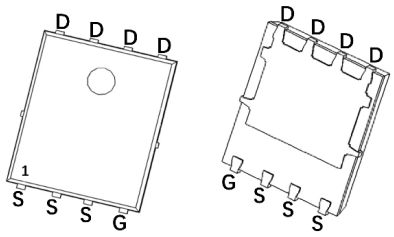
GPT007N04NNCU

40V N-Channel MOSFET

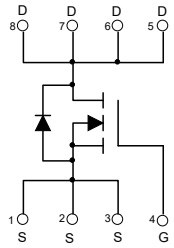
Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	0.7mΩ@10V	300A

PDFN5X6-8L



Schematic diagram



Feature

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

Application

- Power Switching Application
- Power Management
- Motor Driving

Package Marking and Ordering Information

Part Number	Package	Marking	Packing	Reel Size	Tape Width	Qty
GPT007N04NNCU	PDFN5X6-8L	T007N04N	Reel & Tape	330mm	12mm	5000pcs

ABSOLUTE MAXIMUM RATINGS (T_A = 25°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°C	I_D	300	A
	T_C = 100°C	I_D	190	A
Pulsed Drain Current[2]		I_{DM}	1200	A
Single Pulsed Avalanche Current[3]		I_{AS}	61	A
Single Pulsed Avalanche Energy[3]		E_{AS}	1861	mJ
Power Dissipation[5]	T_C = 25°C	P_D	147	W
Thermal Resistance from Junction to Ambient[6]		$R_{\theta JA}$	42	°C/W
Thermal Resistance from Junction to Case		$R_{\theta JC}$	0.85	°C/W
Junction Temperature		T_J	150	°C
Storage Temperature		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	40			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 38V, 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	2.6	4	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A		0.7	1.1	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = 20V, V_{GS} = 0V, f = 1MHz		6580		pF
Output Capacitance	C_{oss}			1952		
Reverse Transfer Capacitance	C_{rss}			439		
Gate Resistance	R_g	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz		4		Ω
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS} = 20V, V_{GS} = 10V, I_D = 20A		149		nC
Gate-Source Charge	Q_{gs}			26		
Gate-Drain Charge	Q_{gd}			50		
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 20V, V_{GS} = 10V, R_L= 1Ω, R_G = 6Ω		28		ns
Turn-On Rise Time	t_r			86		
Turn-Off Delay Time	$t_{d(off)}$			61		
Turn-Off Fall Time	t_f			92		
Source-Drain Diode Characteristics						
Diode Forward Voltage[4]	V_{SD}	V_{GS} = 0V, I_S = 10A			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%.

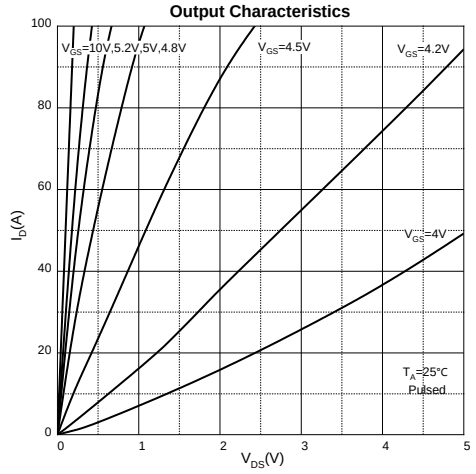
3.E_{AS} condition: V_{DD} = 50V, V_{GS} = 10V, L = 1mH, R_G = 25Ω Starting T_J = 25°C.

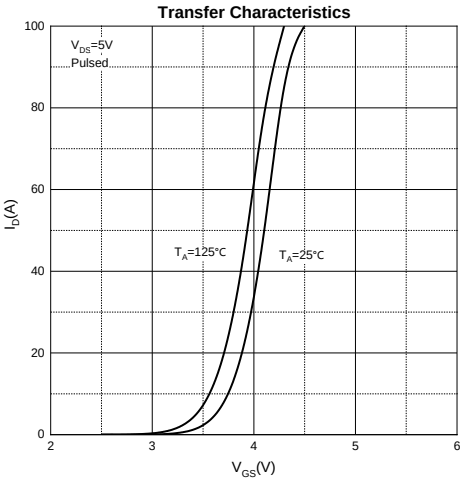
4.Pulse Test: Pulse Width ≤ 300μs, duty cycle ≤ 2%.

