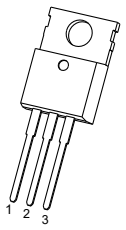
GPT049N12NTB

120V N-Channel MOSFET

Product Summary

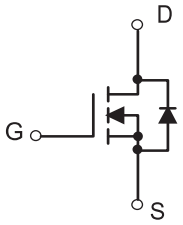
$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
120V	5.2mΩ@10V	120A

TO-220-3L-C



1. GATE
2. DRAIN
3. SOURCE

Schematic diagram



Feature

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

Application

- Power Switching Application

Package Marking and Ordering Information

Part Number	Package	Marking	Packing	Reel Size	Tape Width	Qty
GPT049N12NTB	TO-220-3L-C	T049N12N	Tube	-	-	50pcs

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

Parameter		Symbol	Value	Unit
Drain - Source Voltage		V_{DS}	120	V
Gate - Source Voltage		V_{GS}	±20	V
Continuous Drain Current[1]	T_C = 25℃	I_D	120	A
	T_C = 100℃	I_D	78	A
Pulsed Drain Current[2]		I_{DM}	480	A
Single Pulsed Avalanche Current[3]		I_{AS}	48	A
Single Pulsed Avalanche Energy[3]		E_{AS}	576	mJ
Power Dissipation[5]	T_C = 25℃	P_D	225	W
Thermal Resistance from Junction to Ambient[6]		$R_{\theta JA}$	52	℃/W
Thermal Resistance from Junction to Case		$R_{\theta JC}$	0.55	℃/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	120			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 120V, 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	4	V
Drain-source On-resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A		5.2	6.8	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = 60V, V_{GS} = 0V, f = 1MHz		5162		pF
Output Capacitance	C_{oss}			415		
Reverse Transfer Capacitance	C_{rss}			17		
Gate Resistance	R_g	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz		1.4		Ω
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS} = 60V, V_{GS} = 10V, I_D = 20A		70		nC
Gate-source Charge	Q_{gs}			21		
Gate-drain Charge	Q_{gd}			13		
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 60V, V_{GS} = 10V, I_D= 20A, R_G = 3Ω		14		ns
Turn-on Rise Time	t_r			8		
Turn-off Delay Time	$t_{d(off)}$			29		
Turn-off Fall Time	t_f			9		
Source - Drain Diode Characteristics						
Diode Forward Voltage[4]	V_{SD}	V_{GS} = 0V, I_S = 20A			1.2	V

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%.

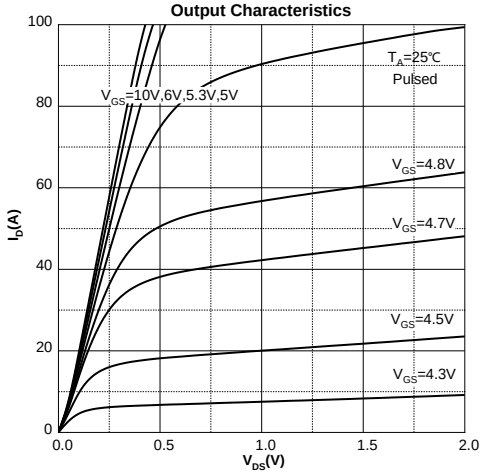
3.E_{AS} condition: V_{DD} = 50V, V_{GS} = 10V, L = 0.5mH, R_G = 25Ω Starting T_J = 25°℃.

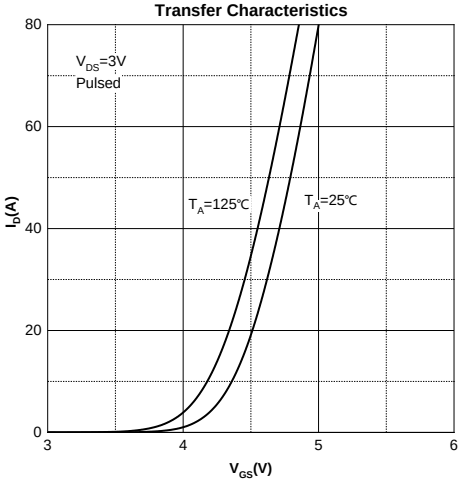
4.Pulse Test : Pulse Width ≤ 300μs, duty cycle ≤ 2%.

