Features

- ♦Low On-Resistance
- ♦Fast Switching
- ♦100% Avalanche Tested
- ♦Repetitive Avalanche Allowed up to Tjmax
- ♦Lead-Free, RoHS Compliant

V_{DS}	30	V
$R_{DS(on),Typ}$	4.5	mΩ
I_D	80	A

D

S

G

TO-252

Description

PTD3006 designed by the trench process techniques to achieve extremely low on-resistance. Additional features of this design can operate at high junction temperature, fast switching speed and improved repetitive avalanche rating . These features combine to make this design an extremely efficient and reliable device for use in Motor applications and a wide variety of other applications.

Absolute Maximum Ratings

Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only;and functional operation of the device at these or any other condition beyond those indicated in the specifications is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions. Ambient temperature (Ta) is 25°C, unless otherwise specified.

Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{GS}	Gate-Source Voltage		±20	V
$V_{(BR)DSS}$	Drain-Source Breakdown 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	T_C=25°C	80	A
Mounted on Large Heat Sink				
I_{DM}	Pulse Drain Current Tested (Sillicon Limit)	T_C=25°C	320	A
I_D	Continuous Drain current@V_{GS}=10V (See Fig2)	T_C=25°C	80	A
P_D	Maximum Power Dissipation	T_C=25°C	58	W
$R_{\theta JC}$	Thermal Resistance-Junction to Case		1.98	°C/W
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed ②		225	mJ

Symbol	Parameter		Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T_J = 25°C (unless otherwise stated)							
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage		V_{GS}=0V I_D=250μA	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current(Tc=25℃)		V_{DS}=24V,V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current(Tc=125℃)		V_{DS}=24V,V_{GS}=0V	--	--	100	μA
I_{GSS}	Gate-Body Leakage Current		V_{GS}=±20V,V_{DS}=0V	--	--	±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage		V_{DS}=V_{GS},I_D=250μA	1.0	1.6	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance①		V_{GS}=10V, I_D=40A	--	4.5	6.0	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance①		V_{GS}=4.5V, I_D=20A	--	5.5	7.5	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated)							
C_{iss}	Input Capacitance		V_{DS}=15V,V_{GS}=0V, f=1MHz	--	1350	--	pF
C_{oss}	Output Capacitance			--	190	--	pF
C_{rss}	Reverse Transfer Capacitance			--	115	--	pF
Q_g	Total Gate Charge	V_{GS}=10V	V_{DS}=15V,I_D=18A, V_{GS}=10V	--	38	--	nC
		V_{GS}=4.5V			15		nC
Q_{gs}	Gate-Source Charge			--	8	--	nC
Q_{gd}	Gate-Drain Charge			--	7	--	nC
Switching Characteristics							
$t_{d(on)}$	Turn-on Delay Time		V_{DD}=15V, I_D=10A, R_G=4.7Ω, V_{GS}=10V	--	13	--	nS
t_r	Turn-on Rise Time			--	12	--	nS
$t_{d(off)}$	Turn-Off Delay Time			--	19	--	nS
t_f	Turn-Off Fall Time			--	12	--	nS
Source- Drain Diode Characteristics@ T_J = 25°C (unless otherwise stated)							
I_{SD}	Source-drain current(Body Diode)		T_C=25℃	--	--	80	A
V_{SD}	Forward on voltage		I_S=40A,V_{GS}=0V	--	--	1.2	V
t_{rr}	Reverse Recovery Time		T_j=25℃,I_{sd}=40A, V_{GS}=0V di/dt=100A/μs	--	22	--	nS
Q_{rr}	Reverse Recovery Charge				11	--	nC

Note:

① Pulse width ≤ 300μs; duty cycle≤ 2%.

② Limited by Tjmax, starting TJ = 25°C, L = 0.5mH,R_G = 25Ω, I_{AS} = 30A, V_{GS} =10V. Part not recommended for use above this value

③ Repetitive rating; pulse width limited by max. junction temperature.

