

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
200V	8.6mΩ@10V	115A

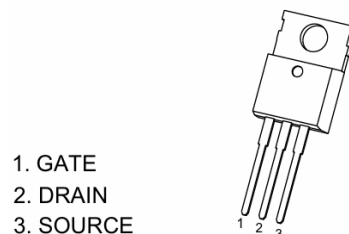
Feature

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

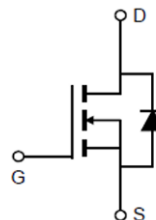
Application

- 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
GPT086N20NTB	TO-220-3L-C	T086N20N	Tube	NA	NA	50pcs

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ 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	$T_C = 25^\circ\text{C}$	I_D	115	A
	$T_C = 100^\circ\text{C}$	I_D	81	A
Pulsed Drain Current ²		I_{DM}	460	A
Single Pulsed Avalanche Current ³		I_{AS}	70	A
Single Pulsed Avalanche Energy ³		E_{AS}	1225	mJ
Power Dissipation ⁵	$T_C = 25^\circ\text{C}$	P_D	300	W
Thermal Resistance from Junction to Ambient ⁶		$R_{\theta JA}$	30	$^\circ\text{C/W}$
Thermal Resistance from Junction to Case		$R_{\theta JC}$	0.50	$^\circ\text{C/W}$
Junction Temperature		T_J	175	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55~ +175	$^\circ\text{C}$

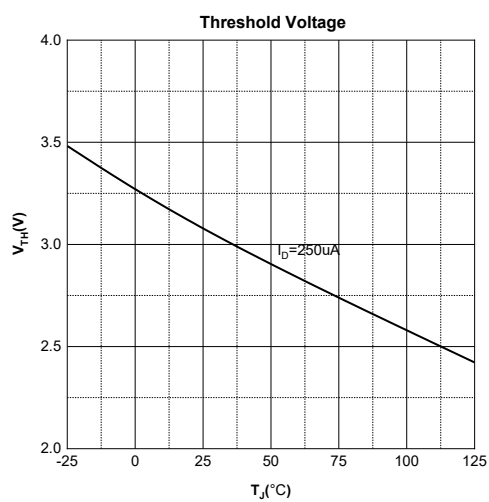
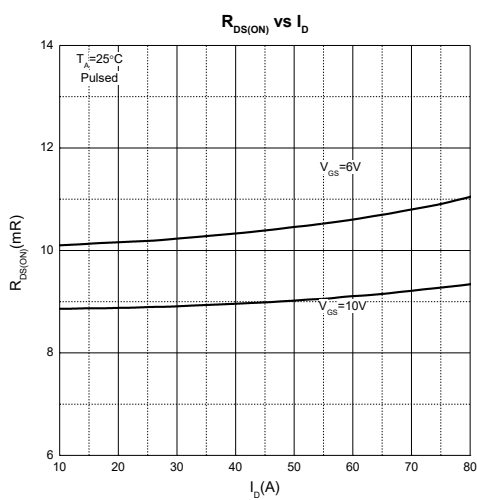
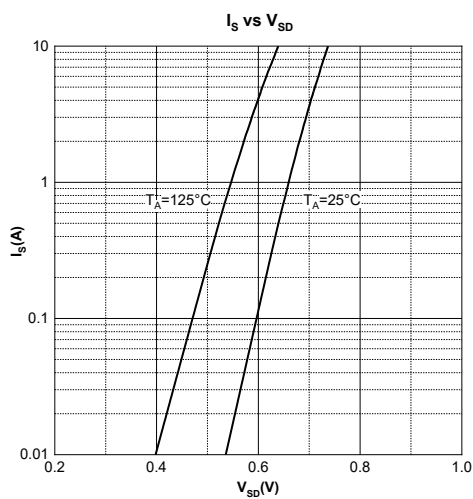
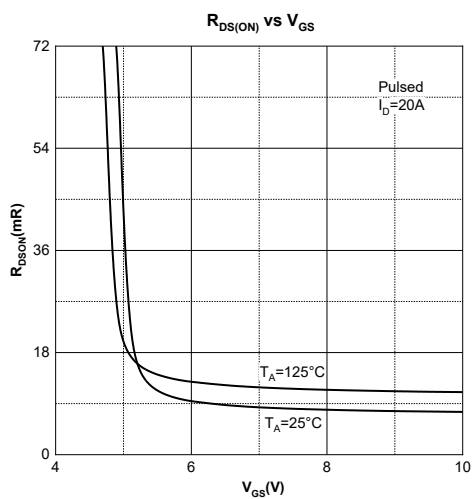
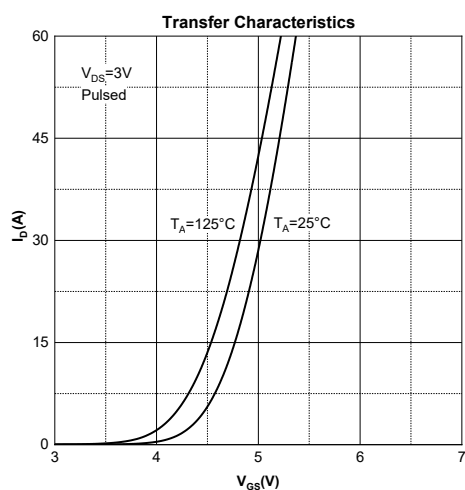
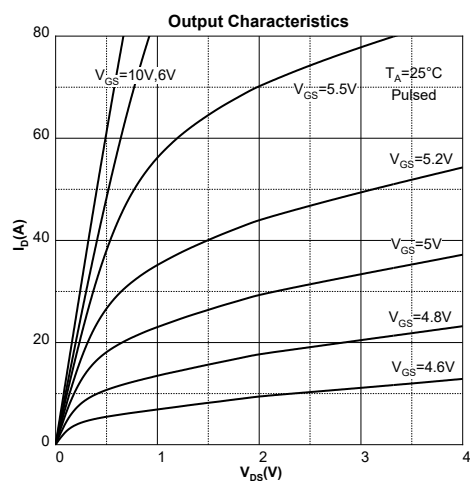
MOSFET ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

