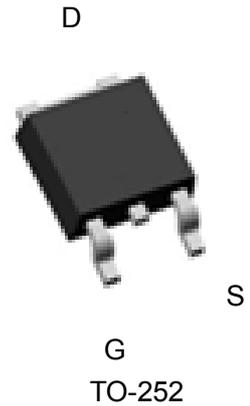




40V/80A N-Channel Advanced Power MOSFET

Features

- ◆ Low On-Resistance
- ◆ Fast Switching
- ◆ 100% Avalanche Tested
- ◆ Repetitive Avalanche Allowed up to T_{jmax}



Order Information

Product	Package	Marking	Packing
PTD4080	TO-252	PTD4080	2500PCS/REF

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 (T_a) is 25°C, unless otherwise specified.

Symbol	Parameter	Rating	Unit
Common Ratings ($T_c=25^\circ\text{C}$ Unless Otherwise Noted)			
V_{GS}	Gate-Source Voltage	± 20	V
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	40	V
T_J	Maximum Junction Temperature	150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
I_S	Diode Continuous Forward Current	$T_C = 25^\circ\text{C}$ 80	A
Mounted on Large Heat Sink			
I_{DM}	Pulse Drain Current Tested (Silicon Limit)	$T_C = 25^\circ\text{C}$ 320	A
I_D	Continuous Drain current@ $V_{GS}=10\text{V}$ (See Fig2)	$T_C = 25^\circ\text{C}$ 80	A
P_D	Maximum Power Dissipation	$T_C = 25^\circ\text{C}$ 58	W
$R_{\theta JC}$	Thermal Resistance-Junction to Case	1.98	$^\circ\text{C/W}$
Drain-Source Avalanche Ratings			
EAS	Avalanche Energy, Single Pulsed ②	178	mJ



40V/80A N-Channel Advanced Power MOSFET

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	40	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current(T _c =25°C)	V _{DS} =32V, 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	1.6	2.5	V
R _{DS(ON)}	Drain-Source On-State Resistance①	V _{GS} =10V, I _D =40A	--	4.8	7.0	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance①	V _{GS} =4.5V, I _D =10A	--	5.6	8.0	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1MHz	--	1400	--	pF
C _{oss}	Output Capacitance		--	190	--	pF
C _{rss}	Reverse Transfer Capacitance		--	150	--	pF
Q _g	Total Gate Charge	V _{DS} =20V, I _D =20A, V _{GS} =10V	--	37	--	nC
Q _{gs}	Gate-Source Charge		--	7	--	nC
Q _{gd}	Gate-Drain Charge		--	18	--	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =20V, I _D =10A, R _G =4.7Ω, V _{GS} =10V	--	16	--	nS
t _r	Turn-on Rise Time		--	15	--	nS
t _{d(off)}	Turn-Off Delay Time		--	20	--	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°C	--	--	80	A
V _{SD}	Forward on voltage	I _S =20A, V _{GS} =0V	--	--	1.2	V
t _{rr}	Reverse Recovery Time	T _j =25°C, I _{sd} =20A, V _{GS} =0V	--	29	--	nS
Q _{rr}	Reverse Recovery Charge		di/dt=100A/μs		16	--

Note:

- ① Pulse width ≤ 300μs; duty cycle ≤ 2%.
 ② Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH, R_G = 25Ω, I_{AS} = 40A, V_{GS} = 10V. Part not recommended for use above this value
 ③ Repetitive rating; pulse width limited by max. junction temperature.



