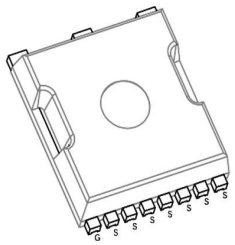
GPT013NE8NTP

85V N-Channel MOSFET

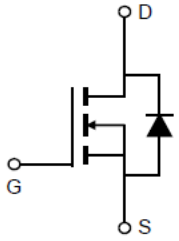
Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
85V	1.3mΩ@10V	360A

TOLL



Schematic diagram



Feature

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

Application

- Power Management Switches
- DC/DC Converter

Package Marking and Ordering Information

Part Number	Package	Marking	Packing	Reel Size	Tape Width	Qty
GPT013NE8NTP	TOLL	T013NE8N	Reel & Tape	330mm	24mm	2000pcs

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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	85	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current[1]	T_C = 25°C	I_D	360	A
	T_C = 100°C		252	
Pulsed Drain Current[2]		I_{DM}	1440	A
Single Pulsed Avalanche Current[3]		I_{AS}	80	A
Single Pulsed Avalanche Energy[3]		E_{AS}	1280	mJ
Power Dissipation[5]	T_C = 25°C	P_D	429	W
Thermal Resistance from Junction to Ambient[6]		$R_{\theta JA}$	45	°C/W
Thermal Resistance from Junction to Case		$R_{\theta JC}$	0.35	°C/W
Junction Temperature		T_J	175	°C
Storage Temperature		T_{STG}	-55~ +175	°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	85			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 85V, 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	2.5	3.0	3.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A		1.3	1.6	mΩ
Forward Transconductance	g_{FS}	V_{DS} = 10V, I_D = 20A		94		S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = 42.5V, V_{GS} = 0V, f = 0.1MHz		10326		pF
Output Capacitance	C_{oss}			4172		
Reverse Transfer Capacitance	C_{rss}			145		
Gate Resistance	R_g	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz		3.4		Ω
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS} = 50V, V_{GS} = 10V, I_D = 20A		150		nC
Gate-Source Charge	Q_{gs}			42		
Gate-Drain Charge	Q_{gd}			31		
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 45V, V_{GS} = 10V, R_G = 3Ω, I_D = 20A		36		ns
Turn-On Rise Time	t_r			34		
Turn-Off Delay Time	$t_{d(off)}$			86		
Turn-Off Fall Time	t_f			31		
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			360	A
Diode Pulse Forward Current[2]	I_{SM}				1440	A
Diode Reverse Recovery Time	t_{rr}	I_F = 20A, dI/dt = 100A/μs		98		ns
Diode Reverse Recovery Charge	Q_{rr}			305		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%.

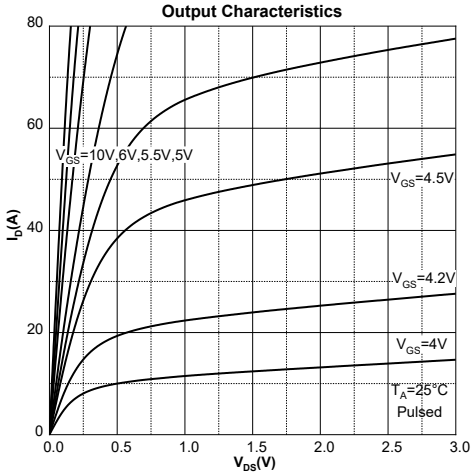
3.E_{AS} condition: V_{DD} = 50V, V_{GS} = 10V, L = 0.5mH, R_G = 25Ω Starting T_J = 25°C.

