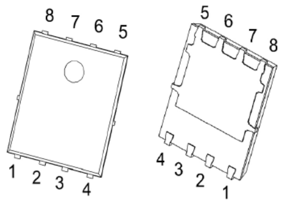
GPT009N04NNCU

40V N-Channel MOSFET

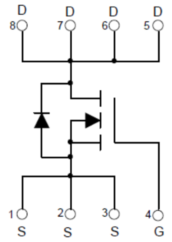
Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	0.8mΩ@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 Management
- Load Switching

Package Marking and Ordering Information

Part Number	Package	Marking	Packing	Reel Size	Tape Width	Qty
GPT009N04NNCU	PDFN5X6-8L	T009N04N	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		190	
Pulsed Drain Current[2]		I_{DM}	1200	A
Single Pulsed Avalanche Current[3]		I_{AS}	50	A
Single Pulsed Avalanche Energy[3]		E_{AS}	625	mJ
Power Dissipation[5]	T_C = 25°C	P_D	156	W
Thermal Resistance from Junction to Ambient[6]		$R_{\theta JA}$	40	°C/W
Thermal Resistance from Junction to Case		$R_{\theta JC}$	0.8	°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	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	2.9	4	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 15A		0.8	1.0	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = 20V, V_{GS} = 0V, f = 0.1MHz		4575		pF
Output Capacitance	C_{oss}			1916		
Reverse Transfer Capacitance	C_{rss}			73		
Gate Resistance	R_g	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz		1.9		Ω
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS} = 30V, V_{GS} = 10V, I_D = 20A		72		nC
Gate-Source Charge	Q_{gs}			19.6		
Gate-Drain Charge	Q_{gd}			17		
Gate Plateau Voltage	$V_{plateau}$			4.5		V
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 20V, V_{GS} = 10V, R_G = 2.7Ω, I_D = 20A		20		ns
Turn-On Rise Time	t_r			30		
Turn-Off Delay Time	$t_{d(off)}$			44		
Turn-Off Fall Time	t_f			21		
Source-Drain Diode Characteristics						
Diode Forward Voltage[4]	V_{SD}	V_{GS} = 0V, I_S = 15A			1.2	V
Diode Continuous Forward Current[1]	I_S	T_C = 25°C			300	A
Diode Pulse Forward Current[2]	I_{SM}				1200	A
Diode Reverse Recovery Time	t_{rr}	I_F = 20A, dI/dt = 100A/μs		68		ns
Diode Reverse Recovery Charge	Q_{rr}			110		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%.

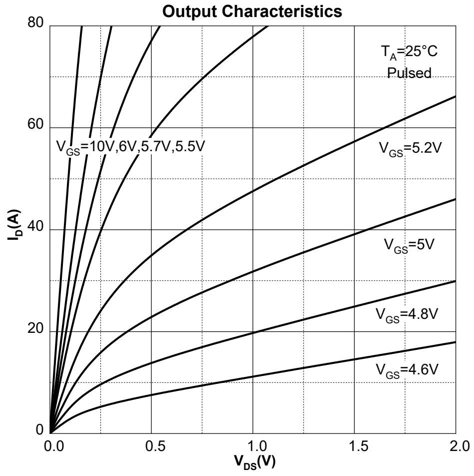
3.E_{AS} condition: V_{DD} = 20V, V_{GS} = 10V, L = 0.5mH, R_G = 25Ω Starting T_J = 25°C.

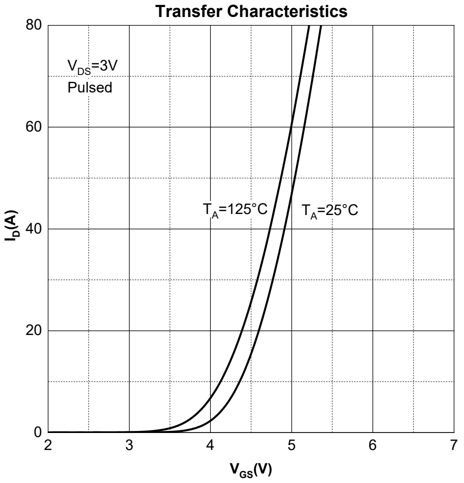
4.Pulse Test: Pulse Width ≤ 300μs, duty cycle ≤ 2%.

