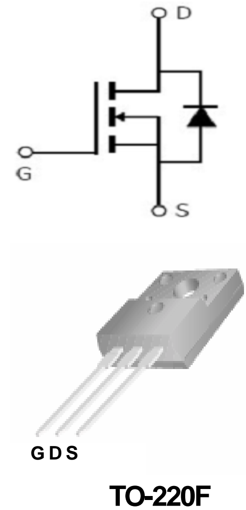
PTF12N65

650V/12A N-Channel Advanced Power MOSFET

Features

- $R_{DS(on)}$ (Typical 0.5Ω)@V_{GS}=10V
- Improved dv/dt Capability, High Ruggedness
- 100% Avalanche Tested
- Maximum Junction Temperature Range (150°C)



TO-220F

Absolute Maximum Ratings

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Symbol	Parameter		Rating	Unit
Common Ratings (T_J=25°C Unless Otherwise Noted)				
V_{GS}	Gate-Source Voltage		±30	V
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage		650	V
T_J	Maximum Junction Temperature		-50 to 150	°C
T_{STG}	Storage Temperature Range		–50 to 150	°C
I_S	Diode Continuous Forward Current		12	A
Mounted on Large Heat Sink (T_J =25°C Unless Otherwise Noted)				
I_{DM}	Pulse Drain Current Tested (Sillicon Limit) (Note1)		48	A
I_D	Continuous Drain current@V_{GS}=10V	T_C =25°C	12	A
P_D	Maximum Power Dissipation		50	W
E_{AS}	Sing Pulsed Avalanche Energy (Note2)		359	mJ
$R_{\theta JC}$	Thermal Resistance Junction−to−Case		2.5	°C/W
$R_{\theta JA}$	Thermal Resistance Junction−to−Ambient		62.5	°C/W

Note :

1. Repetitive Rating:Pulse width limited by maximum junction temperature.
2. IL=11.8mH,IAS=7.8 A,VDD=50V,Tj=25°C

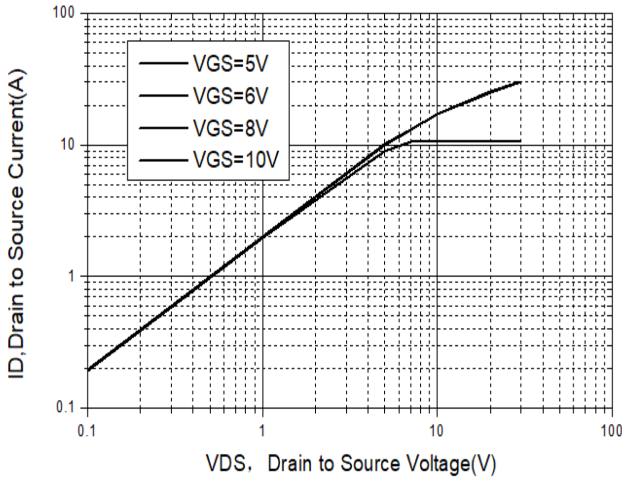
Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	650	--	--	V
I_{DSS}	Zero Gate Voltage Drain current(Tc=25℃)	VDS=650V,VGS=0V	--	--	1	μA
I_{GSS}	Gate-Body Leakage Current	VGS=±30V,VDS=0V	--		±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	VDS=VGS,ID=250μA	3	4	5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance note A	VGS=10V,ID=6A	--	0.5	0.65	Ω
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated) note B						
C_{iss}	Input Capacitance	VDS=25V,VGS=0V, f=1MHz	--	1582	--	pF
C_{oss}	Output Capacitance		--	178	--	pF
C_{rss}	Reverse Transfer Capacitance		--	20	--	pF
Q_g	Total Gate Charge	VDS=520V,ID=10A VGS=10V	--	41	--	nC
Q_{gs}	Gate-Source Charge		--	7	--	nC
Q_{gd}	Gate-Drain Charge		--	18.2	--	nC
Switching Characteristics note B						
$t_{d(on)}$	Turn-on Delay Time	VDS=325V ID=12A RG=25Ω VGS=10V	--	25	--	nS
t_r	Turn-on Rise Time		--	100	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	130	--	nS
t_f	Turn-Off Fall Time		--	100	--	nS
Source- Drain Diode Characteristics@ TJ = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	IS= 12A,VGS=0V	--	0.85	1.4	V