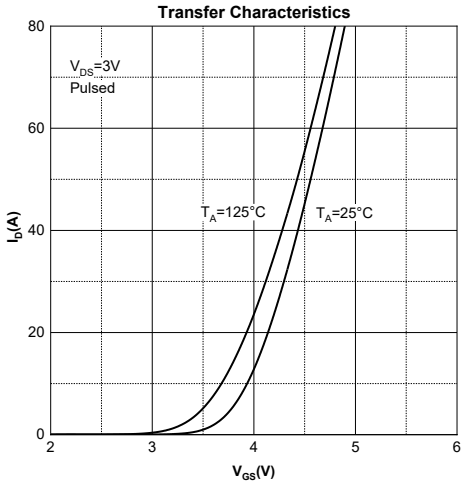
4.Pulse Test: Pulse Width ≤ 300μs, duty cycle ≤ 2%.

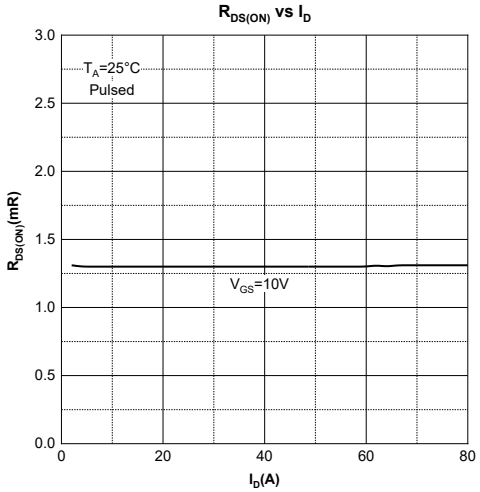
5.The power dissipation P_D is limited by $T_{J(MAX)}$ = 150°C. And device mounted on a large heatsink.

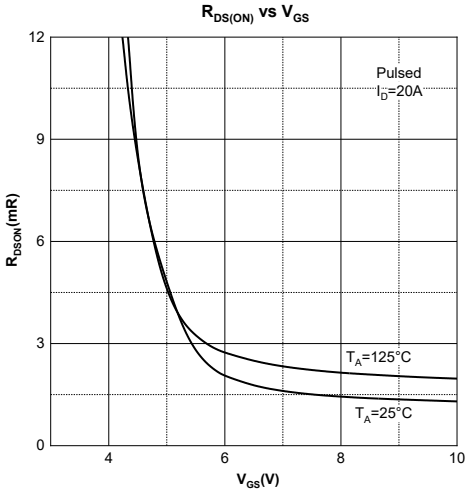
6.Device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A = 25°C.

