

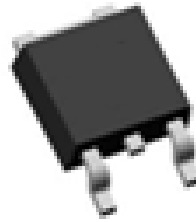
**PTD12N10**  
**100V/12A N-Channel Advanced PowerMOSFET**

**Features**

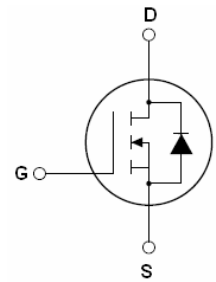
- $V_{DS}=100V$ ;  $I_D=12A$   
 $R_{DS(ON)} < 140m\Omega$  @  $V_{GS}=10V$  (Typ:90m $\Omega$ )
- High UIS and UIS 100% Test

**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 ( $V_{DS}=0V$ )	$\pm 20$	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:  $T_J=25^\circ C, V_{DD}=50V, V_G=10V, R_G=25\Omega$

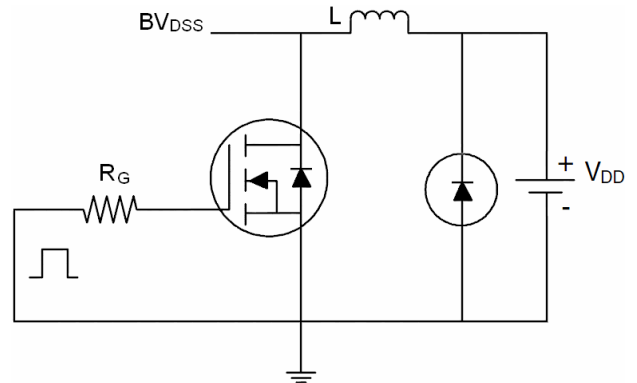
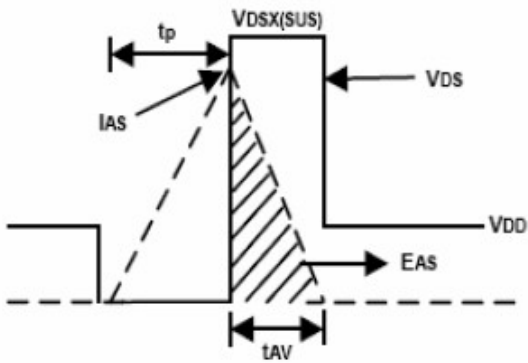
**PTD12N10**
**100V/12A N-Channel Advanced PowerMOSFET**
**Electrical Characteristics (TA=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	90			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current(Tc=25°C)	V <sub>DS</sub> =90V, V <sub>GS</sub> =0V			1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V			±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	2.0	3.0	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =4.5A		90	140	mΩ
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A		100	160	mΩ
<b>Dynamic Characteristics</b>						
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =4.5A	5			S
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V f=1.0MHz		208		PF
C <sub>oss</sub>	Output Capacitance			28		PF
C <sub>rss</sub>	Reverse Transfer Capacitance			1.6		PF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =50V, I <sub>D</sub> =4.5A V <sub>GS</sub> =10V		4.3		nC
Q <sub>gs</sub>	Gate-Source Charge			1.6		nC
Q <sub>gd</sub>	Gate-Drain Charge			1.2		nC
<b>Switching Times</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =50V, R <sub>L</sub> =8.6Ω V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω		14		nS
t <sub>r</sub>	Turn-on Rise Time			3.6		nS
t <sub>d(off)</sub>	Turn-Off Delay Time			21		nS
t <sub>f</sub>	Turn-Off Fall Time			2.7		nS
<b>Source-Drain Diode Characteristics</b>						
I <sub>SD</sub>	Source-Drain Current(Body Diode)			7		A
V <sub>SD</sub>	Forward On Voltage <sup>(Note 1)</sup>	T <sub>J</sub> =25°C, I <sub>SD</sub> =2A, V <sub>GS</sub> =0V		0.8	1.2	V
t <sub>rr</sub>	Reverse Recovery Time <sup>(Note 1)</sup>	T <sub>J</sub> =25°C, I <sub>F</sub> =4.5A di/dt=500A/μs		32		nS
Q <sub>rr</sub>	Reverse Recovery Charge <sup>(Note 1)</sup>			39		nC

