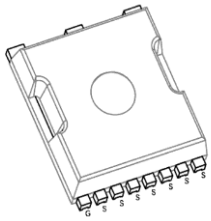
GPT013N10NTPB

100V N-Channel MOSFET

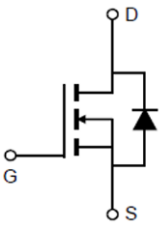
Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
100V	1.3mΩ@10V	350A

TOLL



Schematic diagram



Feature

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

Application

- Power Management
- Motor Driving
- High frequency switching, synchronous rectification

Package Marking and Ordering Information

Part Number	Package	Marking	Packing	Reel Size	Tape Width	Qty
GPT013N10NTPB	TOLL	T013N10N	Reel & Tape	330mm	24mm	2000pcs

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current[1]	T_C = 25°C	I_D	350	A
	T_C = 100°C		221	
Pulsed Drain Current[2]		I_{DM}	1400	A
Single Pulsed Avalanche Current[3]		I_{AS}	90	A
Single Pulsed Avalanche Energy[3]		E_{AS}	2025	mJ
Power Dissipation[5]	T_C = 25°C	P_D	329	W
Thermal Resistance from Junction to Ambient[6]		$R_{\theta JA}$	30	°C/W
Thermal Resistance from Junction to Case		$R_{\theta JC}$	0.38	°C/W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55~ +150	°C

MOSFET ELECTRICAL CHARACTERISTICS (T_A = 25°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	100			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 100V, 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	2.0	3.0	4.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A		1.3	1.8	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = 50V, V_{GS} = 0V, f = 1MHz		9427		pF
Output Capacitance	C_{oss}			3672		
Reverse Transfer Capacitance	C_{rss}			100		
Gate Resistance	R_g	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz		3.1		Ω
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS} = 50V, V_{GS} = 10V, I_D = 20A		143		nC
Gate-Source Charge	Q_{gs}			42		
Gate-Drain Charge	Q_{gd}			35		
Gate Plateau Voltage	$V_{plateau}$			4.6		V
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 50V, V_{GS} = 10V, I_D = 80A, R_G = 3Ω		18		ns
Turn-On Rise Time	t_r			27		
Turn-Off Delay Time	$t_{d(off)}$			50		
Turn-Off Fall Time	t_f			30		
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°C			350	A
Diode Pulse Forward Current[2]	I_{SM}				1400	A
Diode Reverse Recovery Time	t_{rr}	I_F = 80A, dI/dt = 100A/μs		78		ns
Diode Reverse Recovery Charge	Q_{rr}	I_F = 80A, dI/dt = 100A/μs		150		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%.

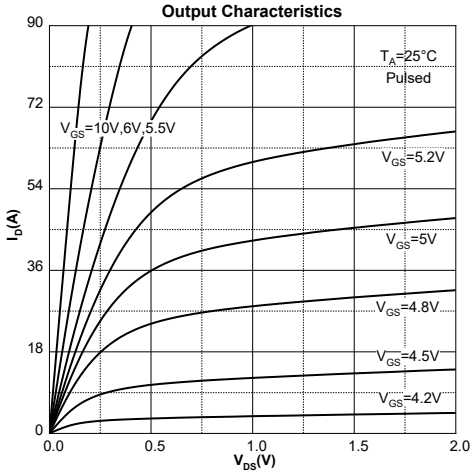
3.E_{AS} condition: V_{DD} = 50V, V_{GS} = 10V, L = 0.5mH, R_G = 25Ω Starting T_J = 25°C.

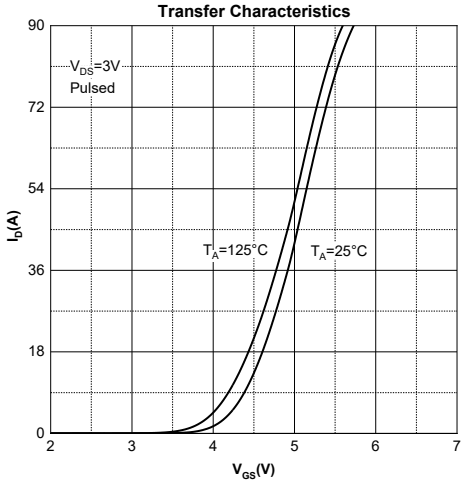
4.Pulse Test: Pulse Width ≤ 300μs, duty cycle ≤ 2%.

