

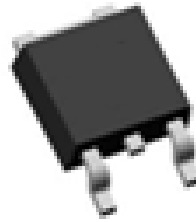
PTD12N10
100V/12A N-Channel Advanced PowerMOSFET

Features

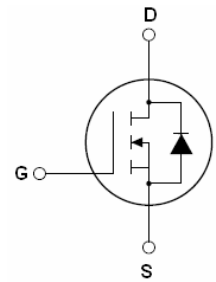
- $V_{DS}=100V$; $I_D=12A$
 $R_{DS(ON)} < 140m\Omega$ @ $V_{GS}=10V$ (Typ:90m Ω)
- High UIS and UIS 100% Test

Application

- Power switching application
- Motor control
- Synchronous-rectification applications



To-252 Top View



Schematic Diagram

Absolute Maximum Ratings (TA=25°C)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage ($V_{GS}=0V$)	90	V
V_{GS}	Gate-Source Voltage ($V_{DS}=0V$)	± 20	V
$I_{D(DC)}$	Drain Current (DC) at $T_c=25^\circ C$ (Note 1)	12	A
$I_{DM(pulse)}$	Drain Current-Continuous@ Current-Pulsed (Note 2)	21	A
P_D	Maximum Power Dissipation($T_c=25^\circ C$)	24	W
E_{AS}	Single Pulse Avalanche Energy (Note 3)	3.1	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 175	$^\circ C$
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	8.3	$^\circ C/W$

- Notes**
1. Calculated continuous current based on maximum allowable junction temperature.
 2. Repetitive Rating: Pulse width limited by maximum junction temperature
 3. EAS condition: $T_J=25^\circ C, V_{DD}=50V, V_G=10V, R_G=25\Omega$

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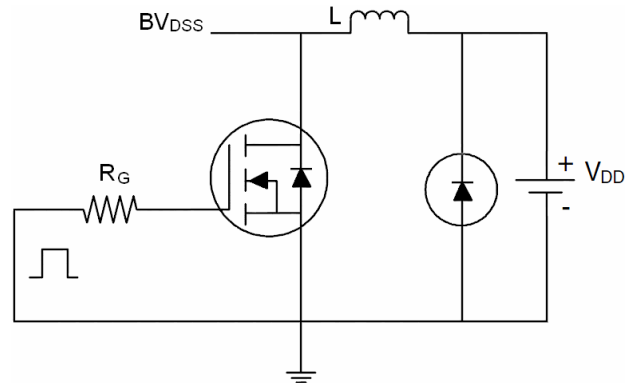
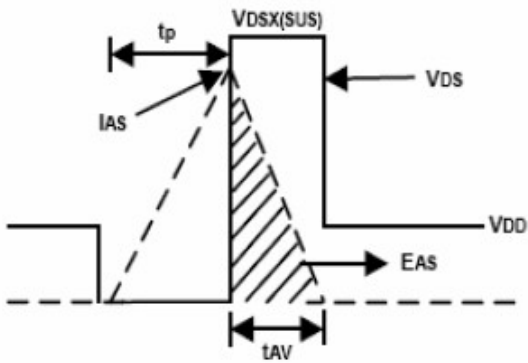
Electrical Characteristics (TA=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	90			V
I _{DSS}	Zero Gate Voltage Drain Current(Tc=25°C)	V _{DS} =90V, V _{GS} =0V			1	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	2.0	3.0	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =4.5A		90	140	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =4A		100	160	mΩ
Dynamic Characteristics						
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =4.5A	5			S
C _{iss}	Input Capacitance	V _{DS} =50V, V _{GS} =0V f=1.0MHz		208		PF
C _{oss}	Output Capacitance			28		PF
C _{rss}	Reverse Transfer Capacitance			1.6		PF
Q _g	Total Gate Charge	V _{DS} =50V, I _D =4.5A V _{GS} =10V		4.3		nC
Q _{gs}	Gate-Source Charge			1.6		nC
Q _{gd}	Gate-Drain Charge			1.2		nC
Switching Times						
t _{d(on)}	Turn-on Delay Time	V _{DS} =50V, R _L =8.6Ω V _{GS} =10V, R _G =3Ω		14		nS
t _r	Turn-on Rise Time			3.6		nS
t _{d(off)}	Turn-Off Delay Time			21		nS
t _f	Turn-Off Fall Time			2.7		nS
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current(Body Diode)			7		A
V _{SD}	Forward On Voltage ^(Note 1)	T _J =25°C, I _{SD} =2A, V _{GS} =0V		0.8	1.2	V
t _{rr}	Reverse Recovery Time ^(Note 1)	T _J =25°C, I _F =4.5A di/dt=500A/μs		32		nS
Q _{rr}	Reverse Recovery Charge ^(Note 1)				39	

