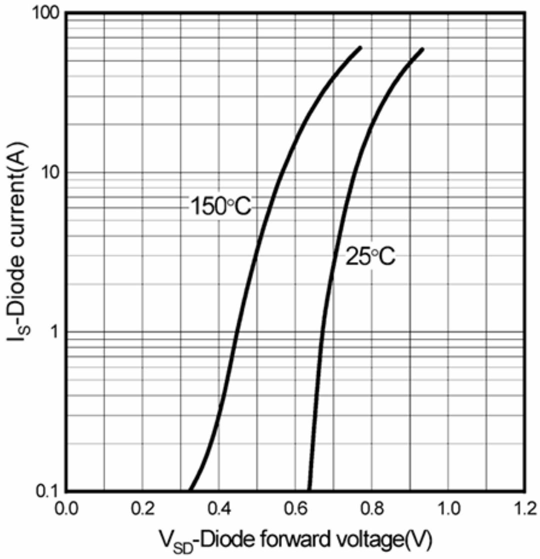


Figure 9.Capacitance Characteristics

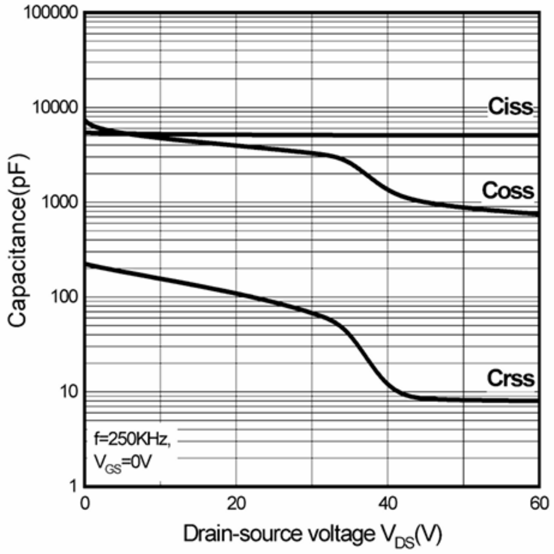
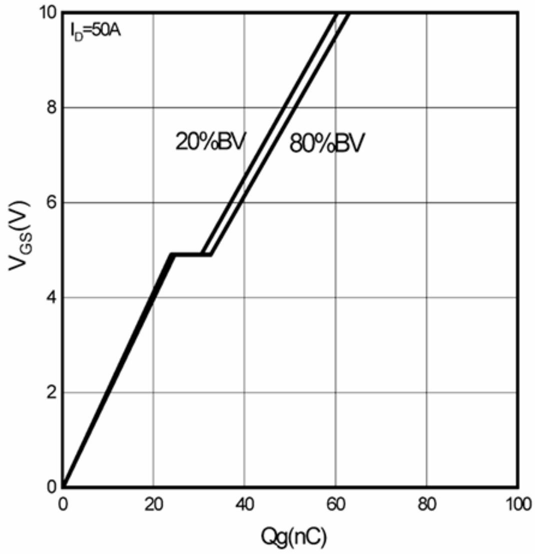