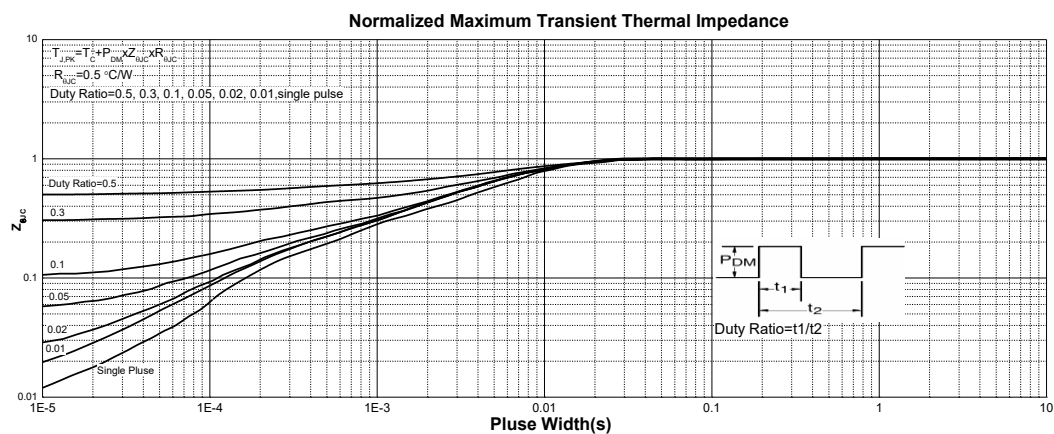
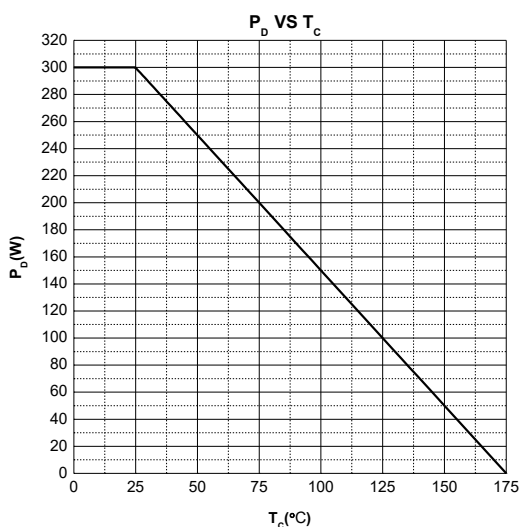
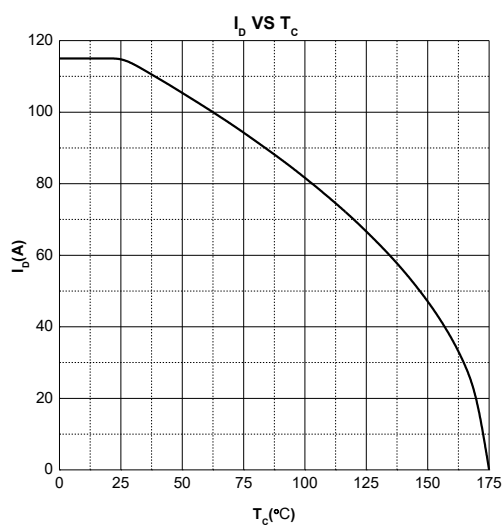
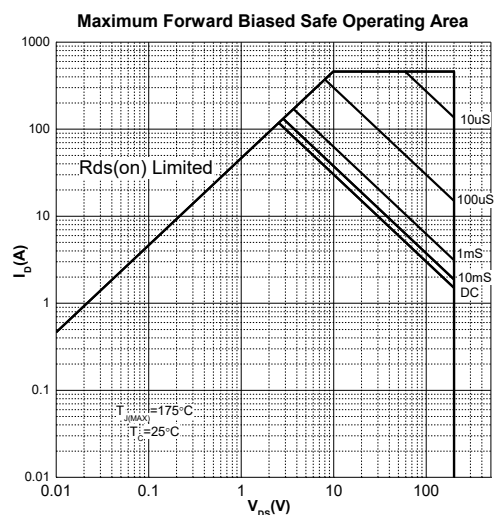
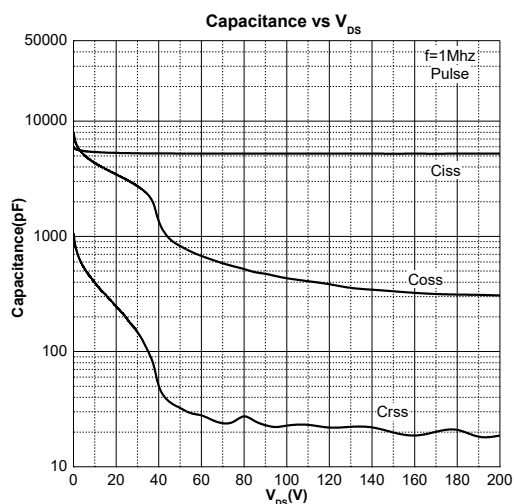
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	200			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 200V, V _{GS} = 0V			1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±100	nA
On Characteristics ⁴						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2	3.1	4	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 20A		8.6	10	mΩ
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = 100V, V _{GS} = 0V, f = 1MHz		5164		pF
Output Capacitance	C _{oss}			425		
Reverse Transfer Capacitance	C _{rss}			18		
Gate Resistance	R _g	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz		3.5		Ω
Switching Characteristics						
Total Gate Charge	Q _g	V _{DS} = 100V, V _{GS} = 10V, I _D = 20A		77		nC
Gate-Source Charge	Q _{gs}			24.6		
Gate-Drain Charge	Q _{gd}			19.3		
Gate Plateau Voltage	V _{plateau}			4.8		V
Turn-On Delay Time	t _{d(on)}	V _{DD} = 100V, V _{GS} = 10V, I _D = 20A, R _G = 3.0Ω		19		ns
Turn-On Rise Time	t _r			30		
Turn-Off Delay Time	t _{d(off)}			40		
Turn-Off Fall Time	t _f			20		
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℃			115	A
Diode Pulse Forward Current ²	I _{SM}	T _C = 25℃			460	A
Diode Reverse Recovery Time	t _{rr}	I _F = 20A, dI/dt = 100A/μs		120		ns
Diode Reverse Recovery Charge	Q _{rr}	I _F = 20A, dI/dt = 100A/μs		650		nC

