

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	1.6m Ω @10V	240A

Feature

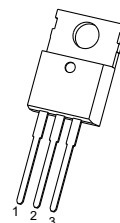
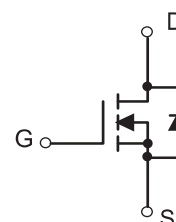
- Split Gate Trench Technology
- Low $R_{DS(on)}$
- Low Gate Charge
- Low Gate Resistance
- 100% UIS Tested

Application

- Power Switching Application
- DC/DC Converter

TO-220-3L-C

1. GATE
2. DRAIN
3. SOURCE


Schematic diagram

Package Marking and Ordering Information

Part Number	Package	Marking	Packing	Reel Size	Tape Width	Qty
GPT014N04NTB	TO-220-3L-C	T014N04N	Tube	-	-	50pcs

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current ¹	$T_C = 25^\circ\text{C}$	I_D	240	A
	$T_C = 100^\circ\text{C}$	I_D	156	A
Pulsed Drain Current ²		I_{DM}	960	A
Single Pulsed Avalanche Current ³		I_{AS}	62	A
Single Pulsed Avalanche Energy ³		E_{AS}	832	mJ
Power Dissipation ⁵		P_D	208	W
$T_C = 25^\circ\text{C}$				
Thermal Resistance from Junction to Ambient ⁶		$R_{\theta JA}$	55	$^\circ\text{C/W}$
Thermal Resistance from Junction to Case		$R_{\theta JC}$	0.6	$^\circ\text{C/W}$
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55~ +150	$^\circ\text{C}$

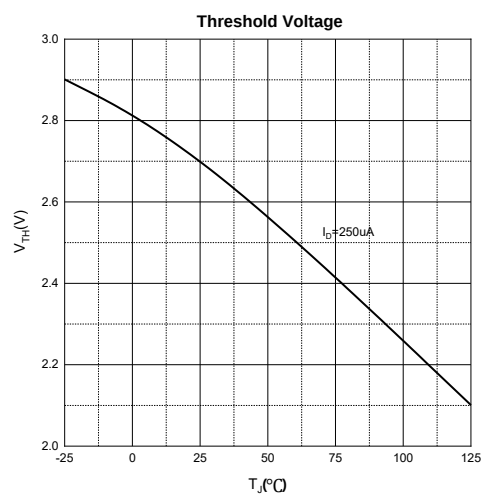
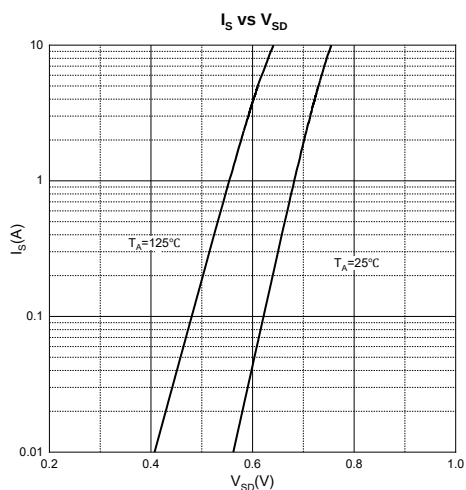
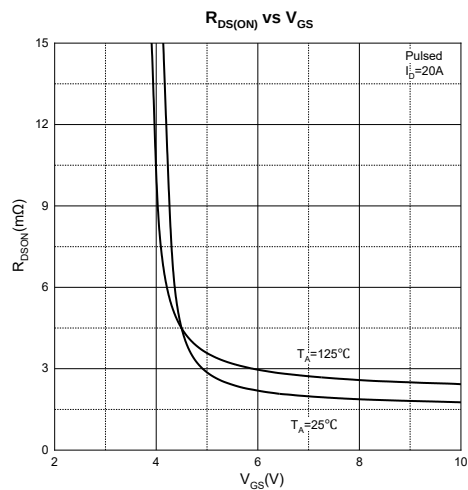
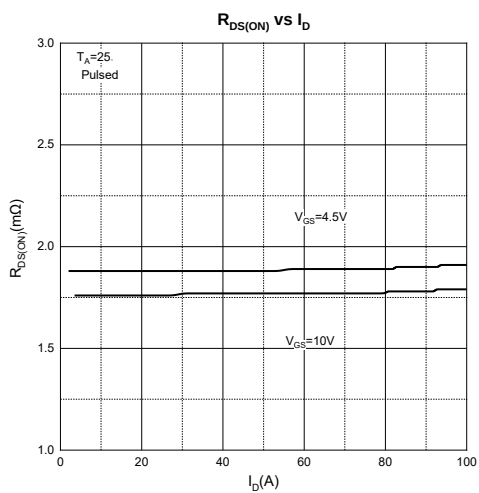
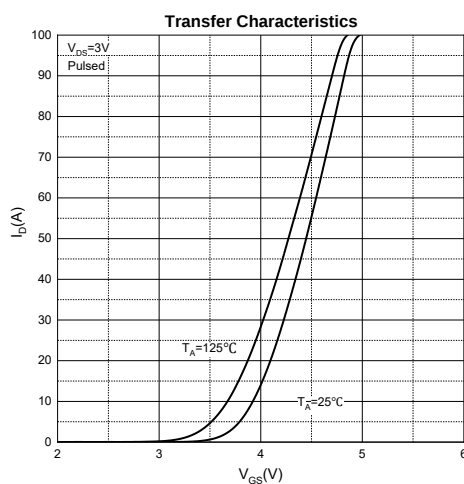
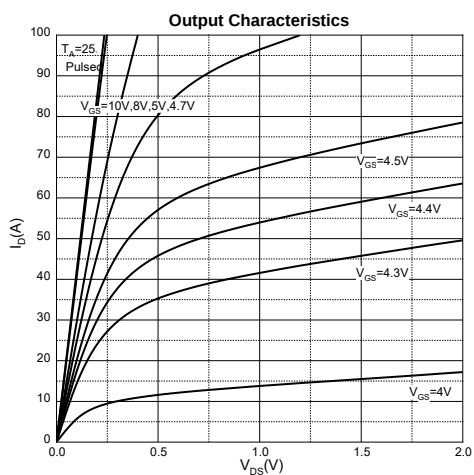
MOSFET ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