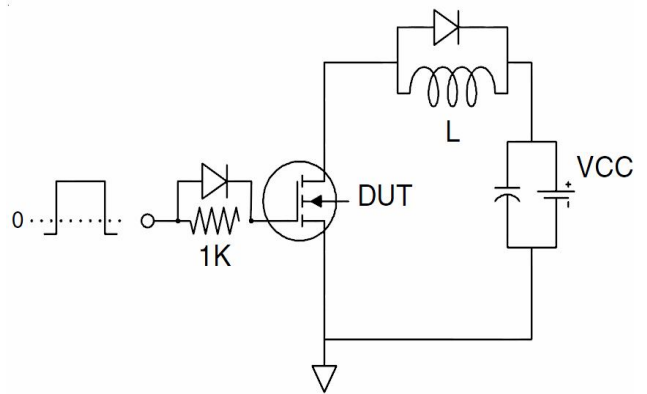
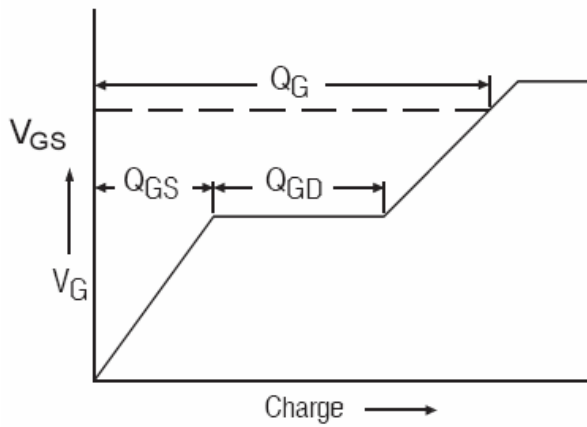
Notes 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 1.5%, Starting T<sub>J</sub>=25°C

**Test Circuit**

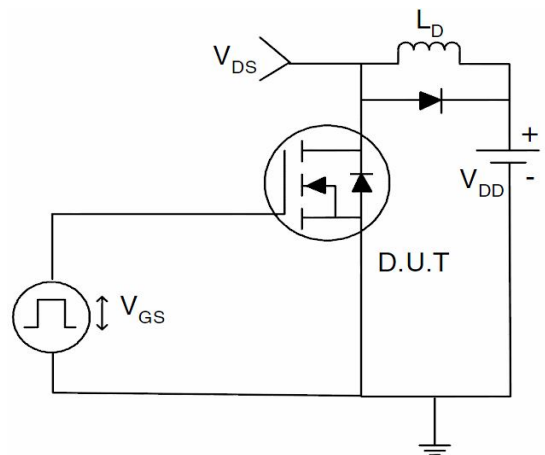
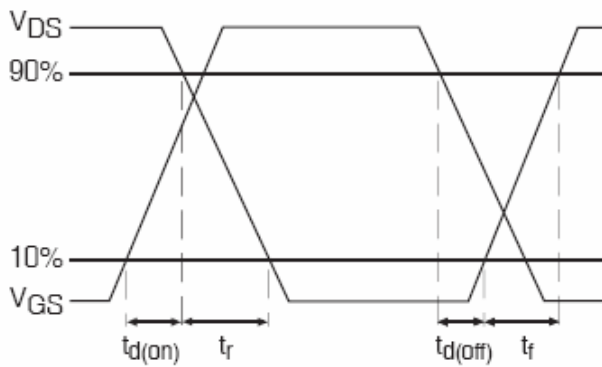
**1)  $E_{AS}$  Test Circuits**