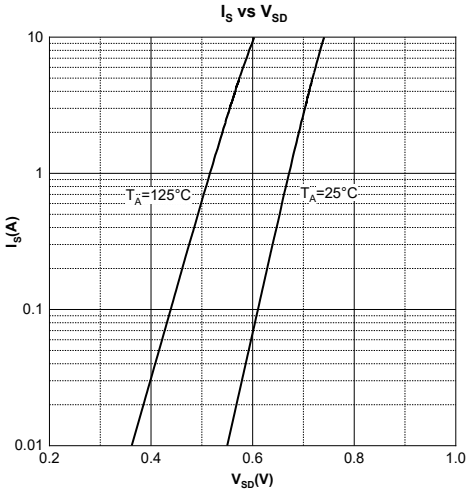
Typical Characteristics

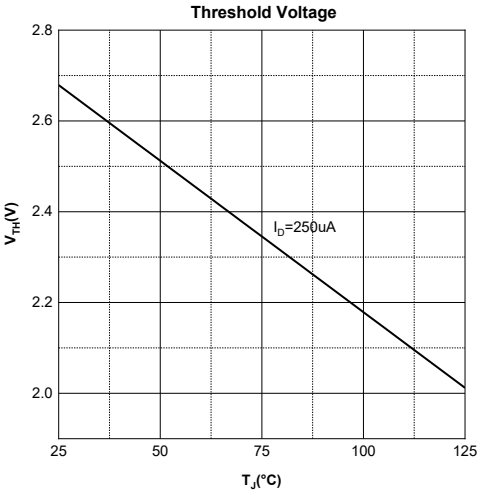


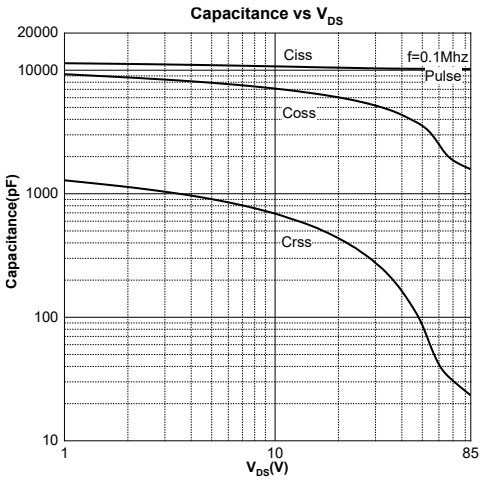


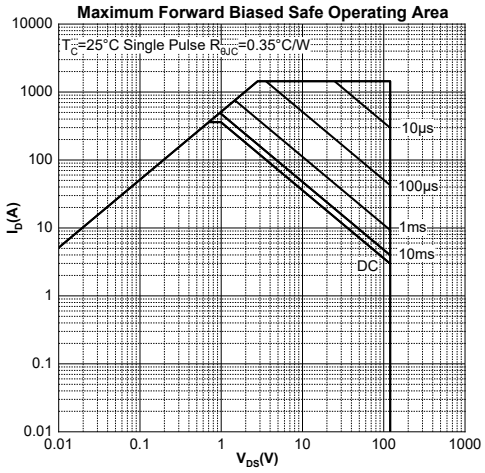


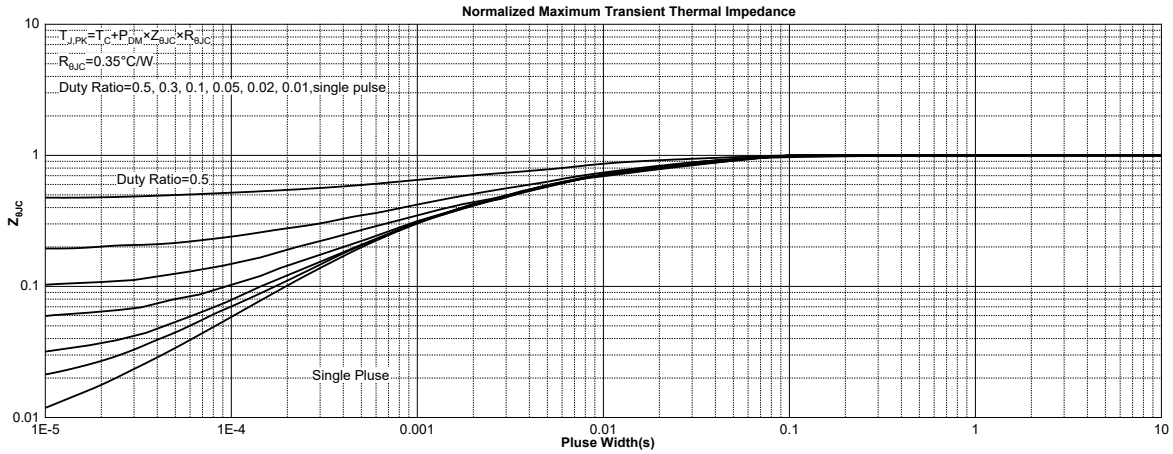






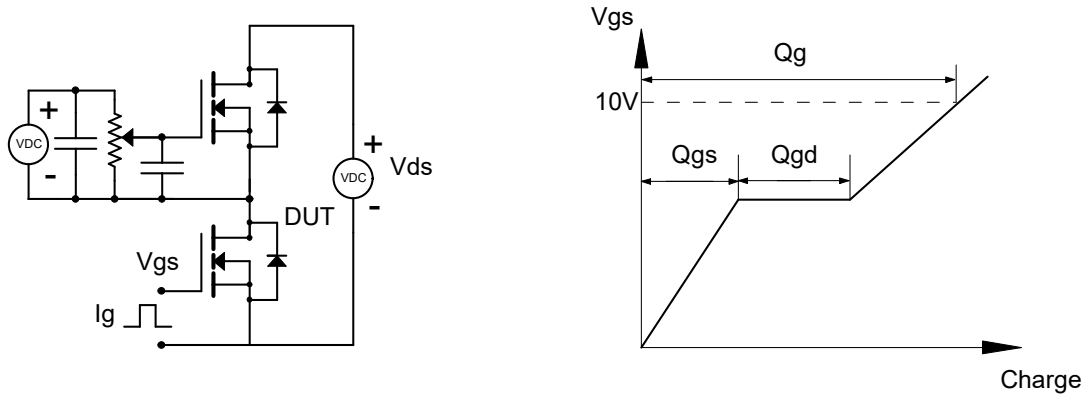

Capacitance vs V_{DS}
Ciss
f=0.1Mhz
Pulse
Coss
Crss
Capacitance(pF)
20000
10000
1000
100
10
1
10
85
V_{DS}(V)


Maximum Forward Biased Safe Operating Area