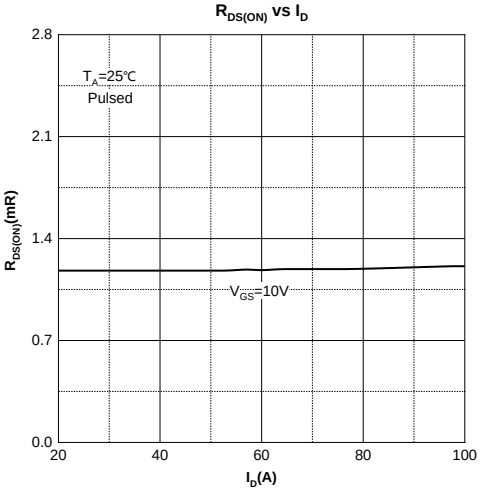
5.The power dissipation P_D is limited by $T_{J(MAX)}$ = 150°C.And device mounted on a large heatsink

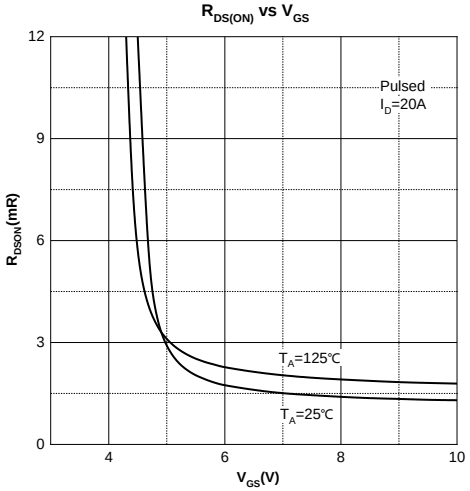
6.Device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C.