**2) Gate Charge Test Circuit:**



**3) Switch Time Test Circuit:**



**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)**

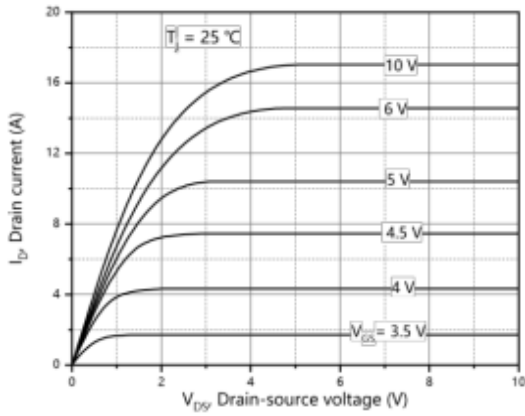


Figure 1, Typ. output characteristics

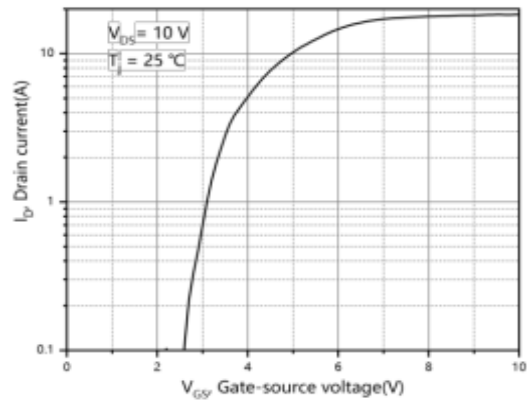


Figure 1, Typ. transfer characteristics

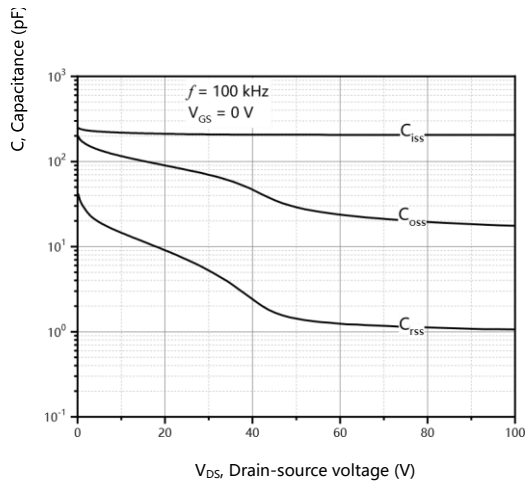


Figure 3, Typ. capacitances

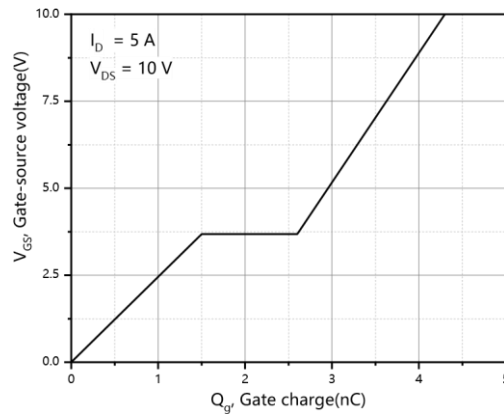


Figure 4, Typ. gate charge

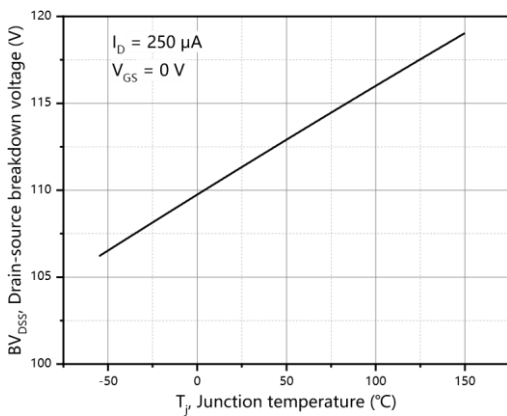


Figure 5, Drain-source breakdown voltage

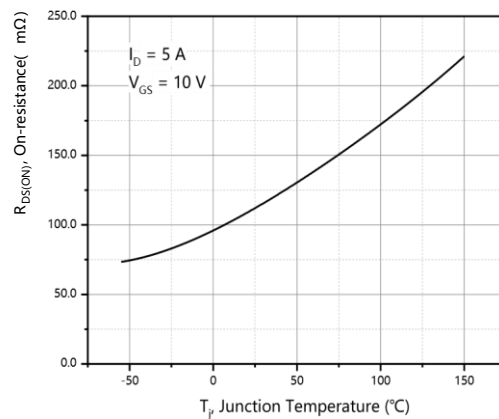


Figure 6, Drain-source on-state resistance