T_C=25°C Single Pulse $R_{\theta JC}$=0.35°C/W
10μs
100μs
1ms
10ms
DC
I_D(A)
10000
1000
100
10
1
0.1
0.01
0.01
0.1
1
10
100
1000
V_{DS}(V)

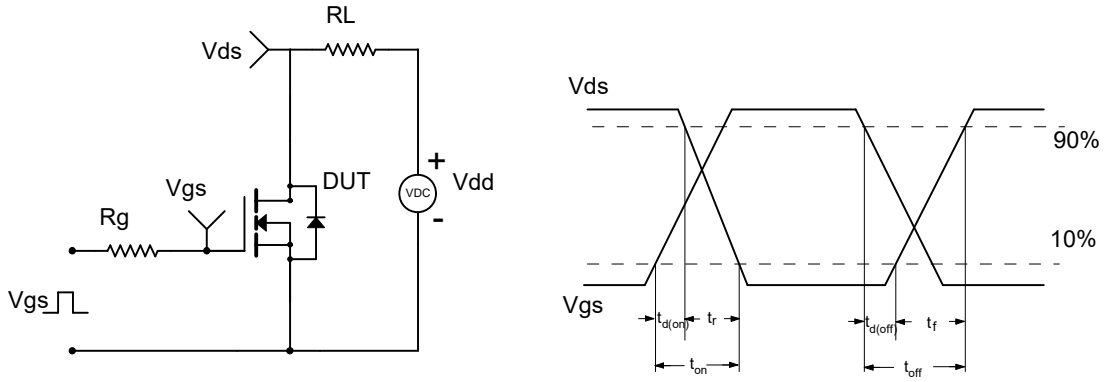

Normalized Maximum Transient Thermal Impedance
$T_{J,PK}=T_C+P_{DM}\times Z_{\theta JC}\times R_{\theta JC}$
$R_{\theta JC}$=0.35°C/W
Duty Ratio=0.5, 0.3, 0.1, 0.05, 0.02, 0.01,single pulse
Duty Ratio=0.5
Single Pluse
$Z_{\theta JC}$
10
1
0.1
0.01
1E-5
1E-4
0.001
0.01
0.1
1
10
Pluse Width(s)