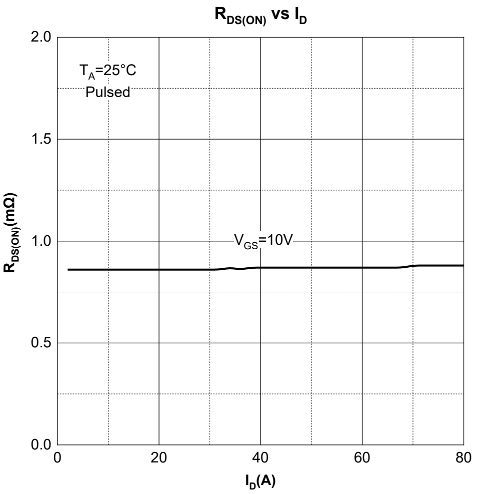
5.The power dissipation P_D is limited by $T_{J(MAX)}$ = 150°C. And device mounted on a large heatsink.

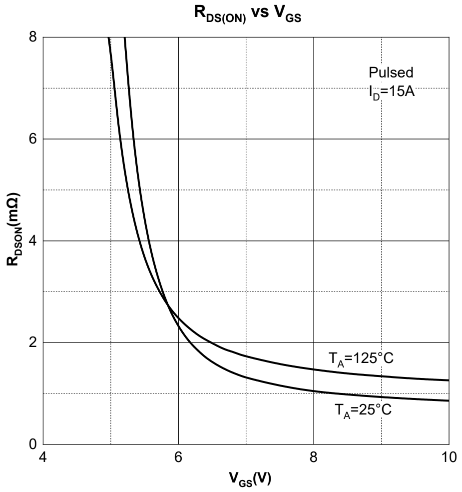
6.Device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A = 25°C.

