



500V/5A N-Channel Power MOSFET

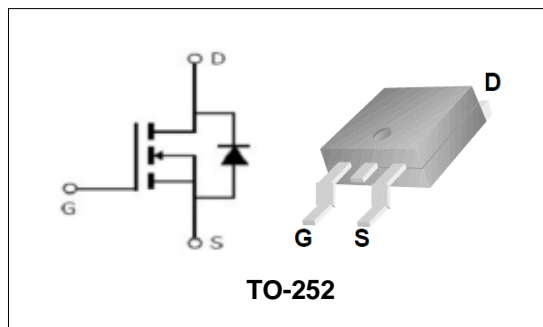
Features

- New technology for high voltage device.
- Low on-resistance and low conduction losses
- Small package
- Ultra Low Gate Charge cause lower driving requirements
- 100% Avalanche Tested

Applications

- Power factor correction (PFC)
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply (UPS)

BVDSS	500	V
ID	5	A
RDSON@VGS=10V	1.5	Ω



Order Information

Product	Package	Marking	Reel Size	Reel	Carton
PTD5N50	TO-252	PTD5N50	13inch	2500PCS	50000PCS

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit	
Common Ratings (TC=25°C Unless Otherwise Noted)				
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	500	V	
V_{GS}	Gate-Source Voltage	±30	V	
T_J	Maximum Junction Temperature	150	°C	
T_{STG}	Storage Temperature Range	-55 to 150	°C	
I_S	Diode Continuous Forward Current	TC =25°C	5	A
Mounted on Large Heat Sink				
E_{AS}	Single Pulse Avalanche Energy (Note1)	131	mJ	
I_{DM}	Pulse Drain Current Tested (Silicon Limit) (Note2)	TC =25°C	20	A
I_D	Continuous Drain current	TC =25°C	5	A
P_D	Maximum Power Dissipation	TC =25°C	55	W
$R_{\theta Jc}$	Thermal Resistance Junction-to-Case (Note3)	2.27	°C/W	
$R_{\theta Ja}$	Thermal Resistance Junction-to-Ambient (Note3)	62.5	°C/W	

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Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ TJ = 25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain- Source Breakdown Voltage	VGS=0V ID=250μA	500	--	--	V
I_{DSS}	Zero Gate Voltage Drain current	VDS=500V,VGS=0V	--	--	1	μA
I_{GSS}	Gate-Body Leakage Current	VGS=±30V,VDS=0V	--	--	±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	VDS=VGS,ID=250μA	2	3	4	V
$R_{DS(ON)}$	Drain-Source On-State Resistance (Note4)	VGS=10V, ID=2.5A	--	1.5	1.7	Ω
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated) (Note5)						
C_{iss}	Input Capacitance	VDS=25V,	--	478	--	pF
C_{oss}	Output Capacitance	VGS=0V,	--	54	--	pF
C_{rss}	Reverse Transfer Capacitance	F=1MHz	--	15	--	pF
Q_g	Total Gate Charge	VDS=400V,	--	13.7	--	nC
Q_{gs}	Gate-Source Charge	ID=5A,	--	3.4	--	nC
Q_{gd}	Gate-Drain Charge	VGS=10V	--	5.8	--	nC
Switching Characteristics (Note5)						
$t_{d(on)}$	Turn-on Delay Time	VDD=250V,	--	46	--	nS
t_r	Turn-on Rise Time	ID=5A,	--	26	--	nS
$t_{d(off)}$	Turn-off Delay Time	VGS=10V	--	130	--	nS
t_f	Turn-off Fall Time	RG=25Ω	--	210	--	nS
Source- Drain Diode Characteristics @ TJ = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	IS=5A,VGS=0V	--	--	1.4	V
t_{rr}	Reverse Recovery Time	IS=10V,VGS=0V,	--	--	--	nS
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/us	--	--	--	nC

Note:

- Limited by TJmax, starting TJ = 25° C, RG = 25Ω, VD = 50V, VGS = 10V. Part not recommended for use above this value.
- Repetitive Rating: Pulse width limited by maximum junction temperature.
- Surface Mounted on FR4 Board, t ≤ 10 sec.
- Pulse Test: pulse width ≤ 300 us, duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.