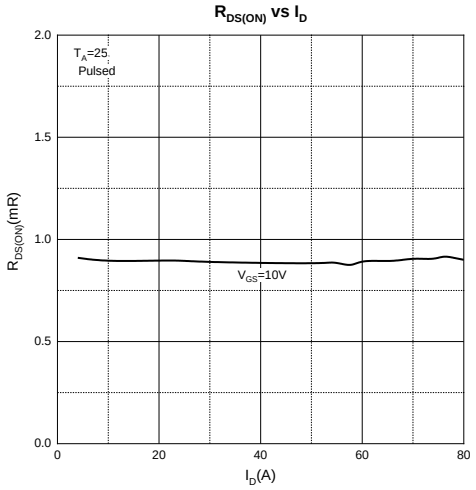
5.The power dissipation P_D is limited by $T_{J(MAX)}$ = 150°C. And device mounted on a large heatsink.

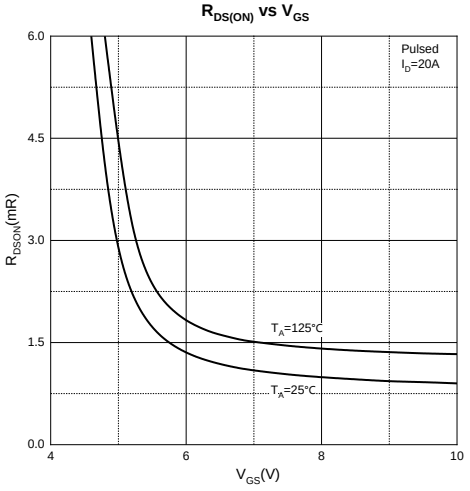
6.Device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C.