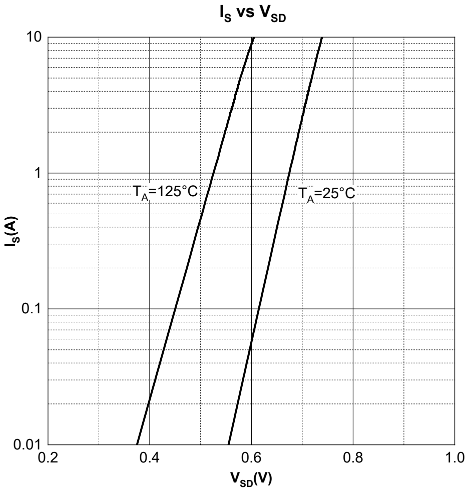
Typical Characteristics

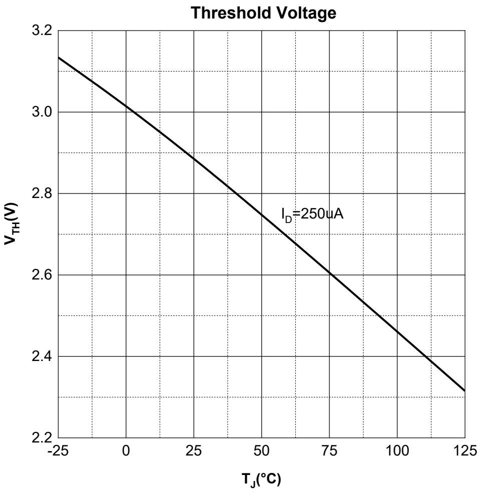

Output Characteristics

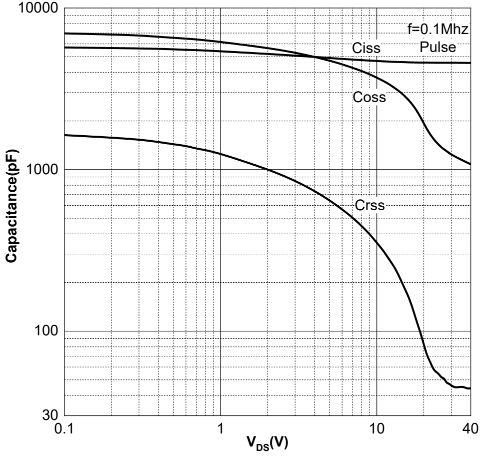

Transfer Characteristics


$R_{DS(ON)}$ vs I_D

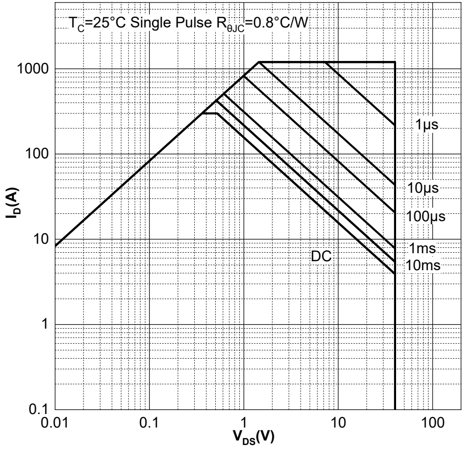

$R_{DS(ON)}$ vs V_{GS}


I_S vs V_{SD}

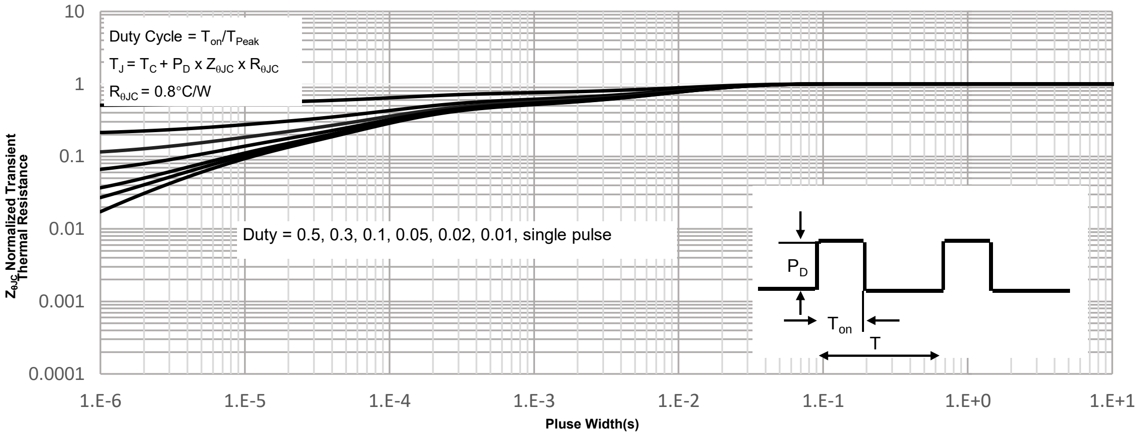

Threshold Voltage



Capacitance vs V_{DS}



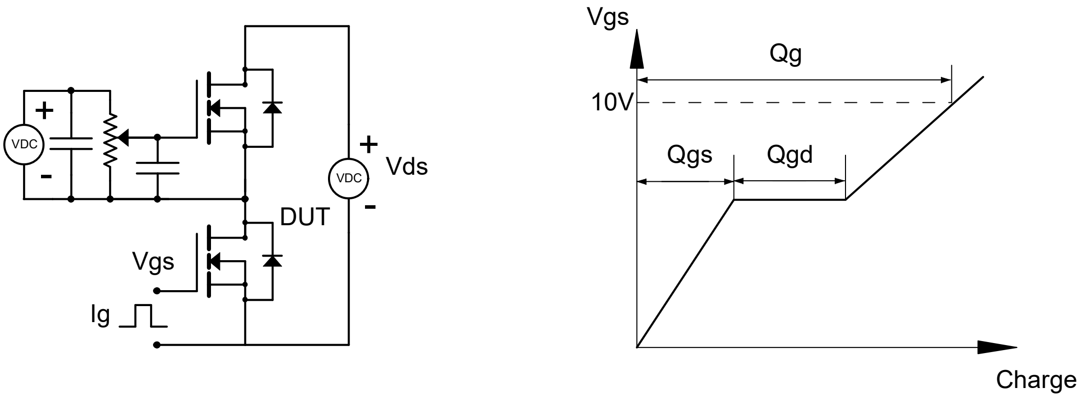
Maximum Forward Biased Safe Operating Area