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Typical Characteristics

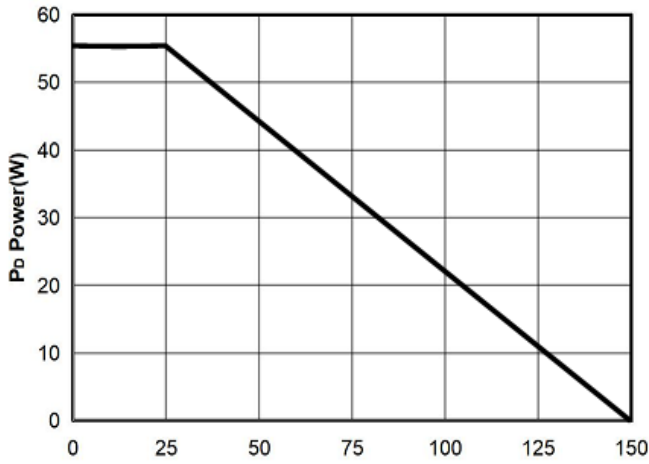


Figure1: T_j Junction Temperature (°C)

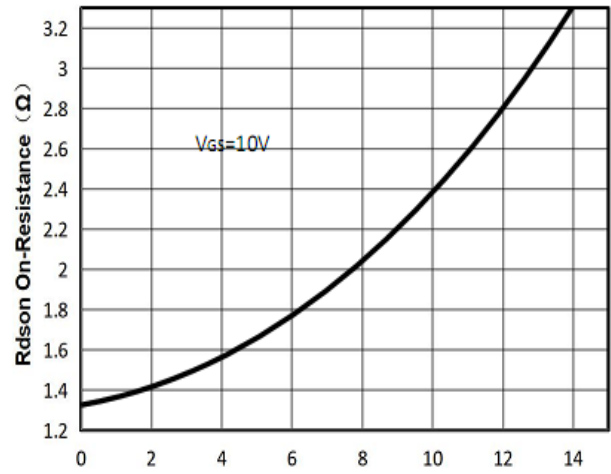


Figure2: I_d Drain Current (A)

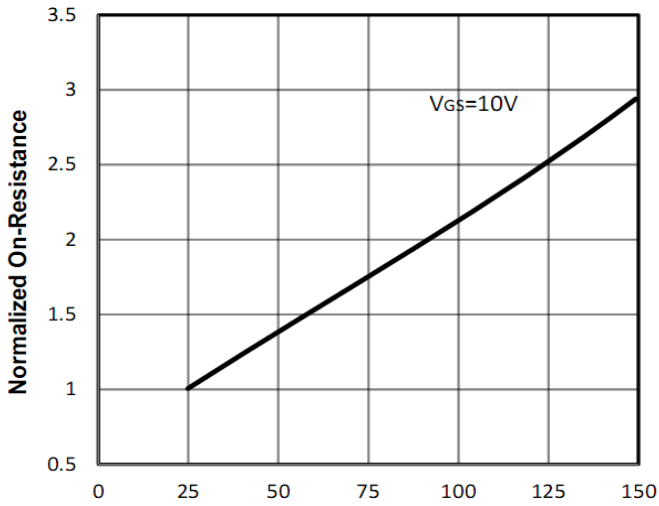


Figure3: T_j Junction Temperature (°C)