Test Circuit

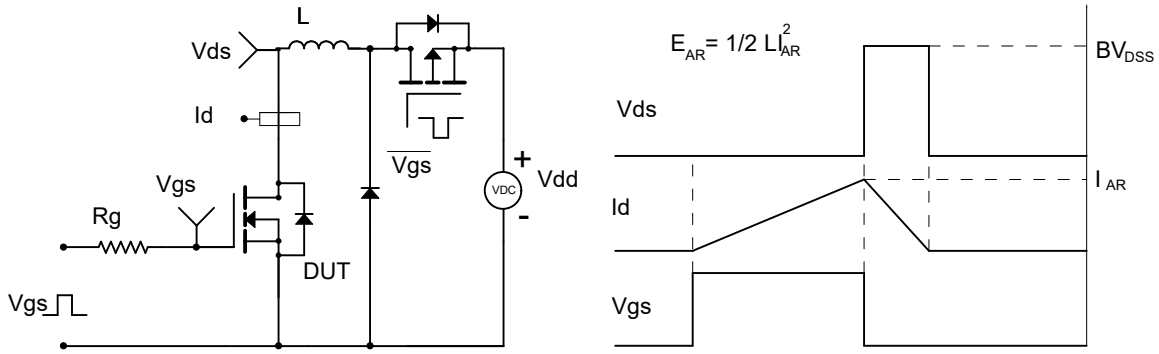
Gate Charge Test Circuit & Waveform



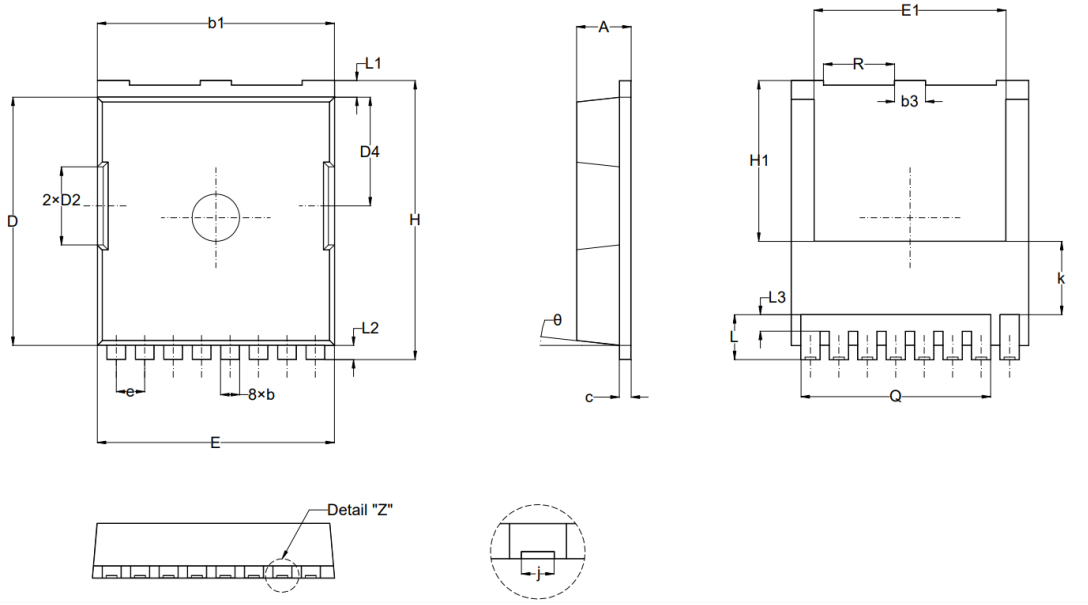
Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



TOLL Package Information



SYMBOL	MILLIMETER		Dimensions In Inches	
	MIN.	MAX.	Min.	Max.
A	2.200	2.400	0.087	0.094
b	0.650	0.900	0.026	0.035
b1	9.700	9.900	0.382	0.390
b3	1.150	1.350	0.045	0.053
c	0.400	0.600	0.016	0.024
D	10.280	10.480	0.405	0.413
D2	3.200	3.400	0.126	0.134
D4	4.450	4.650	0.175	0.183
E	9.800	10.000	0.386	0.394
E1	7.900	8.300	0.311	0.327
e	1.200BSC		0.047BSC	
H	11.480	11.880	0.452	0.468
H1	6.950REF		0.274REF	
j	0.350REF		0.014REF	
K	3.00REF		0.118REF	
L	1.600	2.000	0.063	0.079
L1	0.550	0.850	0.022	0.033
L2	0.500	0.700	0.020	0.028
L3	0.500	0.800	0.020	0.031
N	8REF		0.315REF	
Q	8REF		0.315REF	
R	2.800	3.200	0.110	0.126
θ	10°REF			

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