40V/80A N-Channel Advanced Power MOSFET Typical Characteristics

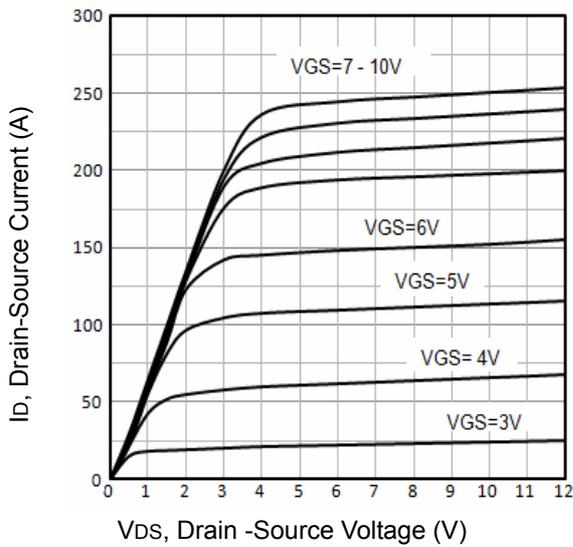


Fig1. Typical Output Characteristics

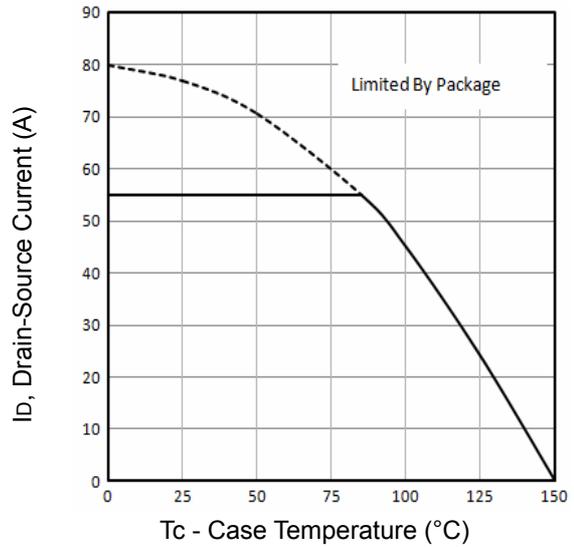


Fig2. Maximum Drain Current Vs. Case Temperature

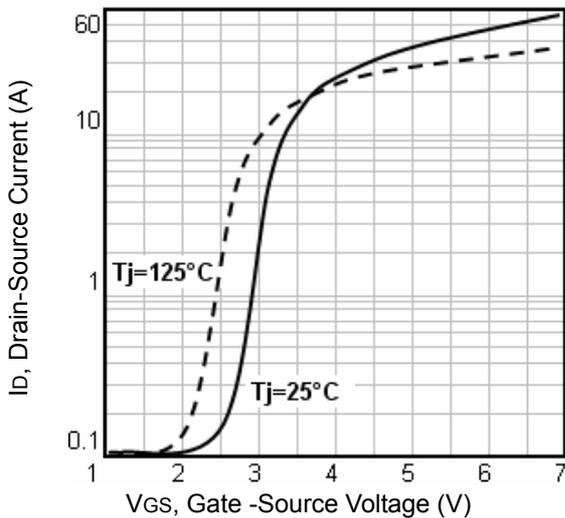


Fig3. Typical Transfer Characteristics

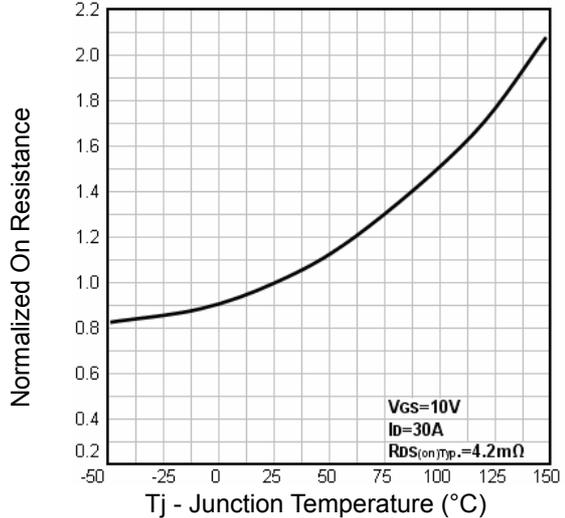


Fig4. Normalized On-Resistance Vs. Temperature

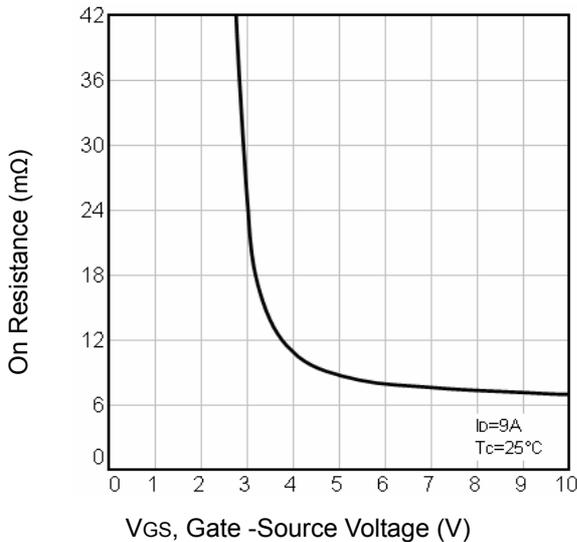


Fig5. On Resistance Vs. Gate-Source Voltage

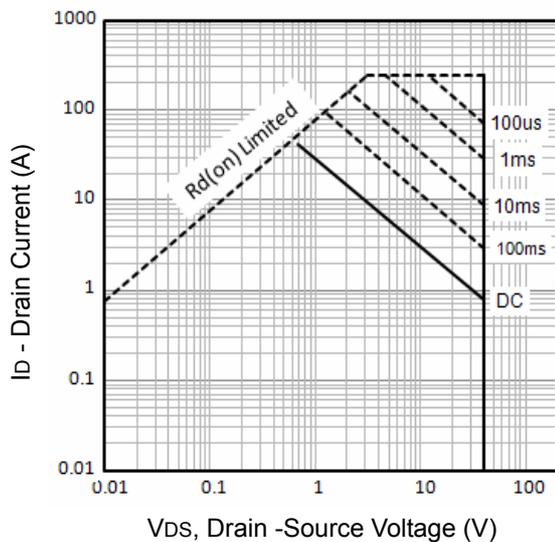


Fig6. Maximum Safe Operating Area

40V/80A N-Channel Advanced Power MOSFET

Typical Characteristics

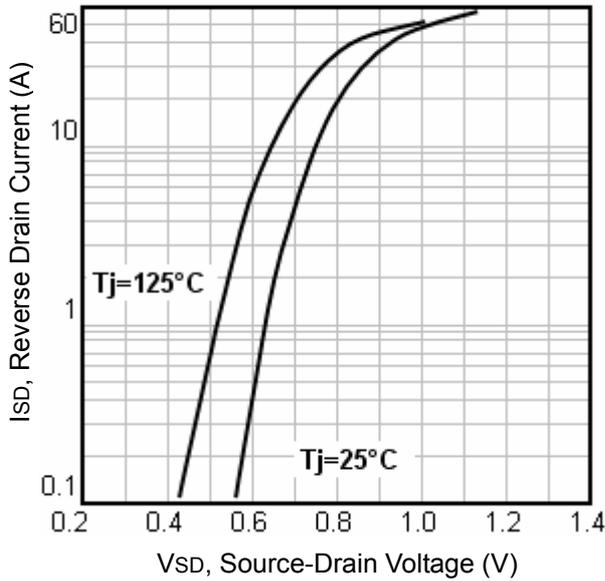