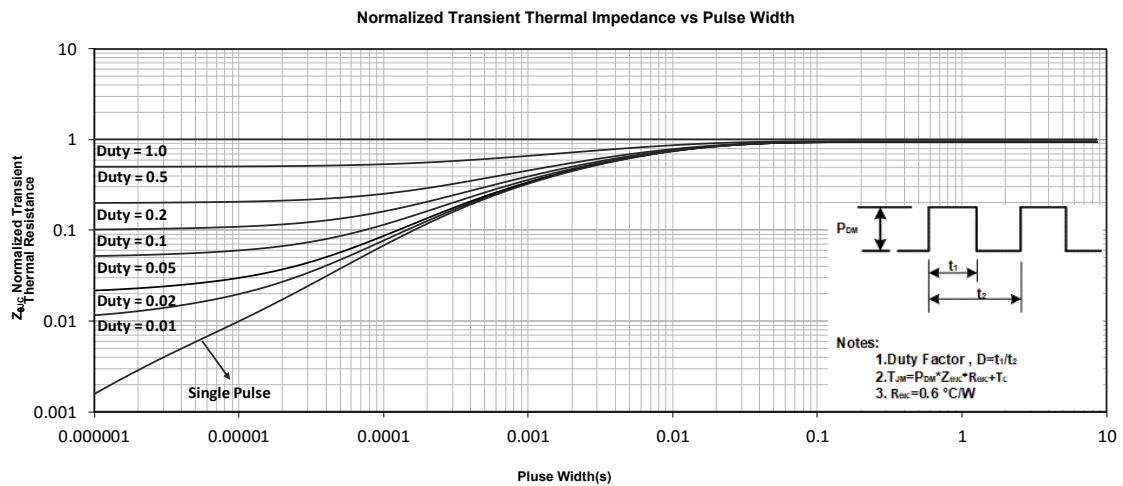
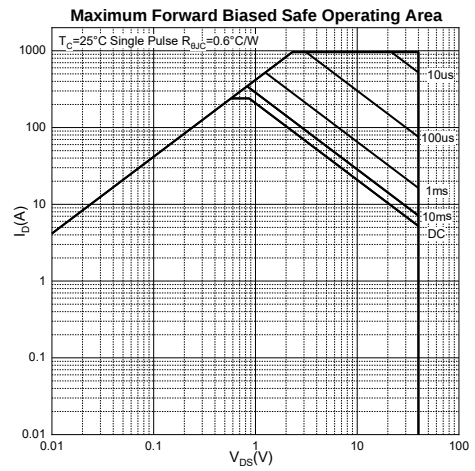
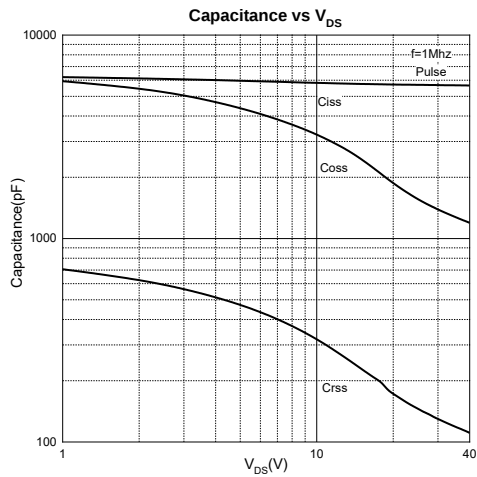
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	40			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 40V, V _{GS} = 0V			1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±100	nA
On Characteristics ⁴						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2	2.7	4	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 20A		1.6	2.0	mΩ
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = 20V, V _{GS} = 0V, f = 1MHz		5815		pF
Output Capacitance	C _{oss}			2016		
Reverse Transfer Capacitance	C _{rss}			222		
Gate Resistance	R _g	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz		4.2		Ω
Switching Characteristics						
Total Gate Charge	Q _g	V _{DS} = 20V, V _{GS} = 10V, I _D = 20A		86		nC
Gate-Source Charge	Q _{gs}			23		
Gate-Drain Charge	Q _{gd}			14		
Turn-On Delay Time	t _{d(on)}	V _{DD} = 20V, V _{GS} = 10V, I _D = 85A, R _G = 1.6Ω		17		ns
Turn-On Rise Time	t _r			10		
Turn-Off Delay Time	t _{d(off)}			61		
Turn-Off Fall Time	t _f			12		
Source-Drain Diode Characteristics						
Diode Forward Voltage ⁴	V _{SD}	V _{GS} = 0V, I _S = 10A			1.2	V
Diode Forward Current ¹	I _S				240	A
Diode Reverse Recovery Time	t _{rr}	I _F = 20A, dI/dt = 500A/μs		25		ns
Diode Reverse Recovery Charge	Q _{rr}			62		nC