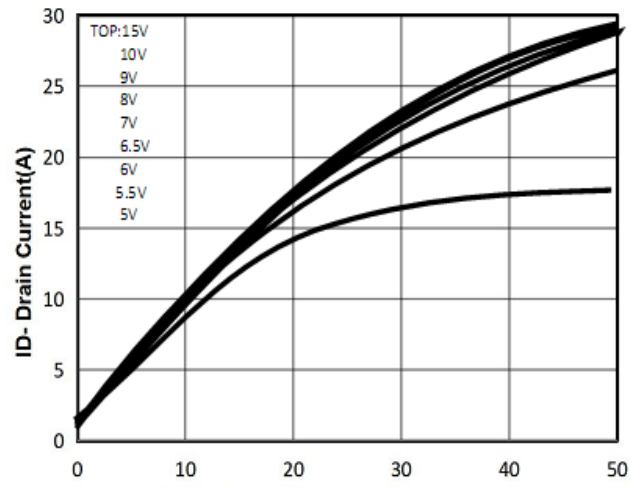


Figure4: V_{ds} Drain-Source Voltage (V)

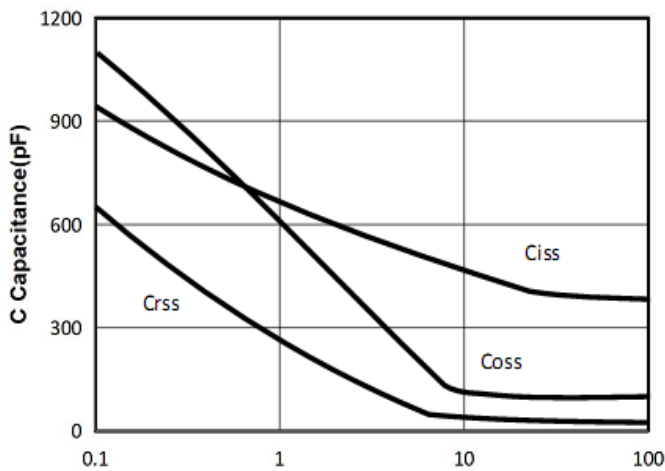


Figure5: V_{ds} Drain Source Voltage (V)

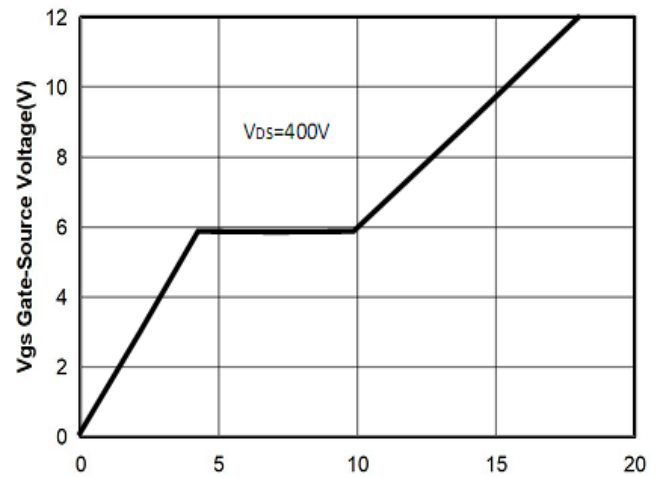


Figure6: Q_g Gate Charge (nC)



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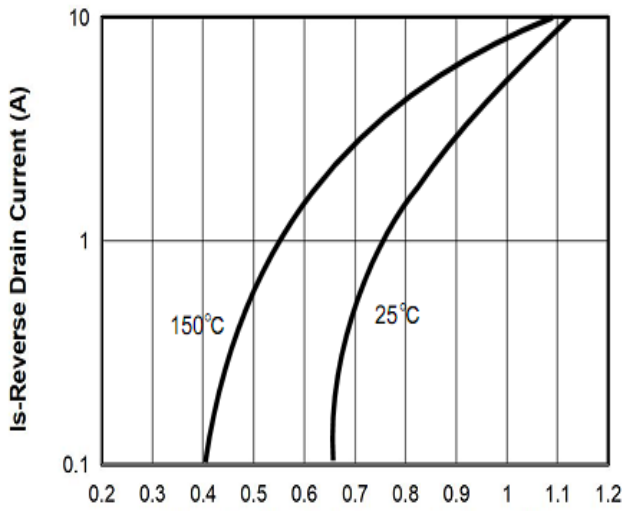