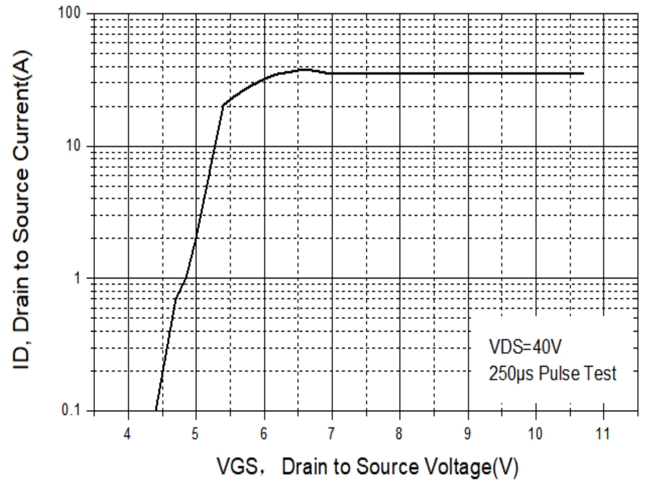
Note:

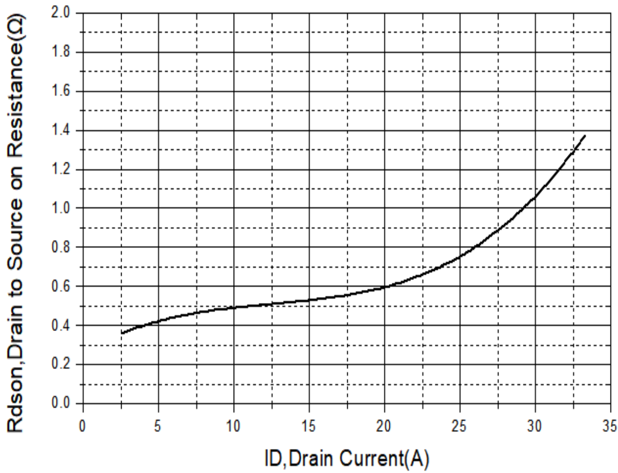
A: Pulse Test: pulse width ≤ 300 us, duty cycle ≤ 2%

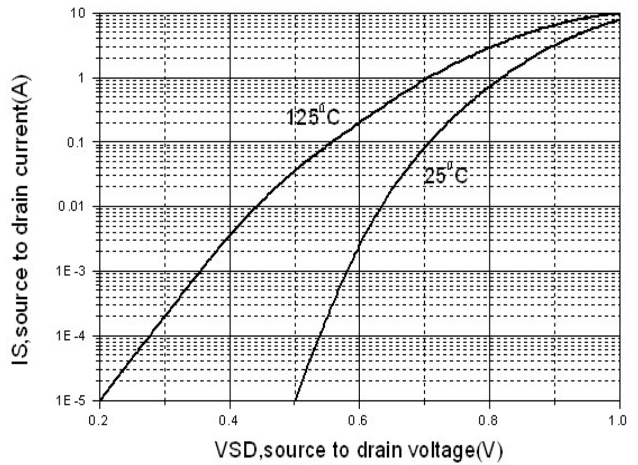
B:Guranteed by design, not subject to production testing.