Typical Characteristics

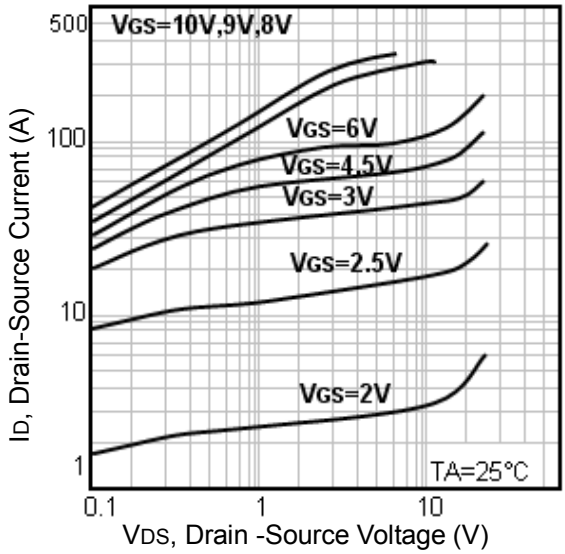

Fig1. Typical Output Characteristics

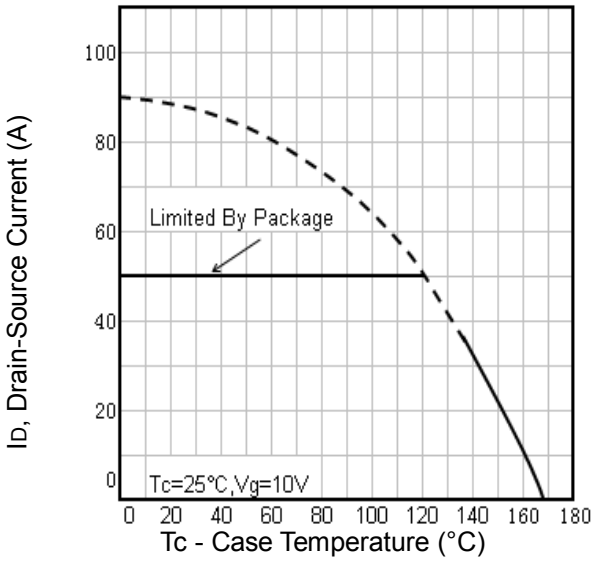

Fig2. Maximum Drain Current Vs.Case Temperature

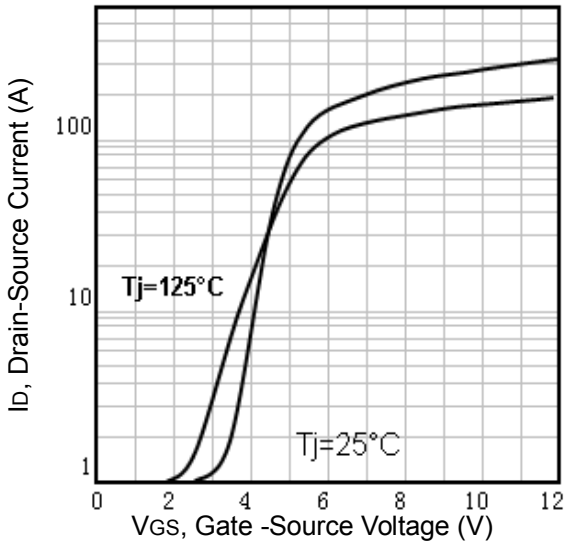

Fig3. Typical Transfer Characteristics

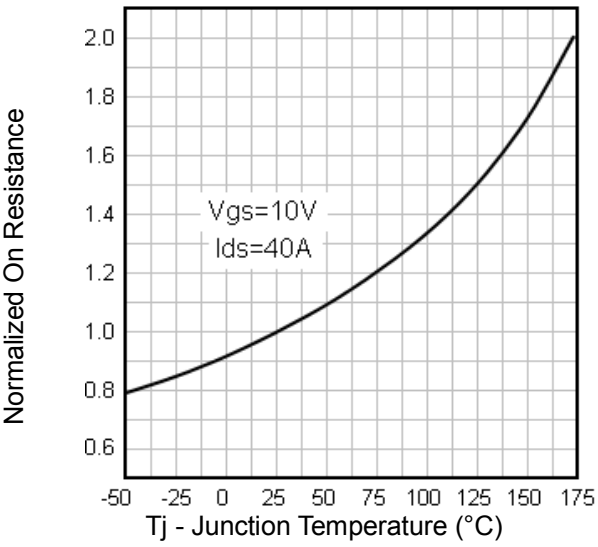

Fig4. Normalized On-Resistance Vs. Temperature