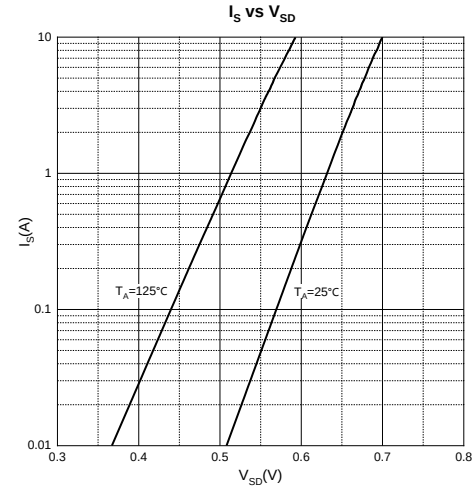
Typical Characteristics

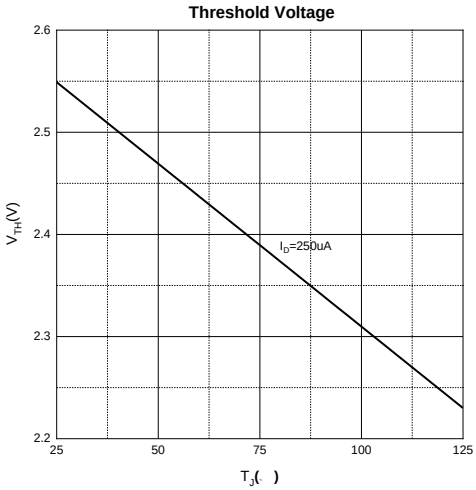


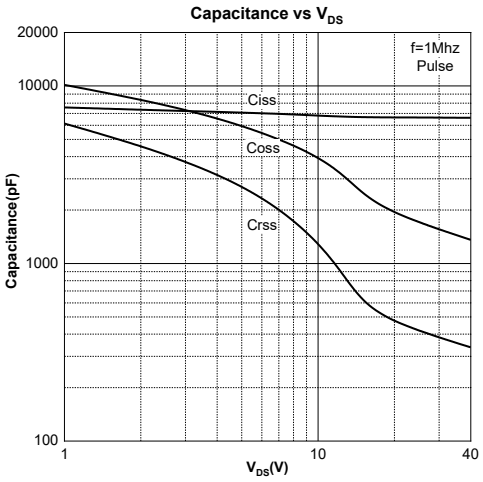


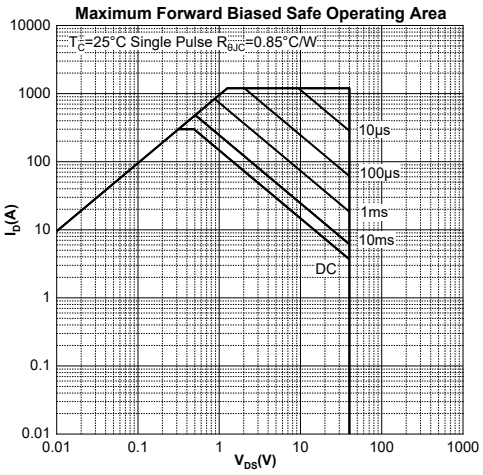


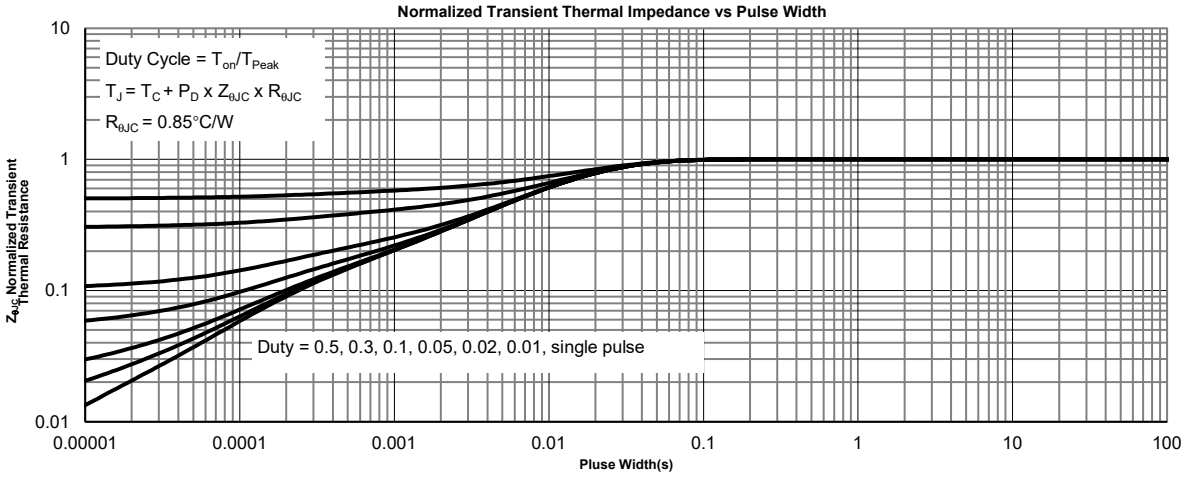






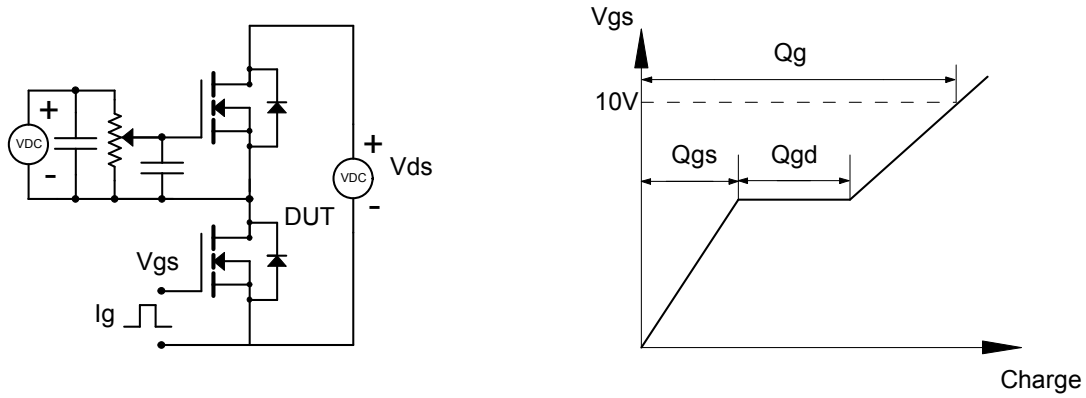

Capacitance vs V_{DS}
f=1Mhz
Pulse
Ciss
Coss
Crss
Capacitance(pF)
20000
10000
1000
100
1
10
40
V_{DS}(V)


Maximum Forward Biased Safe Operating Area
T_C=25°C Single Pulse $R_{\theta JC}$=0.85°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)