Figure7: Vsd Source-Drain Voltage (V)

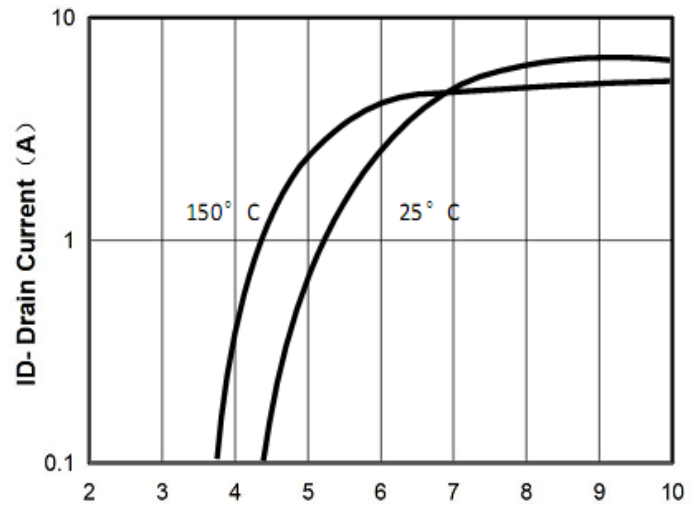


Figure8: Vgs Gate-Source Voltage (V)

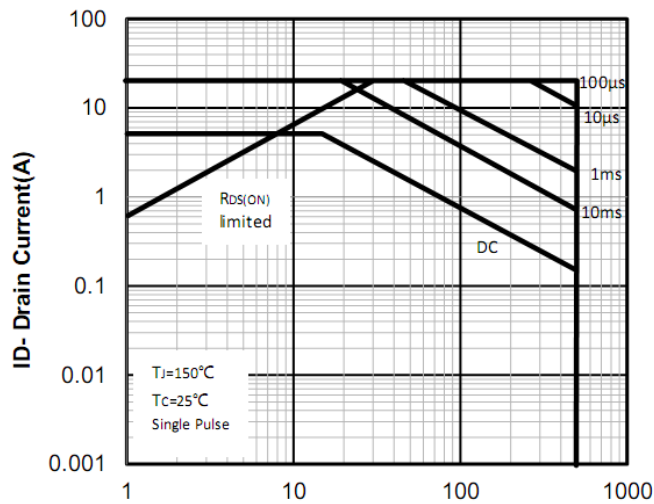


Figure9: Vds Drain -Source Voltage (V)