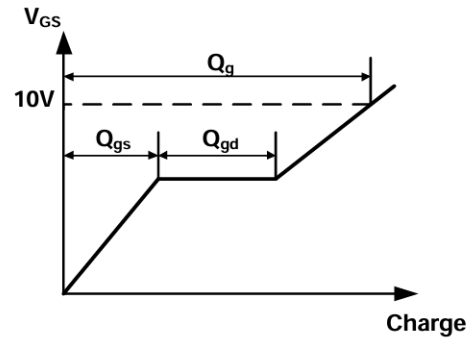
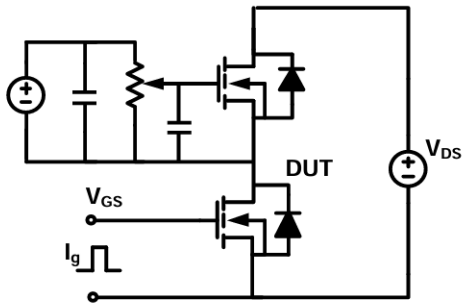
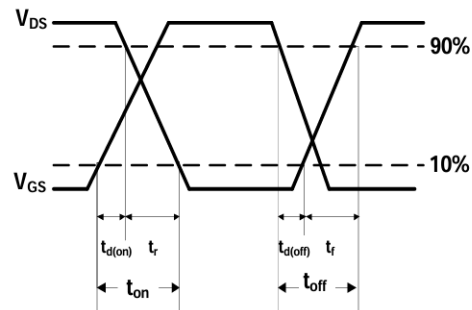
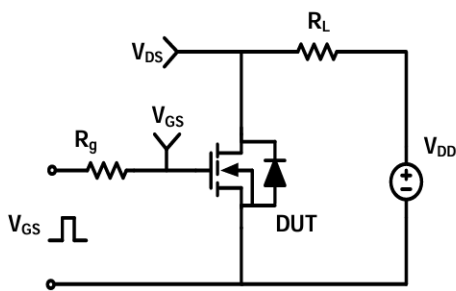
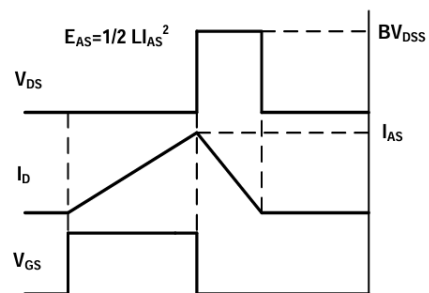
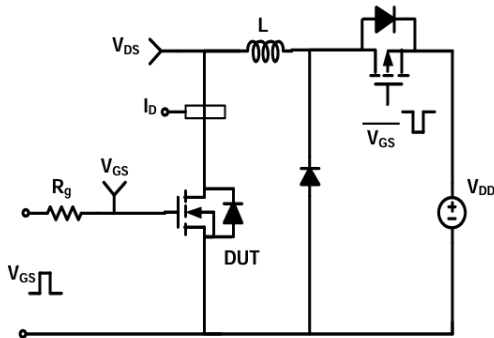
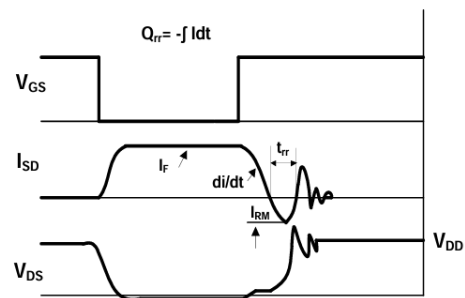
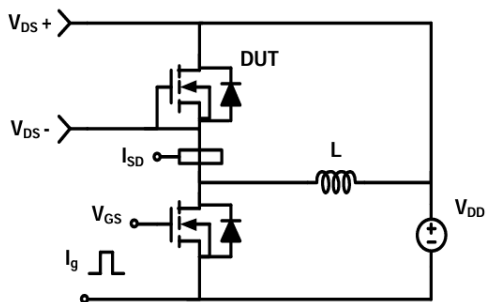
Notes :