Fig7. Typical Source-Drain Diode Forward Voltage

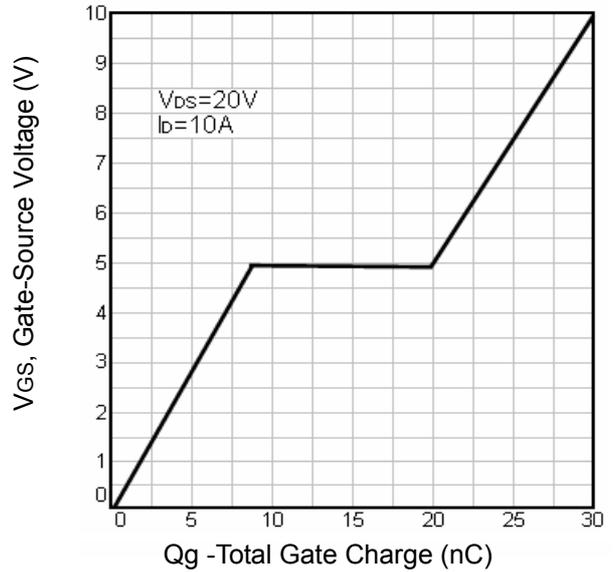


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

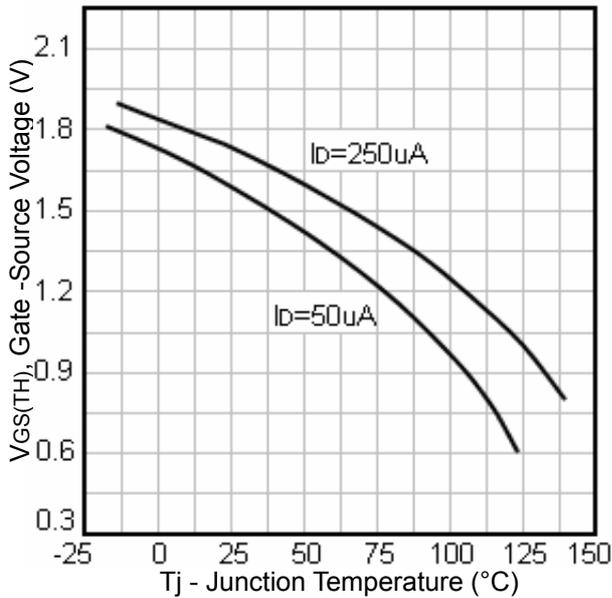


Fig9. Threshold Voltage Vs. Temperature

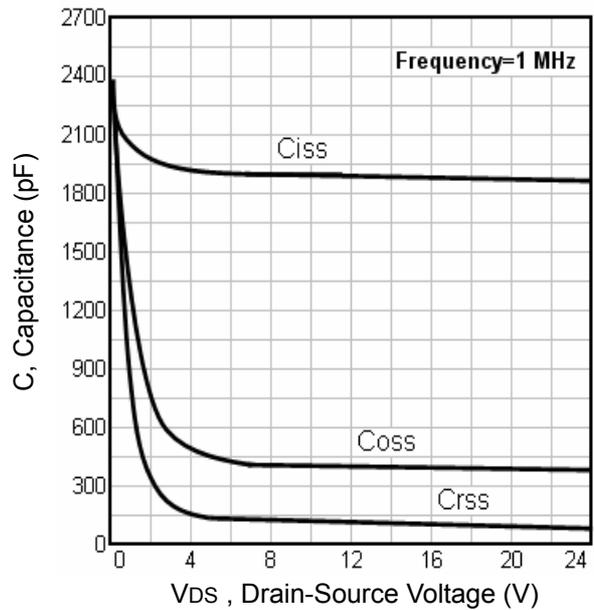


Fig10. Typical Capacitance Vs. Drain-Source Voltage

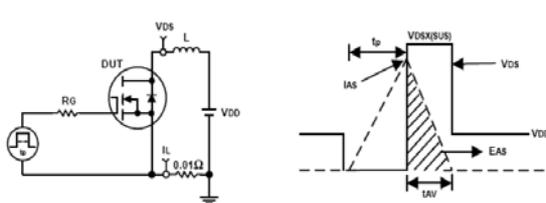


Fig11. Unclamped Inductive Test Circuit and waveforms

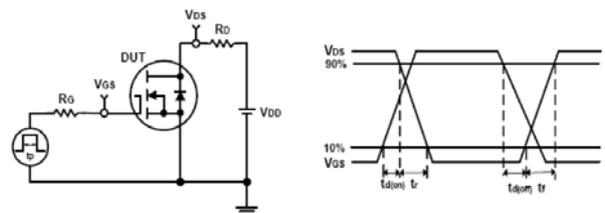
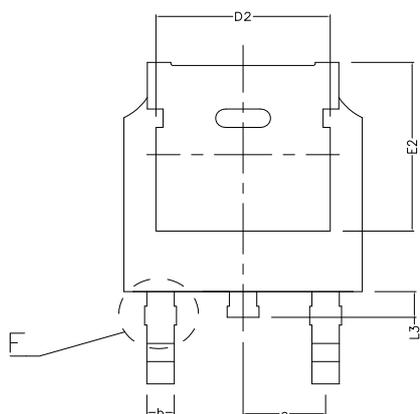
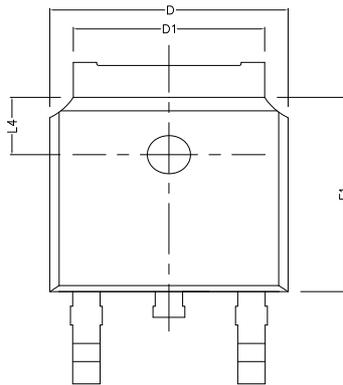


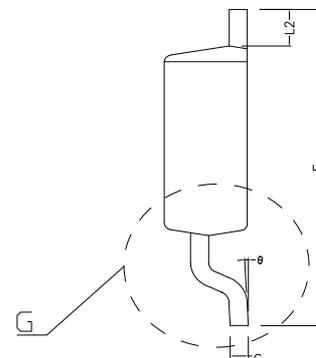
Fig12. Switching Time Test Circuit and waveforms