Figure 10.Gate Charge Characteristics



8

Figure 11.Drain Current Derating

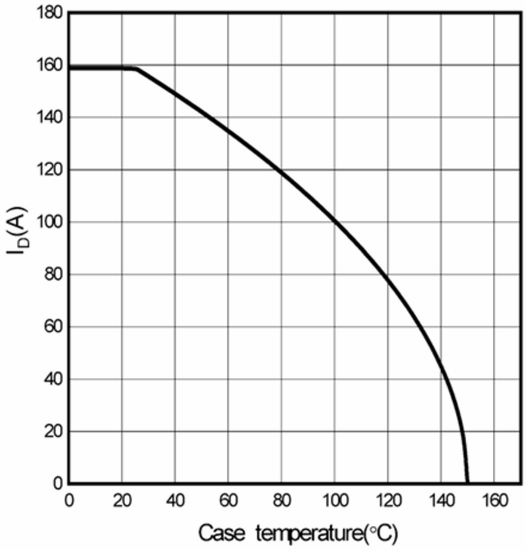


Figure 12.Power Dissipation vs.Temperature

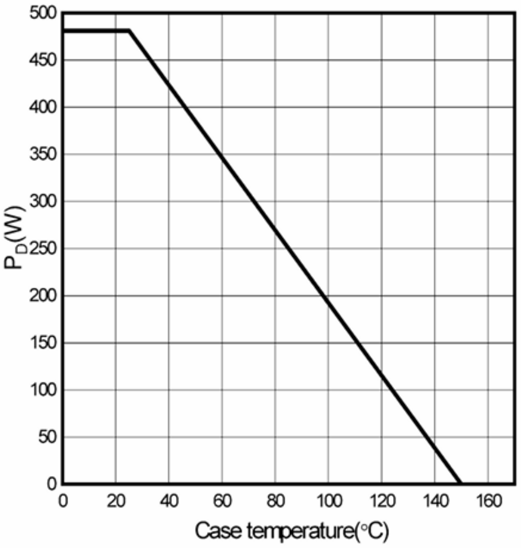


Figure 13. Safe Operating Area

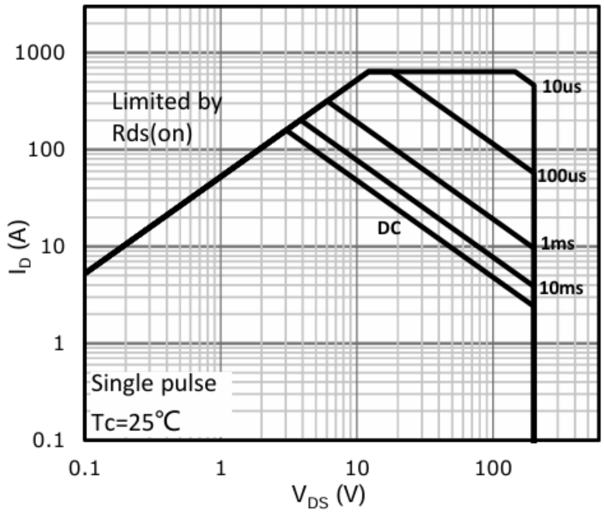
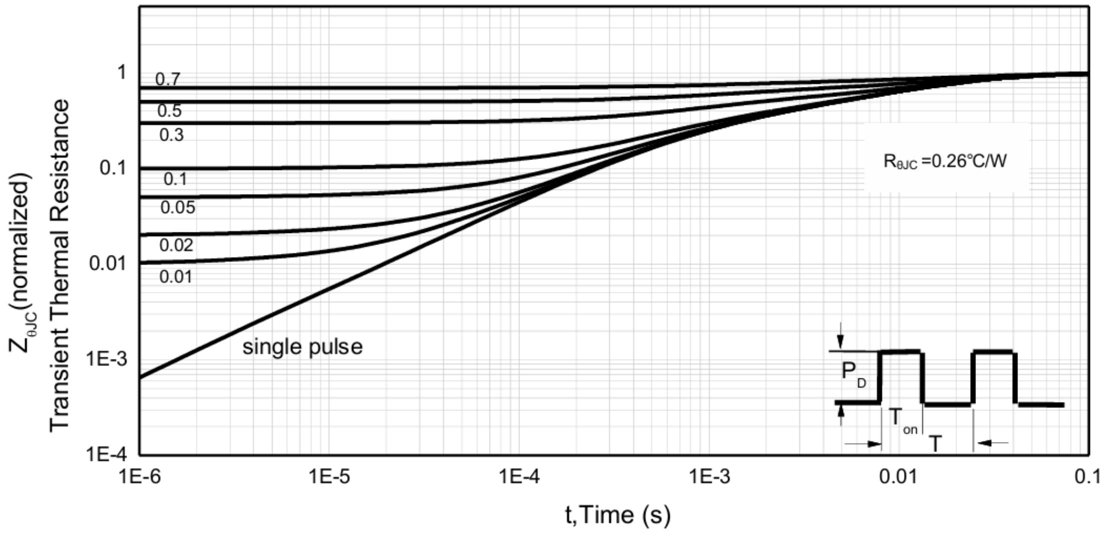
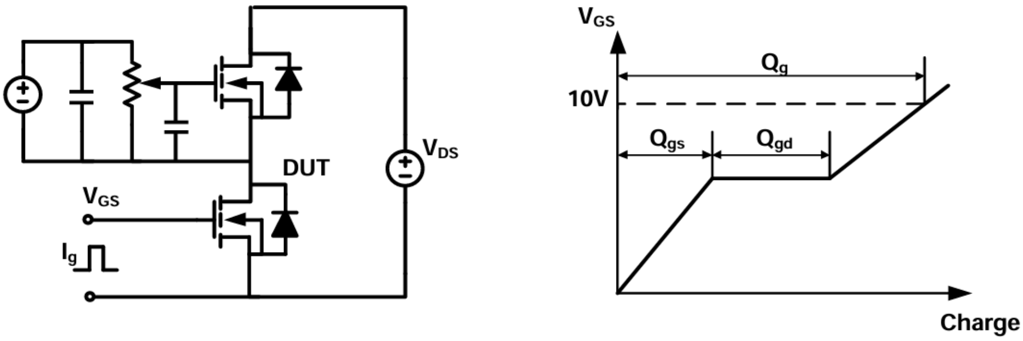