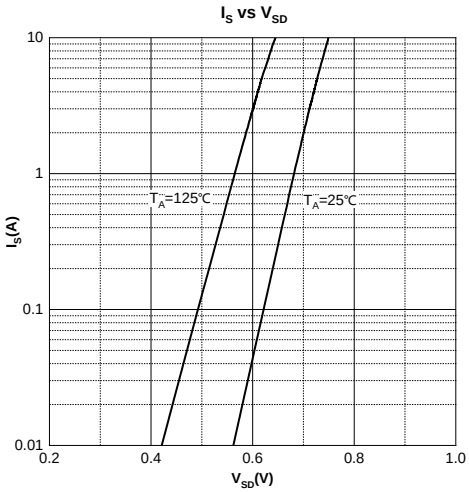
Typical Characteristics

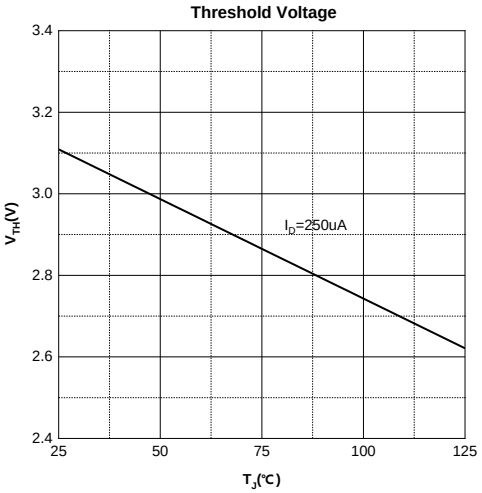


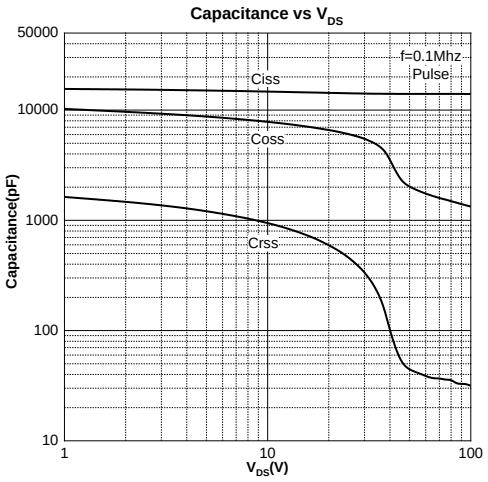


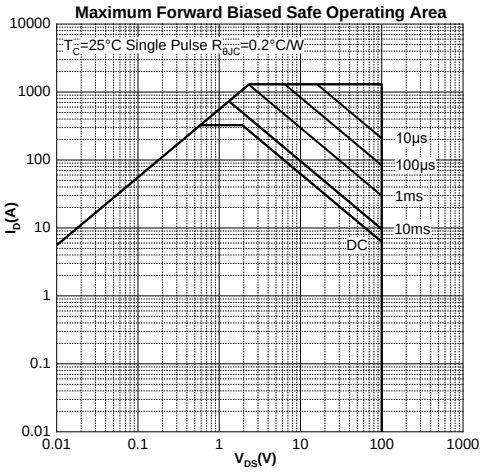


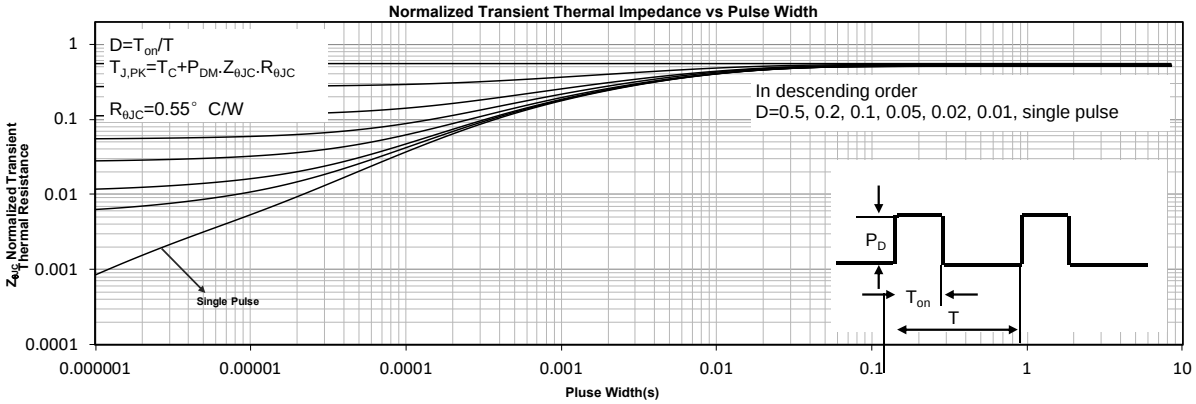






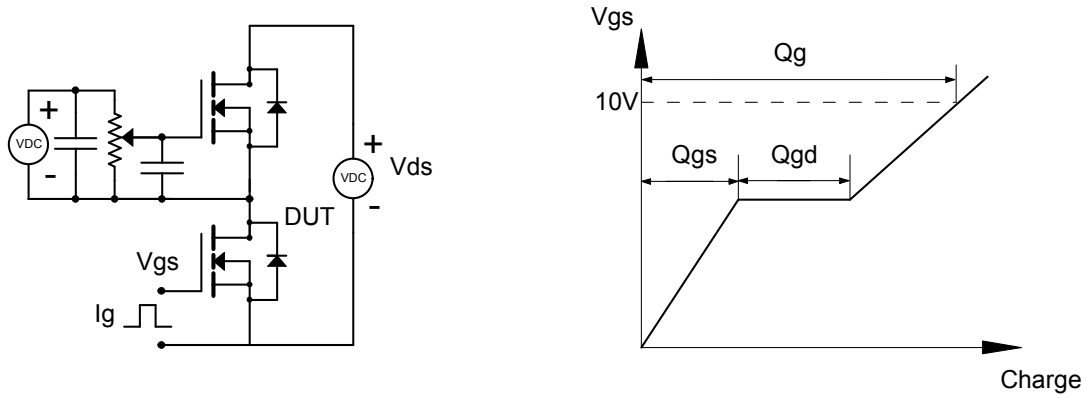

Capacitance vs V_{DS}
f=0.1Mhz
Pulse
Ciss
Coss
Crss
Capacitance(pF)
V_{DS}(V)


Maximum Forward Biased Safe Operating Area