**40V/80A N-Channel Advanced Power MOSFET
TO-252 Package Outline Dimensions (Units: mm)**


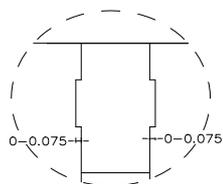
BOTTOM VIEW



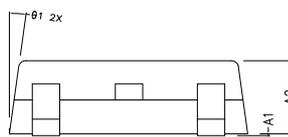
TOP VIEW



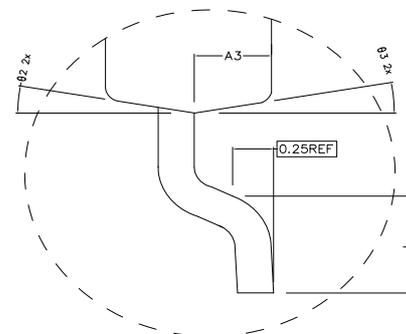
SIDE VIEW



DETAIL F



SIDE VIEW



DETAIL G

COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A1	0.000	0.100	0.150
A2	2.200	2.300	2.400
A3	1.020	1.070	1.120
b	0.710	0.760	0.810
c	0.460	0.508	0.550
D	6.500	6.600	6.700
D1	5.330REF		
D2	4.830REF		
E	9.900	10.100	10.300
E1	6.000	6.100	6.200
E2	5.600REF		
e	2.286TYPE		
L	1.400	1.550	1.700
L2	1.10REF		
L3	0.80REF		
L4	1.80REF		
θ	0~8°		
θ1	7° TYPE		
θ2	10° TYPE		
θ3	10° TYPE		