Figure 14. Normalized Maximum Transient Thermal Impedance (R_{thJC})

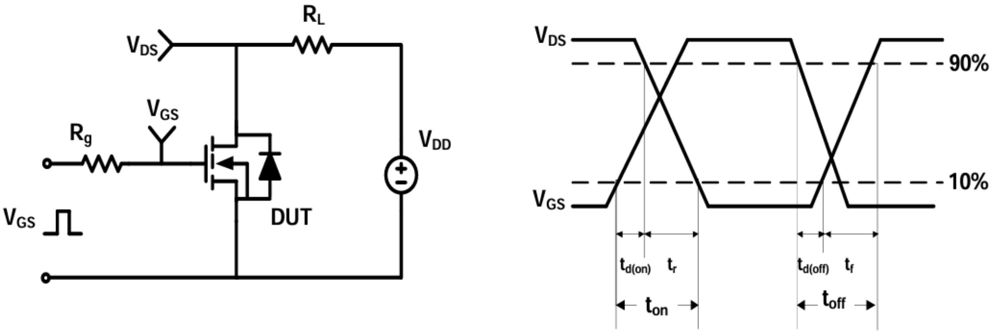


Test Circuit

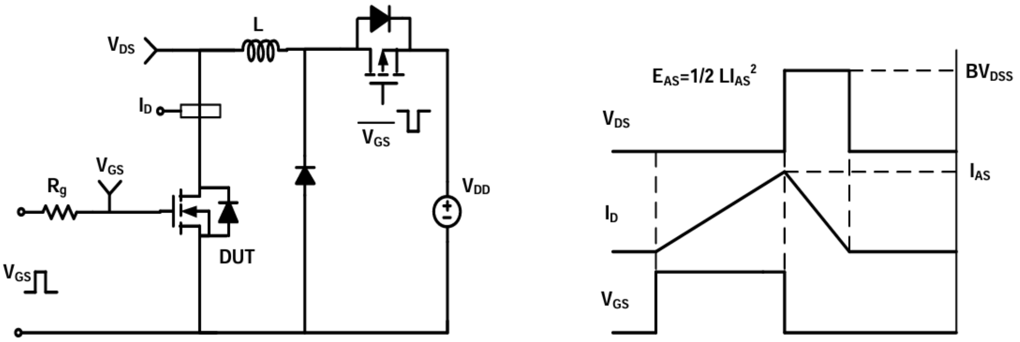
Gate Charge Test Circuit & Waveform



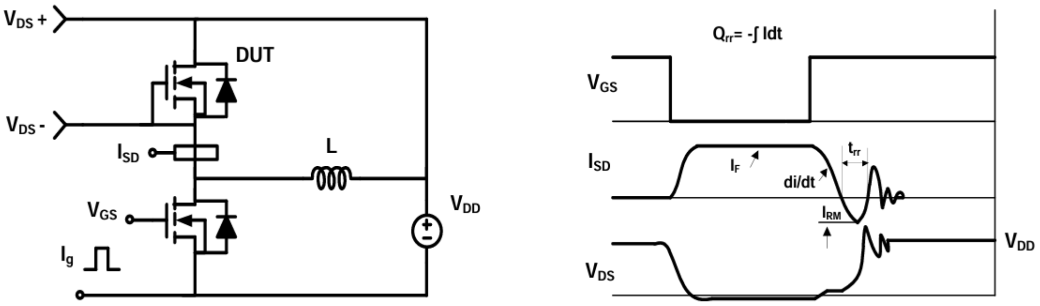
Resistive Switching Test Circuit & Waveform