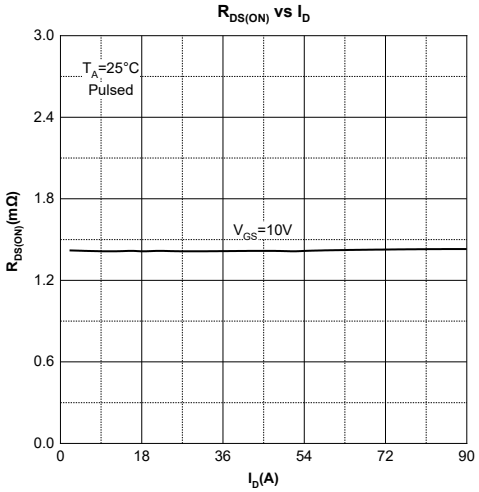
5.The power dissipation P_D is limited by $T_{J(MAX)}$ = 150°C. And device mounted on a large heatsink.

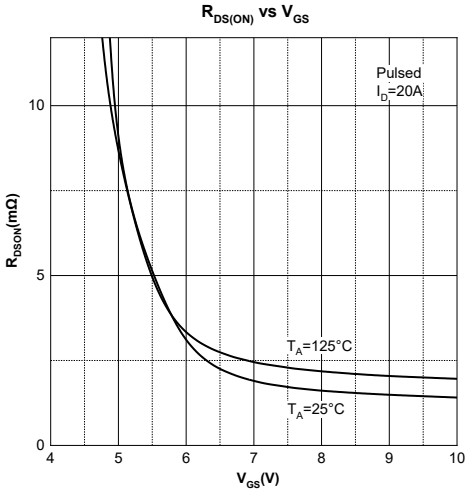
6.Device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A = 25°C.