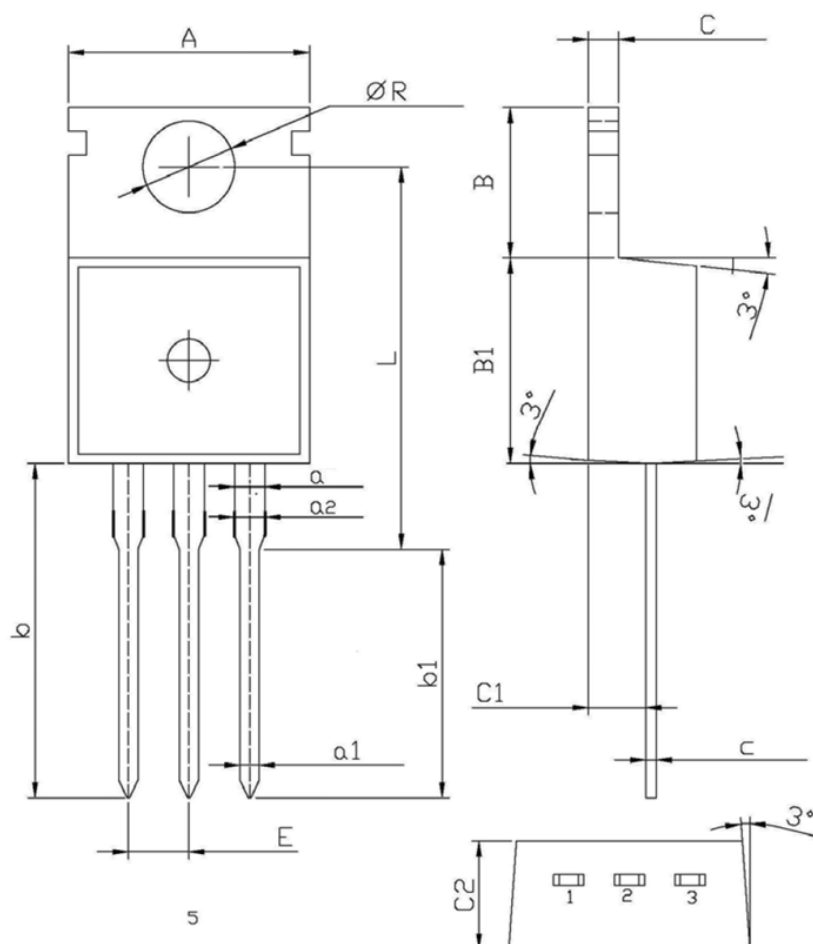
- 1.The maximum current rating is limited by package.And device mounted on a large heatsink
- 2.Pulse Test : Pulse Width $\leq 10\mu s$, duty cycle $\leq 1\%$.
- 3.EAS condition: $V_{DD} = 100V, V_{GS} = 10V, L = 0.5mH, R_G = 25\Omega$ Starting $T_J = 25^\circ\text{C}$.
- 4.Pulse Test : Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 5.The power dissipation P_D is limited by $T_{J(MAX)} = 175^\circ\text{C}$.And device mounted on a large heatsink
- 6.Device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$.

Typical Characteristics





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.