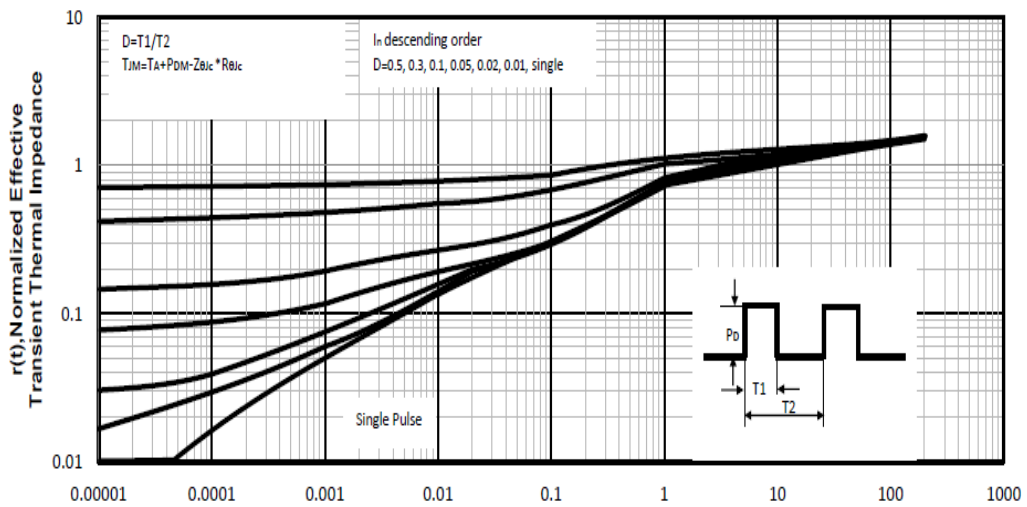


Figure10: Square Wave Pulse Duration (sec)

Test Circuit and Waveform:

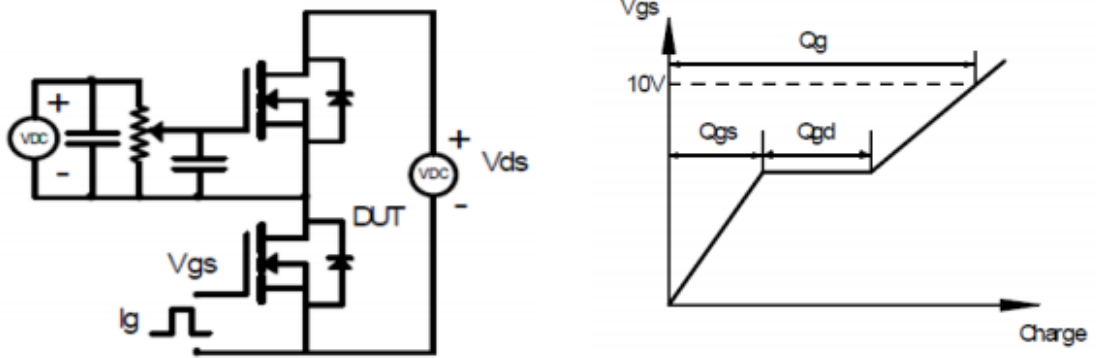


Figure A Gate Charge Test Circuit & Waveforms

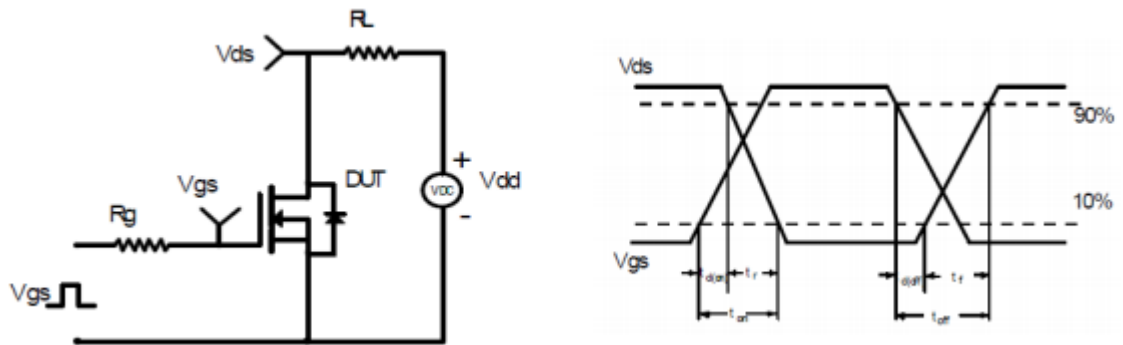


Figure B Switching Test Circuit & Waveforms

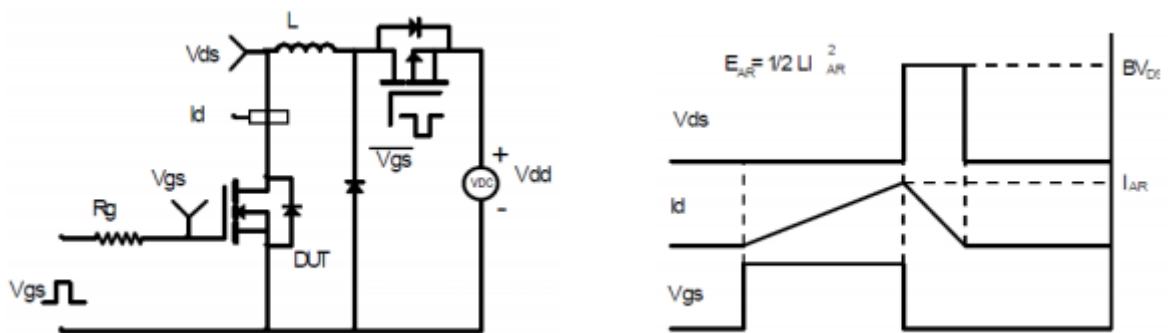
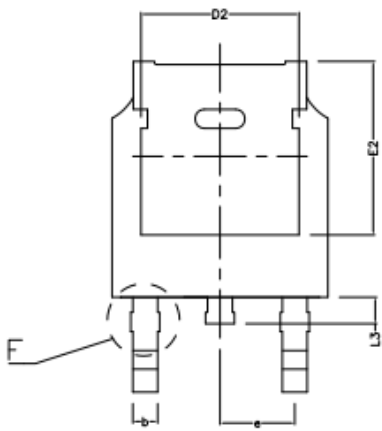


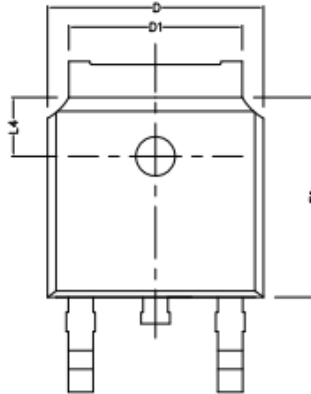
Figure C Unclamped Inductive Switching Circuit & Waveforms



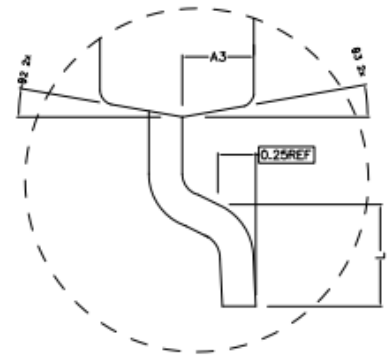
TO-252 Package Outline Dimensions (Units: mm)



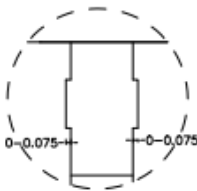
BOTTOM VIEW



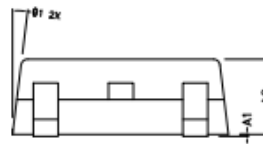
TOP VIEW



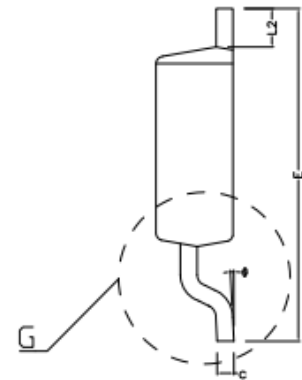
DETAIL G



DETAIL F



SIDE VIEW



SIDE VIEW

COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A1	2.440	2.540	2.640
A2	4.600	4.700	4.800
A3	2.730	2.830	2.930
b1	0.750	0.800	0.850
b2	1.230	1.280	1.330
c	0.450	0.500	0.550
D	10.060	10.160	10.260
E	28.650	28.850	29.050
E1	15.770	15.870	15.970
e	2.54TYPE		
L1	6.68REF		
L2	3.30REF		
L3	12.830	12.980	13.130
theta 1	5° TYPE		
theta 2	5° TYPE		
theta 3	5° TYPE		
theta 4	5° TYPE		