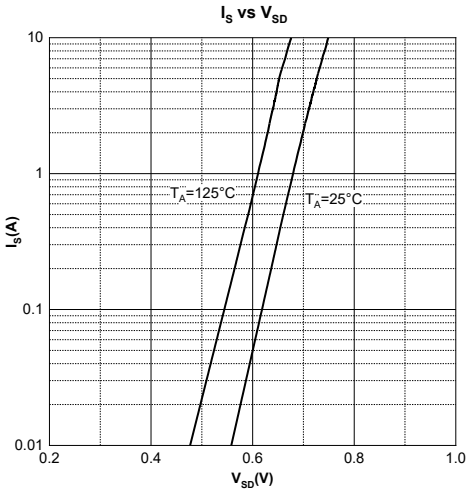
Typical Characteristics

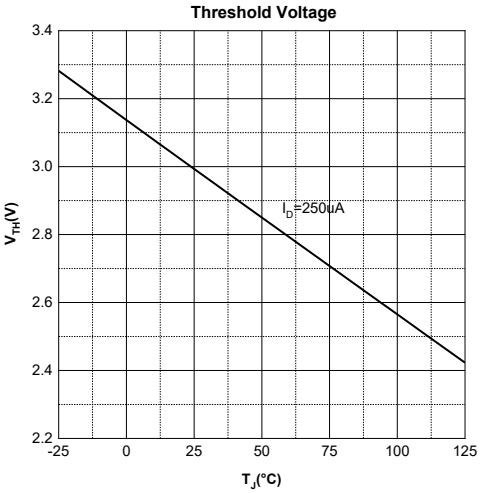


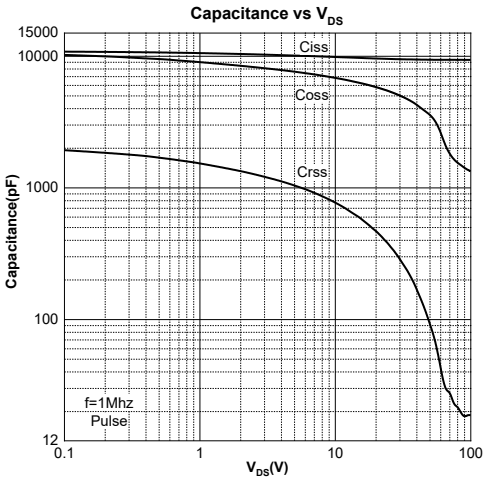


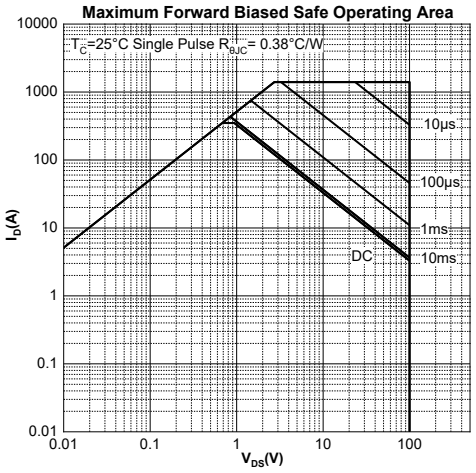


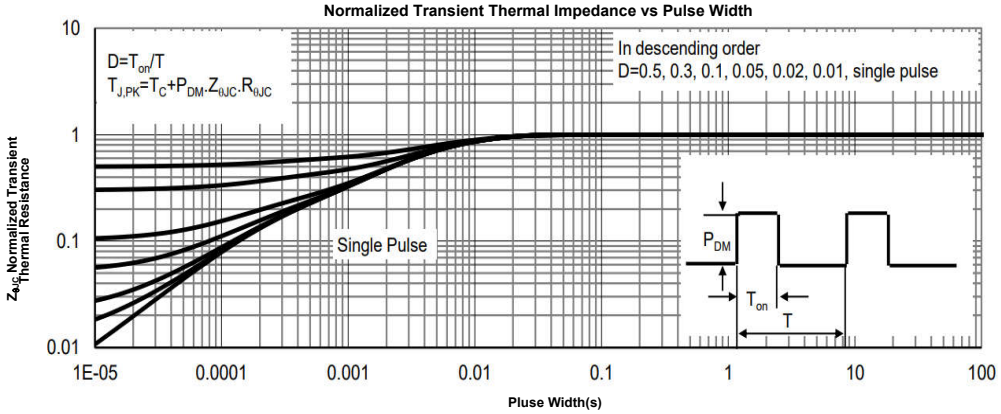






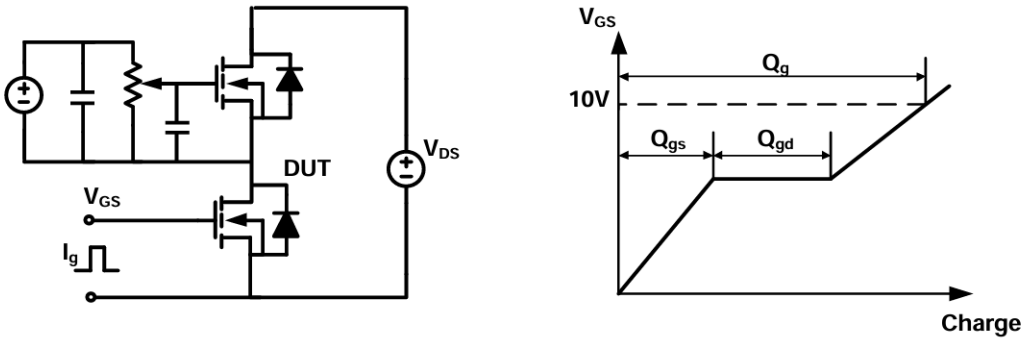

Capacitance vs V_{DS}
Ciss
Coss
Crss
f=1Mhz
Pulse
Capacitance(pF)
V_{DS}(V)


Maximum Forward Biased Safe Operating Area
T_C=25°C Single Pulse $R_{\theta JC}$= 0.38°C/W
10μs
100μs
1ms
10ms
DC
I_D(A)
V_{DS}(V)

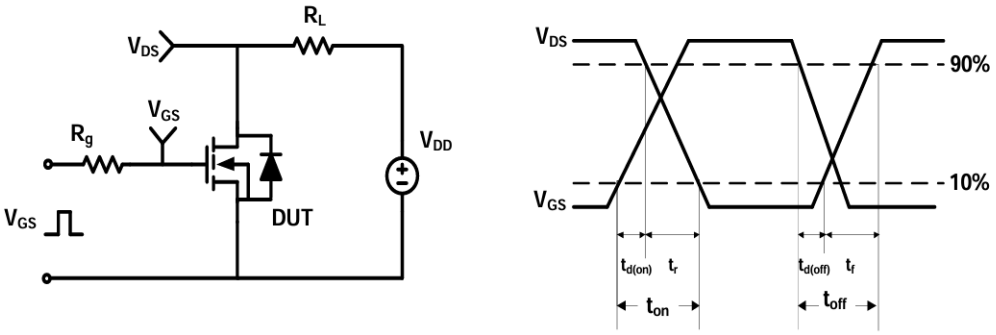

Normalized Transient Thermal Impedance vs Pulse Width
D=T_{on}/T
$T_{J,PK}$=T_C+P_{DM}.$Z_{\theta JC}$.$R_{\theta JC}$
In descending order
D=0.5, 0.3, 0.1, 0.05, 0.02, 0.01, single pulse
Single Pulse
P_{DM}
T_{on}
T
$Z_{\theta JC}$,Normalized Transient Thermal Resistance
Pluse Width(s)