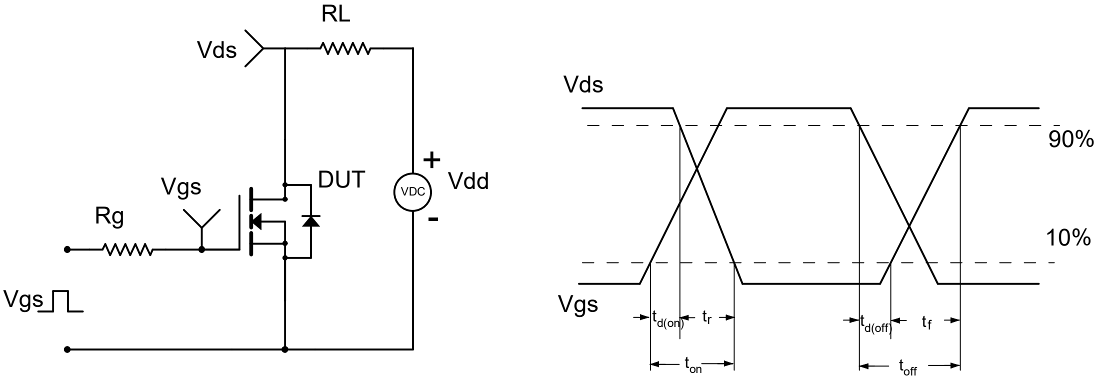
Normalized Transient Thermal Impedance vs Pulse Width

Test Circuit

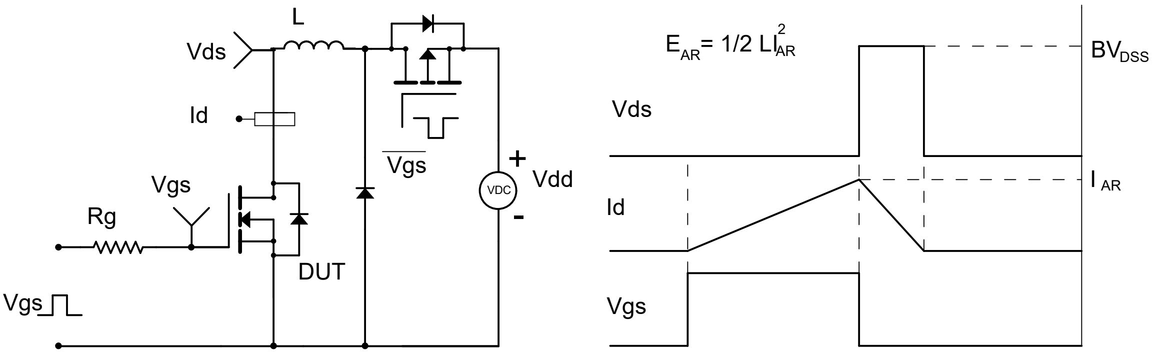
Gate Charge Test Circuit & Waveform



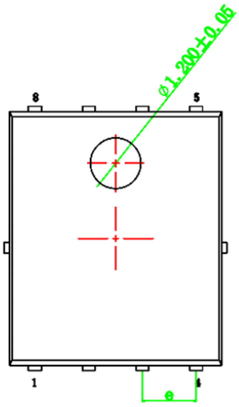
Resistive Switching Test Circuit & Waveform



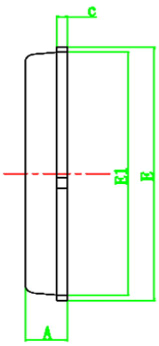
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



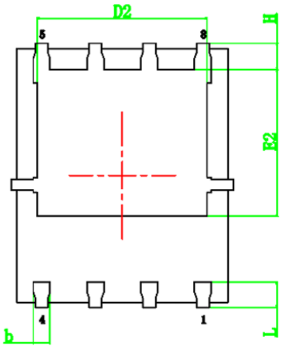
PDFN5X6-8L Package Information



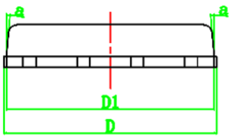
Top View



Side View



Bottom View



Front View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.200	0.035	0.047
b	0.330	0.510	0.013	0.020
c	0.190	0.300	0.007	0.012
D	4.800	5.220	0.189	0.210
D2	3.900	4.300	0.154	0.170
E	5.900	6.100	0.232	0.240
E1	5.700	5.800	0.224	0.228
E2	3.350	3.750	0.132	0.148
e	1.270REF		0.050REF	
H	0.350	0.720	0.014	0.028
D1	4.800	5.000	0.189	0.197
L	0.350	0.750	0.014	0.030
a	0°	12°	0°	12°

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