T_C=25°C Single Pulse $R_{\theta JC}$=0.2°C/W
10μs
100μs
1ms
10ms
DC
I_D(A)
V_{DS}(V)

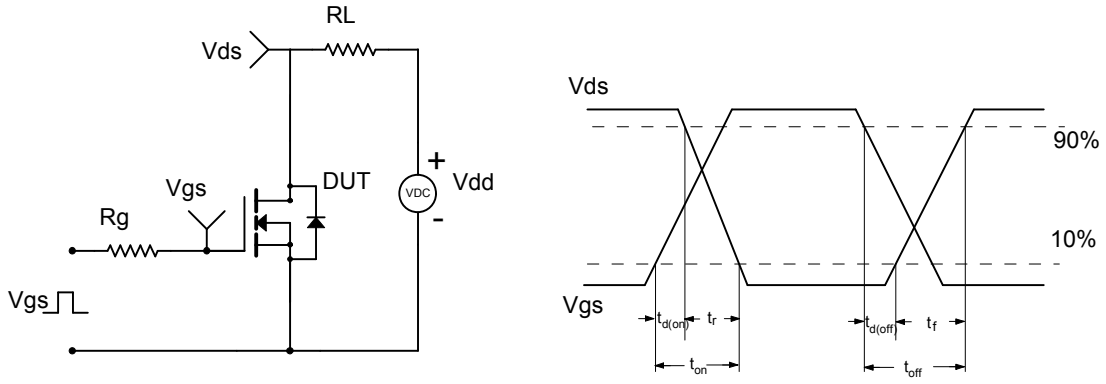

Normalized Transient Thermal Impedance vs Pulse Width
D=T_{on}/T
$T_{J,PK}$=T_C+P_{DM}.$Z_{\theta JC}$.$R_{\theta JC}$
$R_{\theta JC}$=0.55° C/W
In descending order
D=0.5, 0.2, 0.1, 0.05, 0.02, 0.01, single pulse
Single Pulse
P_D
T_{on}
T
$Z_{\theta JC}$ Normalized Transient Thermal Resistance
Pluse Width(s)