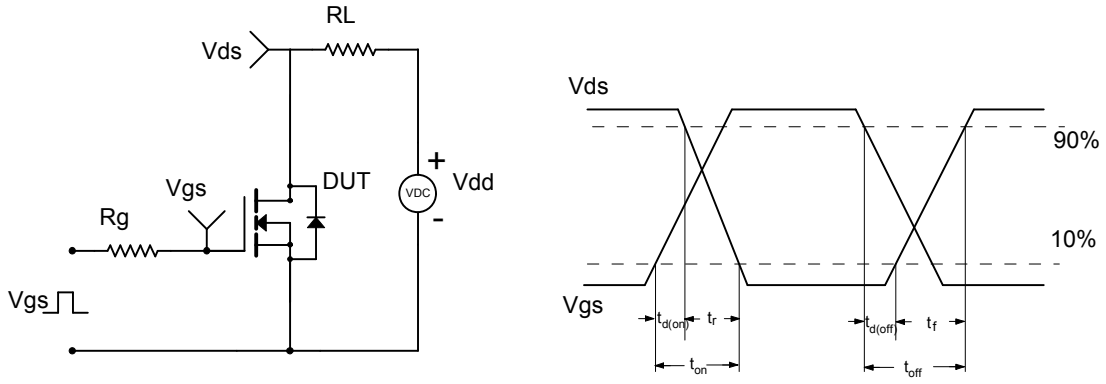

Normalized Transient Thermal Impedance vs Pulse Width
Duty Cycle = T_{on}/T_{Peak}
$T_J = T_C + P_D \times Z_{\theta JC} \times R_{\theta JC}$
$R_{\theta JC}$ = 0.85°C/W
Duty = 0.5, 0.3, 0.1, 0.05, 0.02, 0.01, single pulse
$Z_{\theta JC}$ Normalized Transient Thermal Resistance
10
1
0.1
0.01
0.00001
0.0001
0.001
0.01
0.1
1
10
100
Pluse Width(s)

Test Circuit

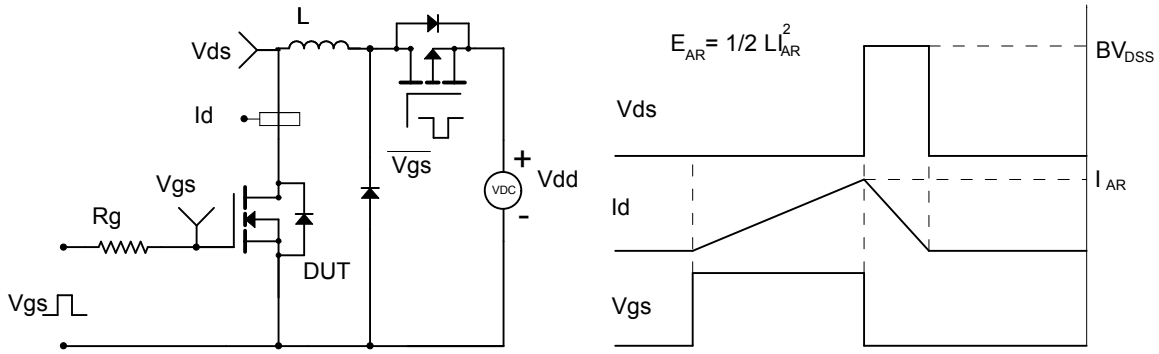
Gate Charge Test Circuit & Waveform



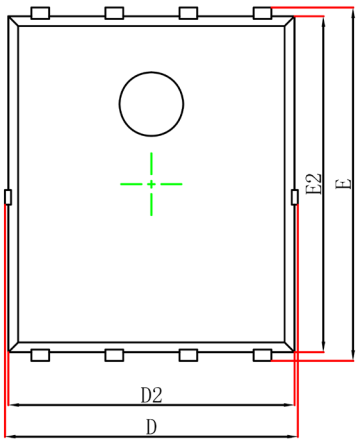
Resistive Switching Test Circuit & Waveform



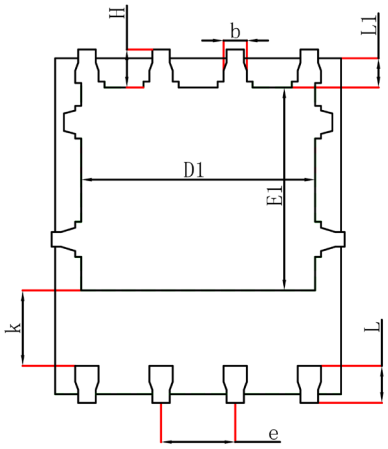
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



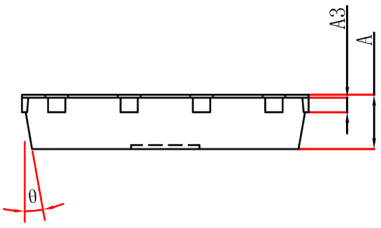
PDFN5X6-8L Package Information



Top View
[顶视图]



Bottom View
[背视图]



Side View
[侧视图]

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.10	0.035	0.043
A3	0.254REF		0.010REF	
D	4.700	5.260	0.185	0.207
E	5.750	6.250	0.226	0.246
D1	3.560	4.500	0.140	0.177
E1	3.180	3.660	0.125	0.144
D2	4.700	5.100	0.185	0.201
E2	5.600	6.000	0.220	0.236
k	1.100	-	0.043	-
b	0.300	0.500	0.012	0.020
e	1.270TYP		0.050TYP	
L	0.510	0.710	0.020	0.028
L1	0.424	0.576	0.017	0.023
H	0.510	0.710	0.020	0.028
θ	8°	12°	8°	12°

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