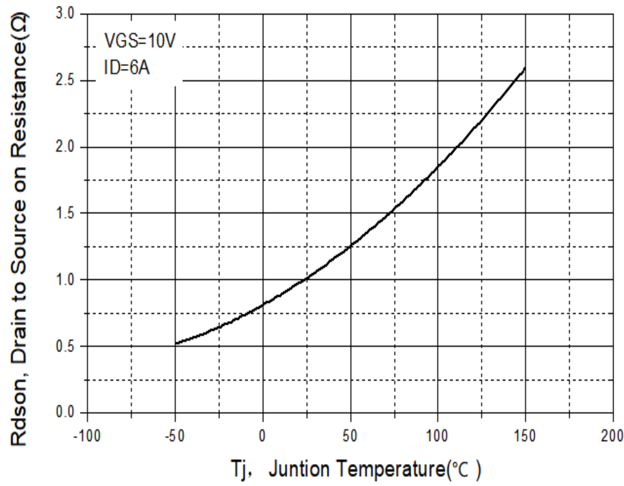
Typical characteristic curve:

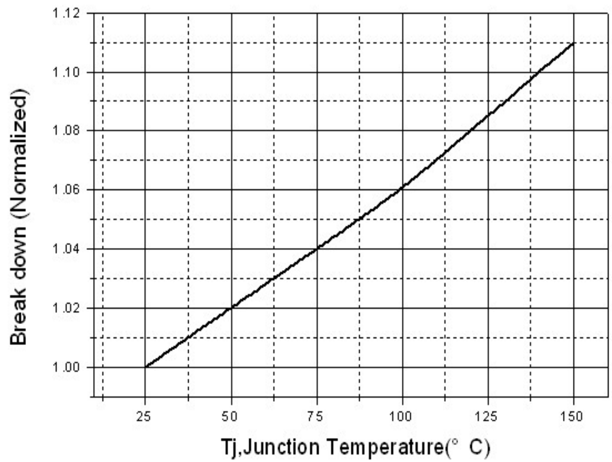


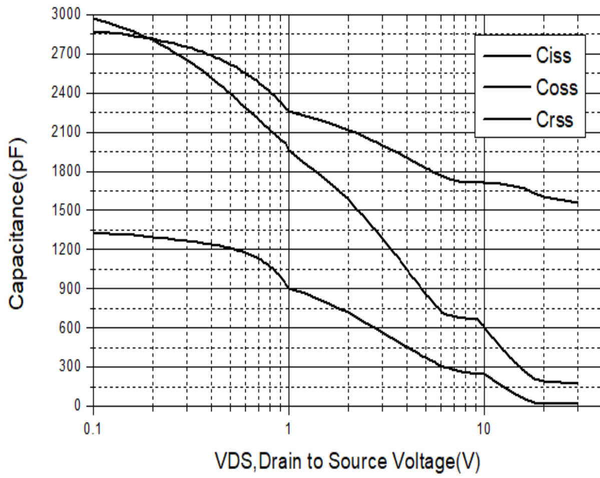


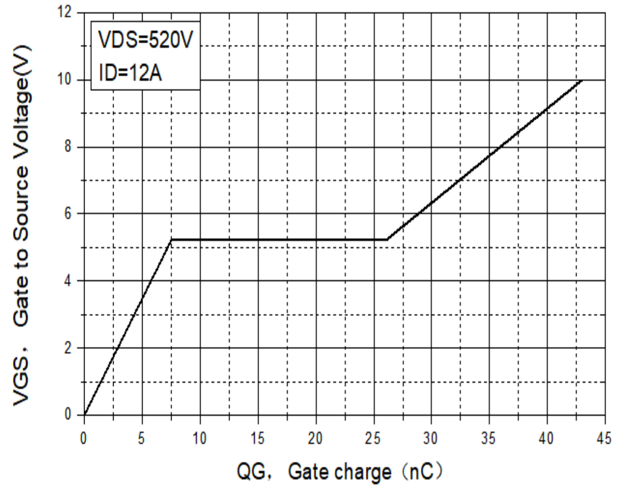


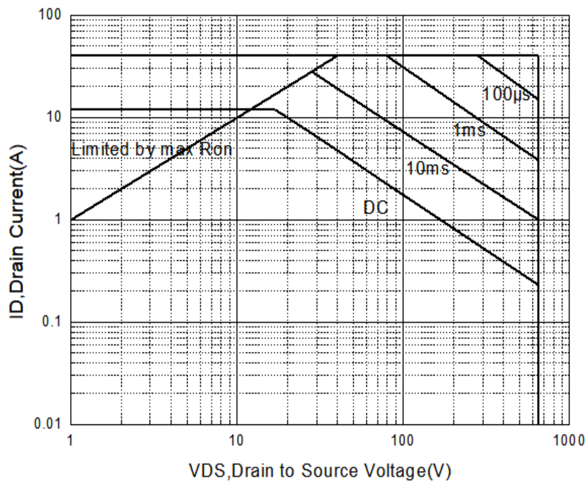


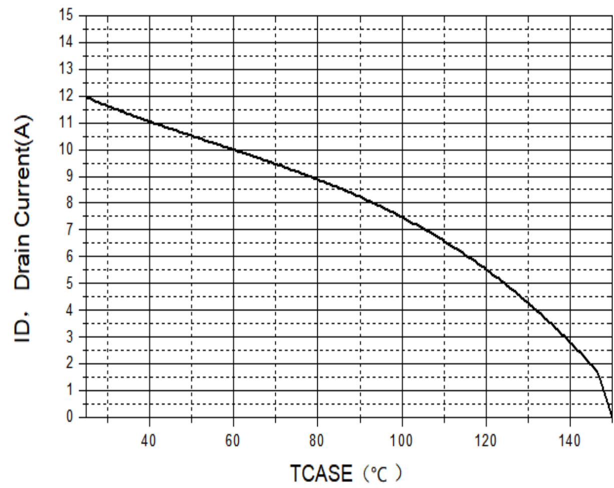