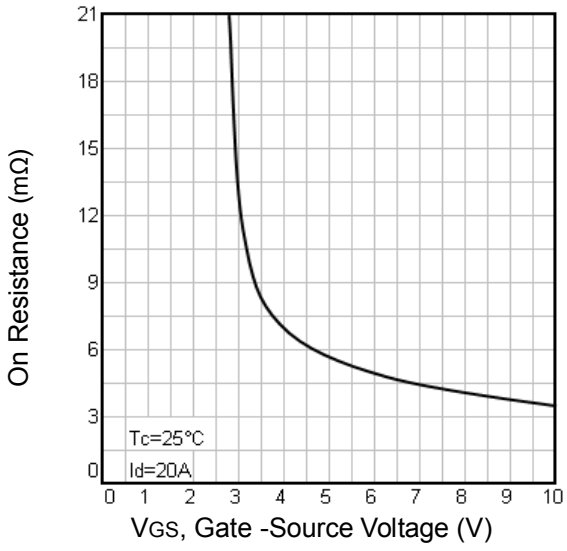

Fig5. On Resistance Vs. Gate -Source Voltage

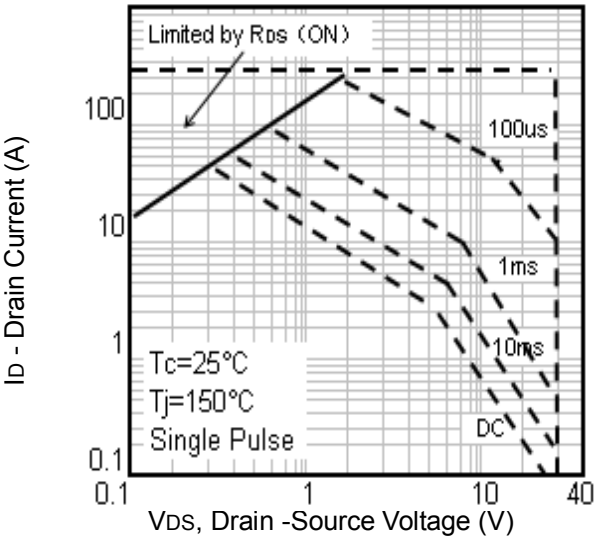

Fig6. Maximum Safe Operating Area

Typical Characteristics

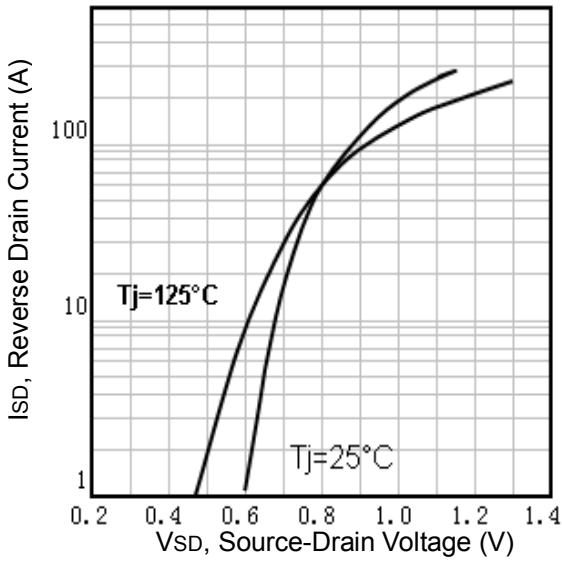

Fig7. Typical Source-Drain Diode Forward Voltage

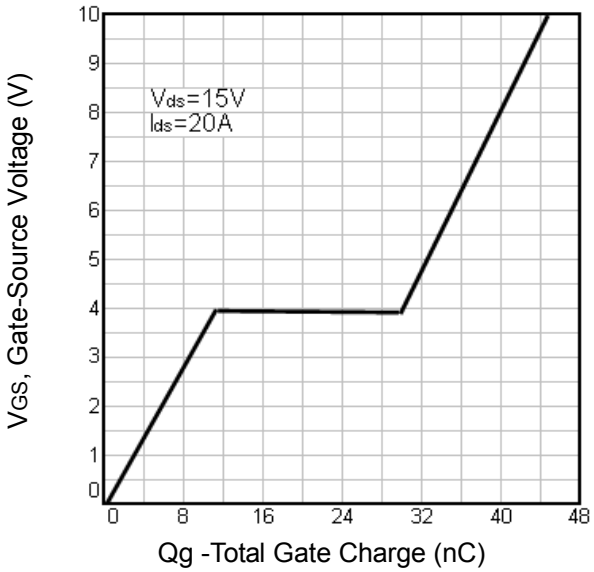

Fig8. Typical Gate Charge Vs.Gate-Source Voltage

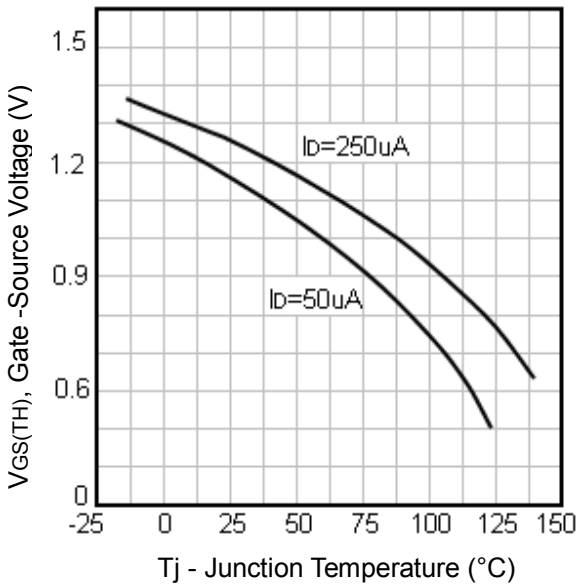