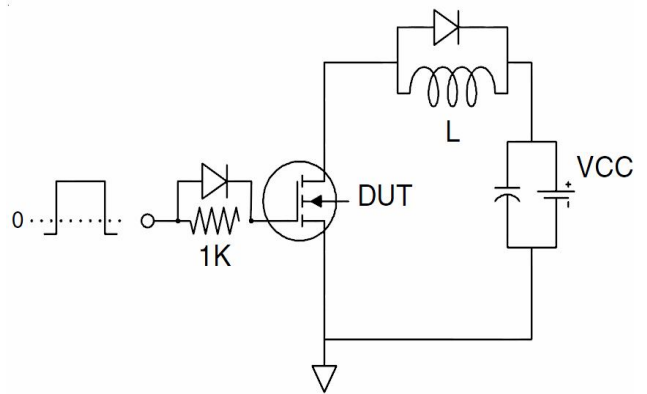
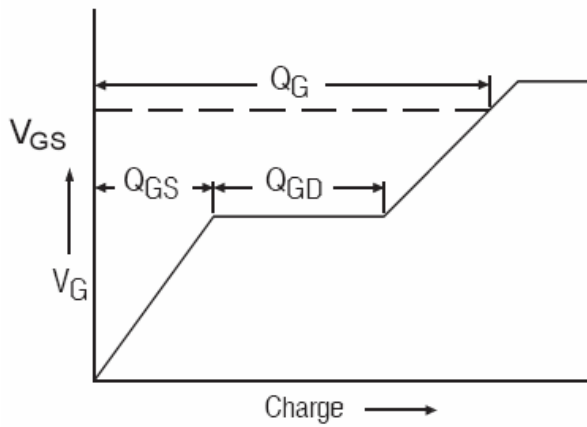
Notes 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 1.5%, Starting T_J=25°C

Test Circuit

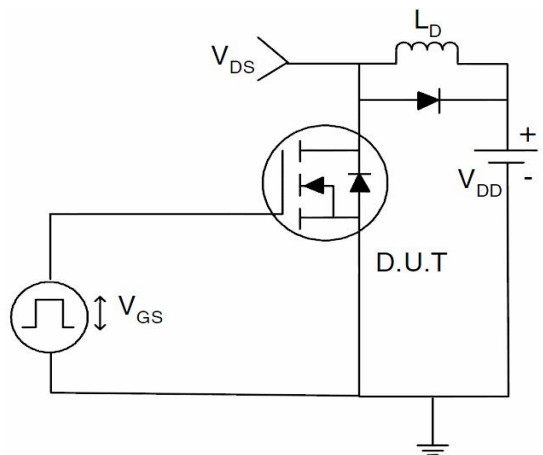
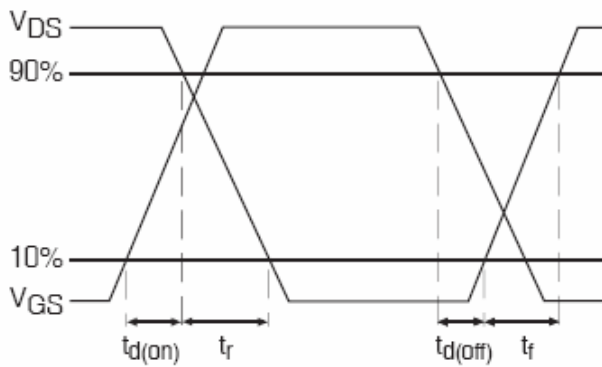
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit:



3) Switch Time Test Circuit:



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

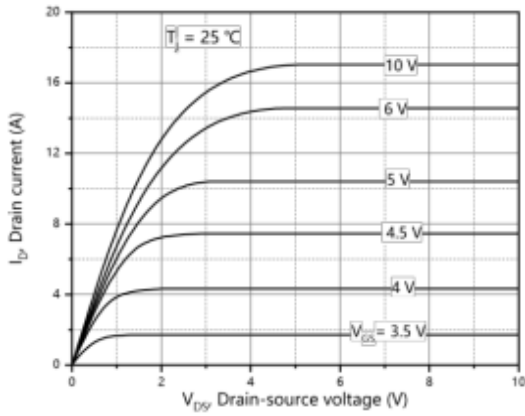


Figure 1, Typ. output characteristics

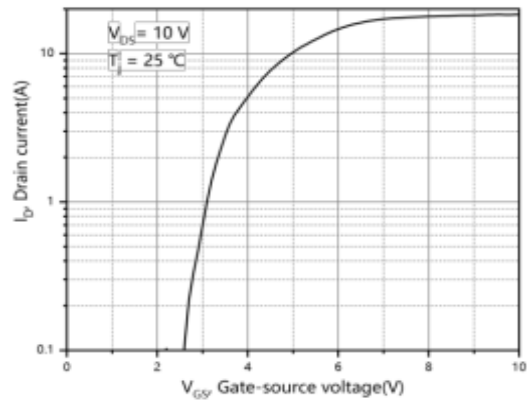


Figure 1, Typ. transfer characteristics

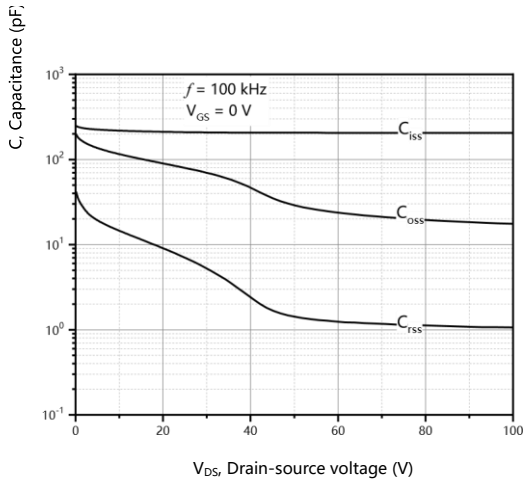


Figure 3, Typ. capacitances

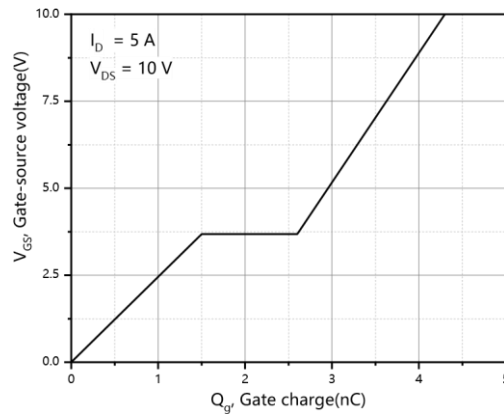


Figure 4, Typ. gate charge

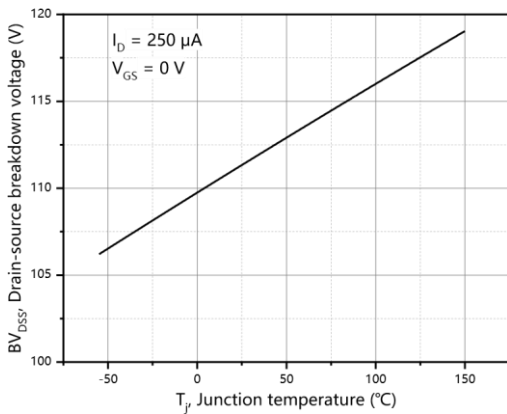


Figure 5, Drain-source breakdown voltage

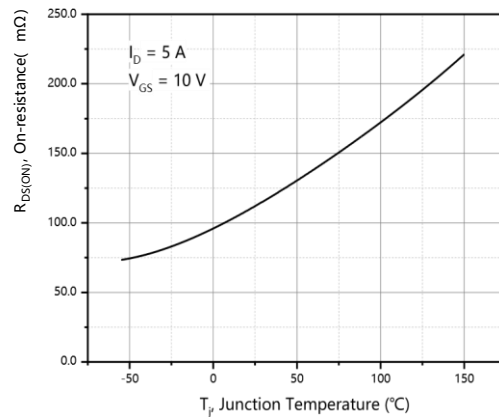


Figure 6, Drain-source on-state resistance

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