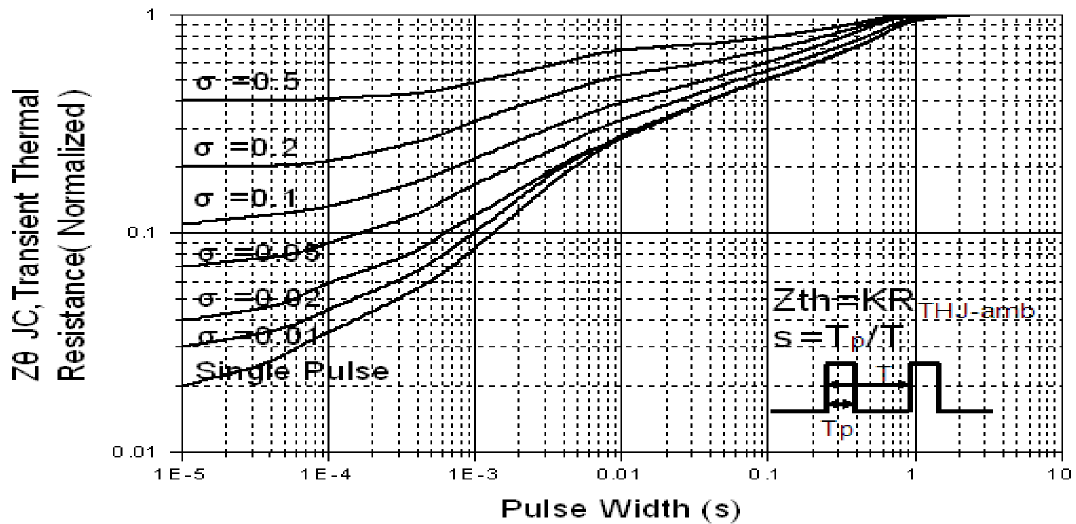



Capacitance(pF)
VDS,Drain to Source Voltage(V)
Ciss
Coss
Crss


VGS, Gate to Source Voltage(V)
QG, Gate charge（nC）
VDS=520V
ID=12A

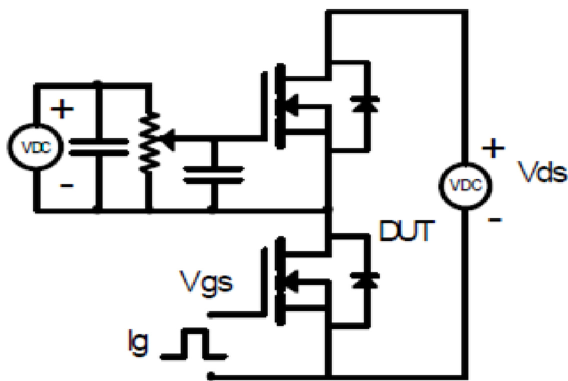

ID,Drain Current(A)
VDS,Drain to Source Voltage(V)
Limited by max Ron
100μs
1ms
10ms
DC