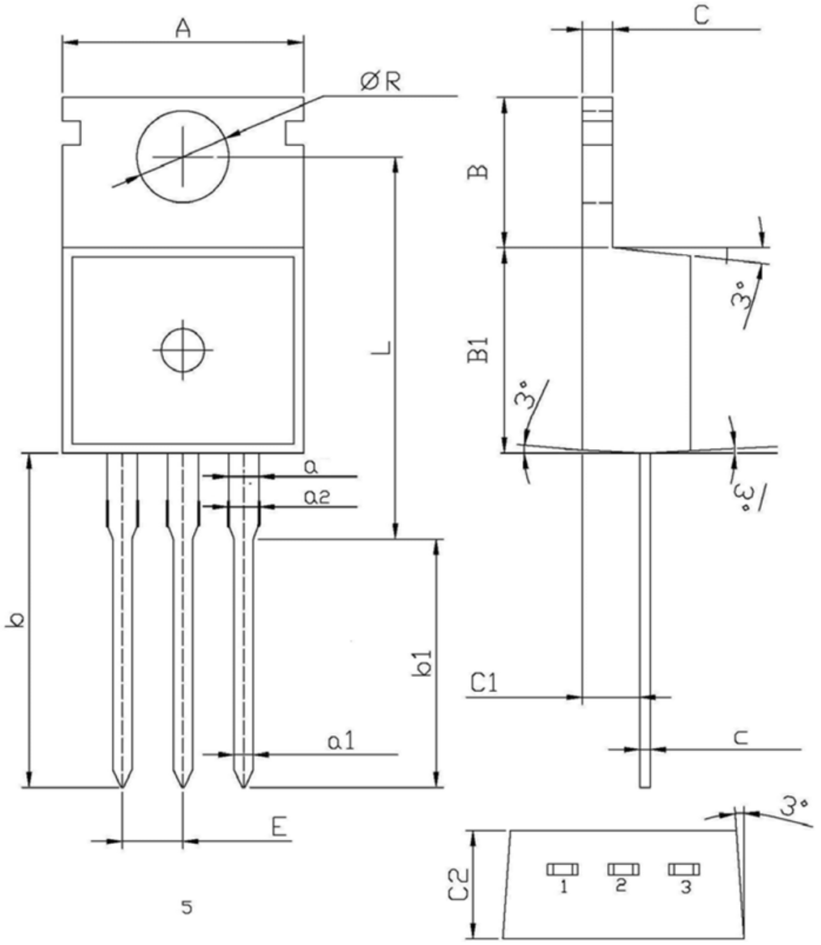
Unclamped Inductive Switching (UIS) Test Circuit & Waveform



Diode Recovery Test Circuit & Waveform



TO-220-3L-C Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	9.800	10.200	0.386	0.402
R	3.560	3.640	0.140	0.143
L	15.700	16.100	0.618	0.634
b	12.600	13.600	0.496	0.535
b1	9.600	10.600	0.378	0.417
a	1.220	1.320	0.048	0.052
E	2.340	2.740	0.092	0.108
a2	1.250	1.620	0.049	0.064
C	1.200	1.400	0.047	0.055
B	5.900	6.700	0.232	0.264
B1	9.000	9.400	0.354	0.370
C1	2.200	2.600	0.087	0.102
a1	0.700	0.900	0.028	0.035
c	0.400	0.600	0.016	0.024
C2	4.300	4.700	0.169	0.185

Attention：

- GreenPower Electronics reserves the right to improve product design function and reliability without notice.
- Any and all semiconductor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are solely responsible for providing adequate safe measures when design their systems.
- GreenPower Electronics products belong to consumer electronics or other civilian electronic products.