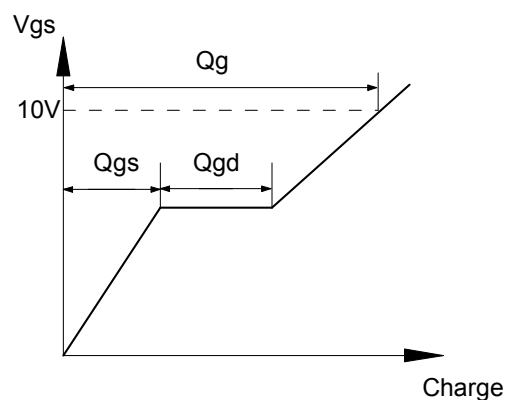
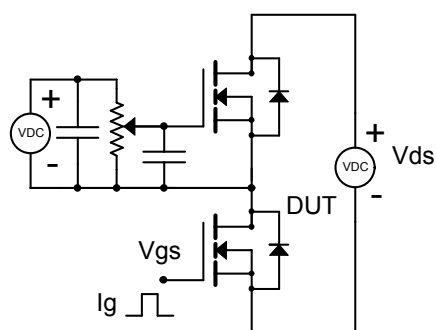
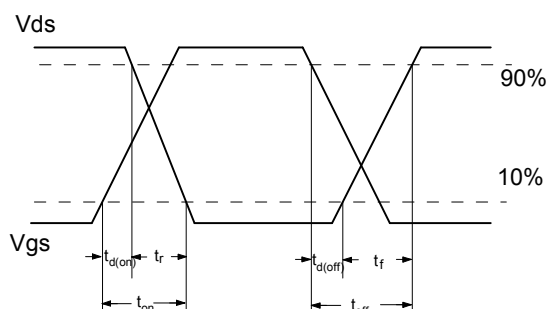
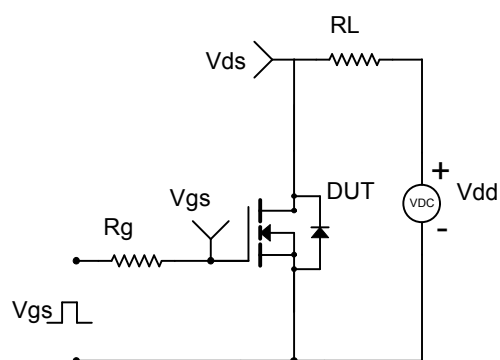
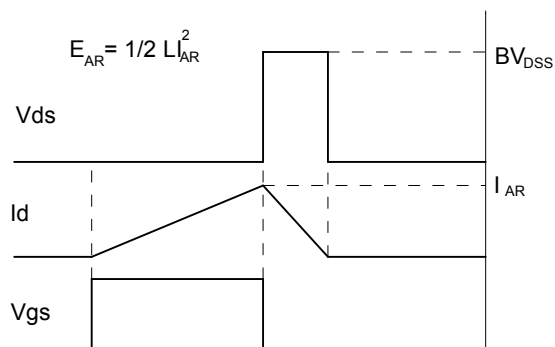
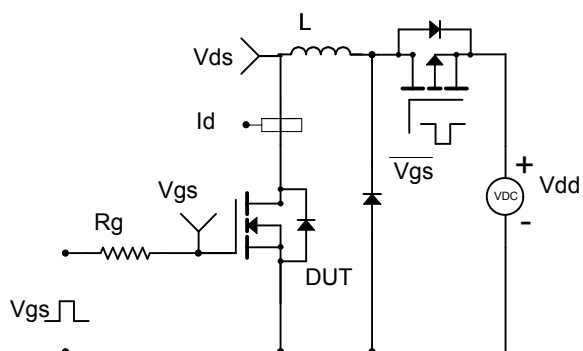
Notes :