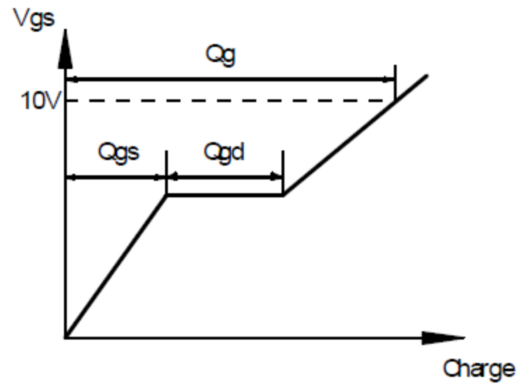

ID, Drain Current(A)
TCASE（℃）


Zθ JC, Transient Thermal Resistance(Normalized)
Pulse Width (s)
σ =0.5
σ =0.2
σ =0.1
σ =0.05
σ =0.02
σ =0.01
Single Pulse
Zth=KRTHJ-amb
s=Tp/T
Tp
T

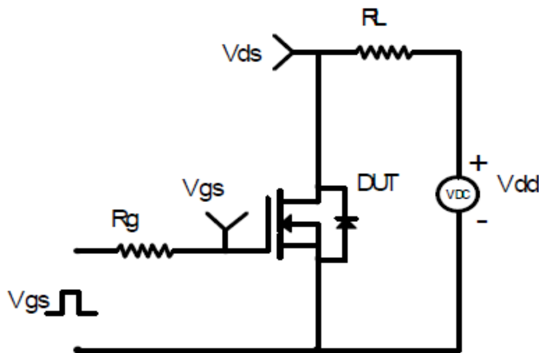
Test Circuit and Waveform

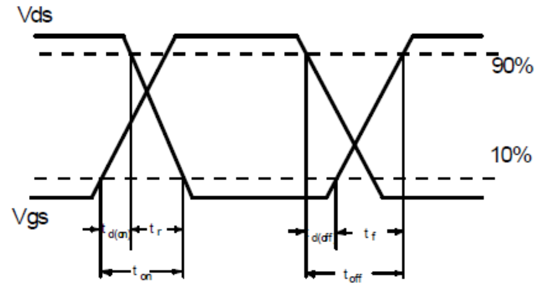
Gate Charge Test Circuit and Waveform



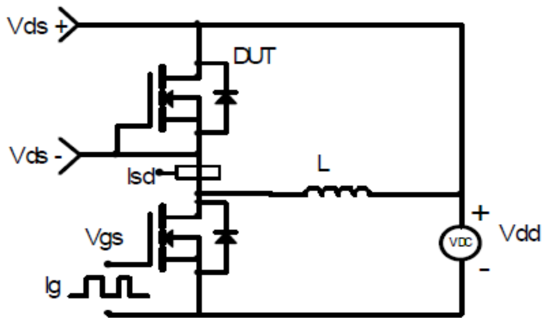


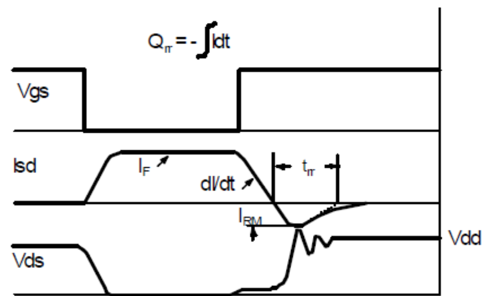
Switching time test circuit and waveform





Reverse Recovery Test Circuit and Waveform





Avalanche Test Circuit and Waveform