Test Circuit

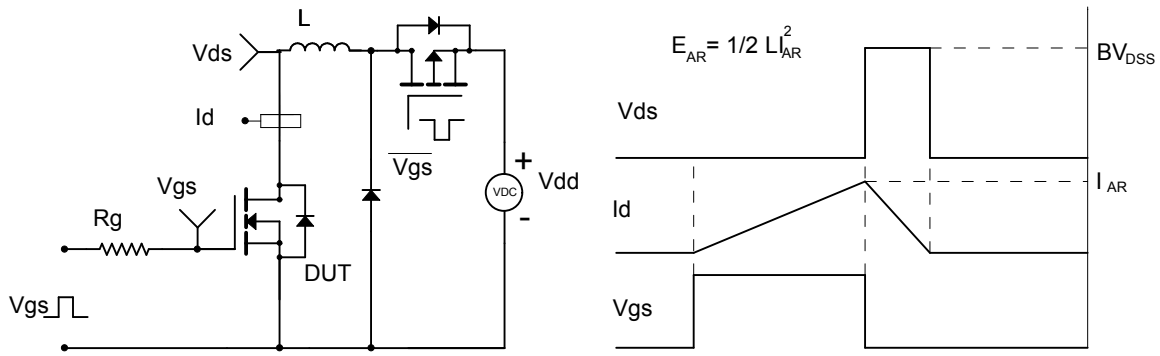
Gate Charge Test Circuit & Waveform



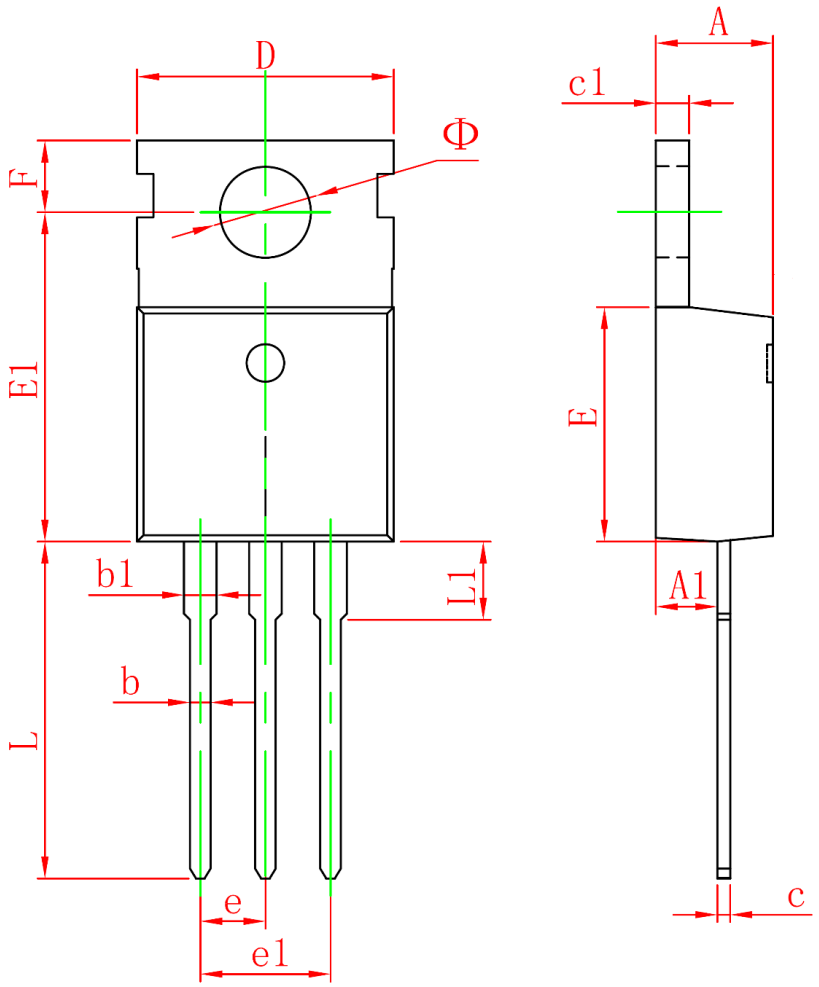
Resistive Switching Test Circuit & Waveform



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	4.300	4.700	0.169	0.185
A1	2.200	2.600	0.087	0.102
b	0.600	1.000	0.024	0.039
b1	1.150	1.600	0.045	0.063
c	0.300	0.700	0.012	0.028
c1	1.000	1.400	0.039	0.055
D	9.600	10.400	0.378	0.409
E	8.800	9.750	0.346	0.384
E1	11.800	13.300	0.465	0.524
e	2.540BSC		0.100BSC	
e1	4.840	5.320	0.191	0.209
F	2.600	3.000	0.102	0.118
L	12.600	14.800	0.496	0.583
L1	2.800	4.200	0.110	0.165
Φ	3.400	4.000	0.134	0.157