Fig9. Threshold Voltage Vs. Temperature

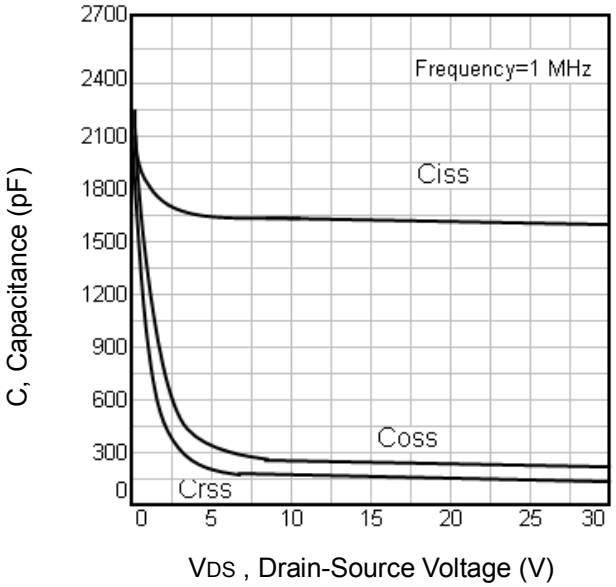

Fig10. Typical Capacitance Vs.Drain-Source Voltage

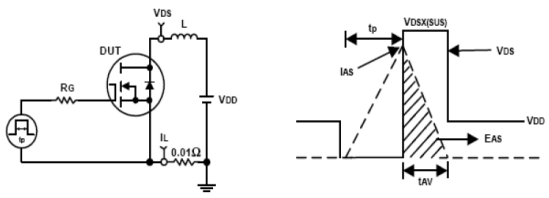

Fig11. Unclamped Inductive Test Circuit and waveforms

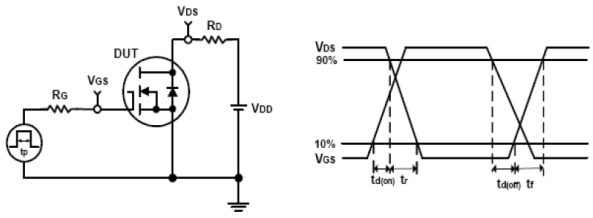

Fig12. Switching Time Test Circuit and waveforms

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