Test Circuit

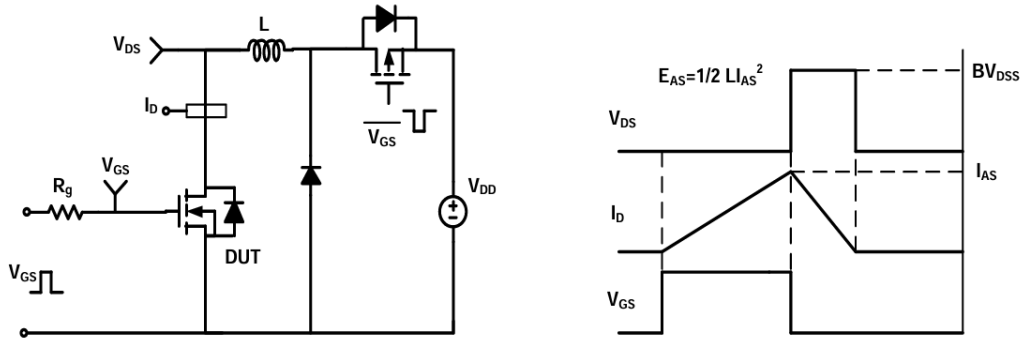
Gate Charge Test Circuit & Waveform



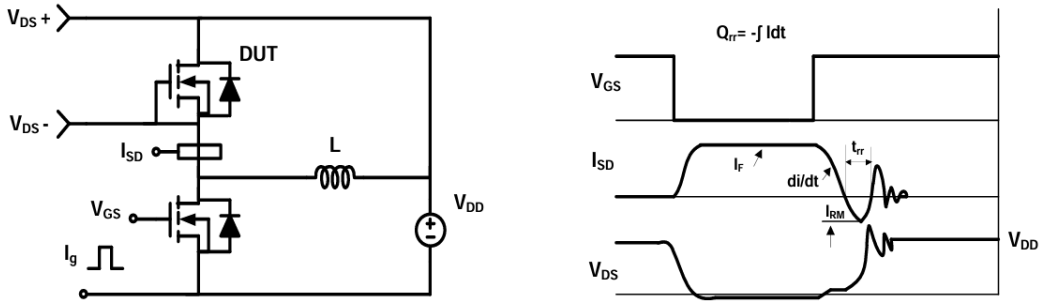
Resistive Switching Test Circuit & Waveform



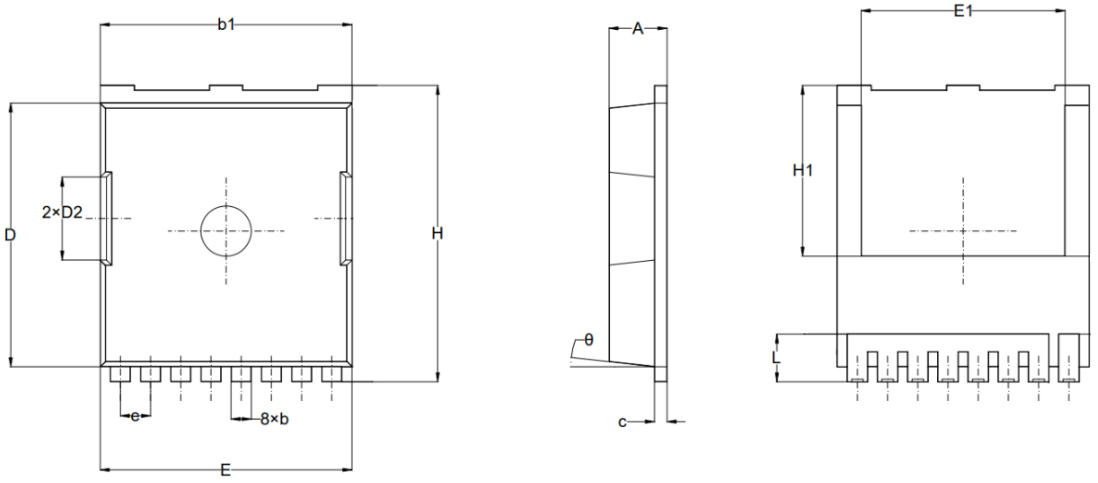
Unclamped Inductive Switching (UIS) Test Circuit & Waveform



Diode Recovery Test Circuit & Waveform



TOLL Package Information



SYMBOL	MILLIMETER		Dimensions In Inches	
	MIN.	MAX.	Min.	Max.
A	2.150	2.450	0.085	0.096
b	0.600	0.900	0.024	0.035
b1	9.650	10.000	0.380	0.394
c	0.400	0.600	0.016	0.024
D	10.180	10.580	0.401	0.417
D2	2.850	3.450	0.112	0.136
E	9.700	10.100	0.382	0.398
E1	7.900	9.250	0.311	0.364
e	1.100	1.300	0.043	0.051
H	11.000	11.900	0.433	0.469
H1	6.750	7.350	0.266	0.289
L	1.270	2.100	0.050	0.083
θ	10°REF			

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