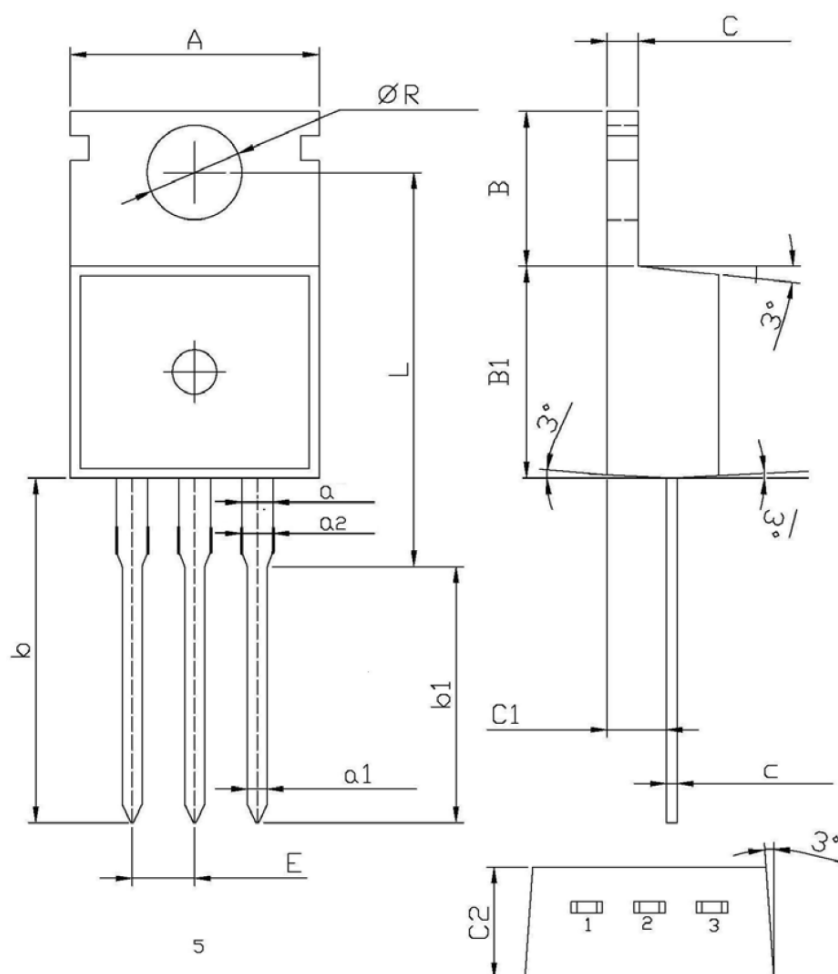
- 1.The maximum current rating is limited by package. And device mounted on a large heatsink.
- 2.Pulse Test : Pulse Width $\leq 10\mu s$, duty cycle $\leq 1\%$.
- 3.EAS condition: $V_{DD} = 20V, V_{GS} = 10V, L = 0.5mH, R_G = 25\Omega$ Starting $T_J = 25^\circ\text{C}$.
- 4.Pulse Test : Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 5.The power dissipation P_D is limited by $T_{J(MAX)} = 150^\circ\text{C}$. 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





Gate Charge Test Circuit & Waveform

Resistive Switching Test Circuit & Waveform

Unclamped Inductive Switching (UIS) Test Circuit & Waveforms


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.