PFP6N80 / PFF6N80

800V N-Channel MOSFET

FEATURES

- Originative New Design
- 100% EAS Test
- Rugged Gate Oxide Technology
- Extremely Low Intrinsic Capacitances
- Remarkable Switching Characteristics
- Unequalled Gate Charge : 22.2 nC (Typ.)
- Extended Safe Operating Area
- Lower $R_{DS(ON)}$: 2.4 Ω (Typ.) @V_{GS}=10V

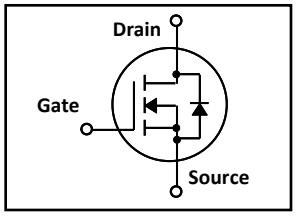
APPLICATION

- Low power battery chargers
- Switch mode power supply (SMPS)
- AC adaptors

BV_{DSS} = 800 V

$R_{DS(on)}$ = 2.4 Ω

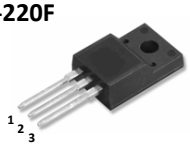
I_D = 5.5 A



TO-220

1.Gate 2. Drain 3. Source

TO-220F



1.Gate 2. Drain 3. Source

Absolute Maximum Ratings

T_C=25℃ unless otherwise specified

Symbol	Parameter	PFP6N80	PFF6N80	Units
V_{DSS}	Drain-Source Voltage	800		V
I_D	Drain Current – Continuous (T_C = 25°C)	5.5	5.5*	A
	Drain Current – Continuous (T_C = 100°C)	3.5	3.5*	A
I_{DM}	Drain Current – Pulsed (Note 1)	22	22*	A
V_{GS}	Gate-Source Voltage	±30		V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	600		mJ
I_{AR}	Avalanche Current (Note 1)	5.5		A
E_{AR}	Repetitive Avalanche Energy (Note 1)	17.9		mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.5		V/ns
P_D	Total Power Dissipation (TA=25°C) *	2.0		W
	Power Dissipation (T_C = 25°C)	179	60	W
	- Derate above 25°C	1.43	0.48	W/°C
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150		°C
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300		°C

* Drain current limited by maximum junction temperature.

Thermal Resistance Characteristics

Symbol	Parameter	PFP6N80	PFF6N80	Units
$R_{\theta JC}$	Junction-to-Case	0.7	2.1	°C/W
$R_{\theta JA}$	Junction-to-Ambient*	0.5	--	
$R_{\theta JA}$	Junction-to-Ambient	62.5	62.5	

Electrical Characteristics T_C=25°C unless otherwise specified

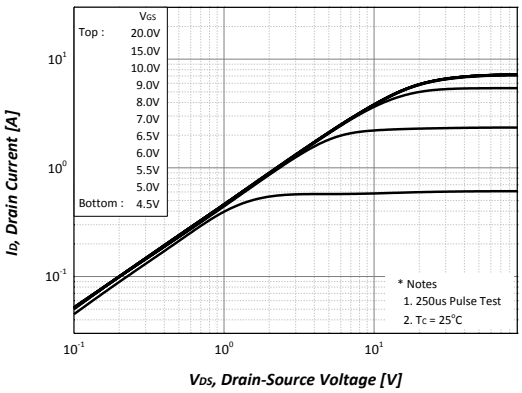
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
On Characteristics						
V_{GS}	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 uA	2.5	--	4.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 3.0 A	--	2.4	3.0	Ω
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 uA	800	--	--	V
ΔBV_{DSS} /ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250 uA, Referenced to25°C	--	0.56	--	V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 800 V, V_{GS} = 0 V	--	--	10	uA
		V_{DS} = 640 V, T_C = 125℃	--	--	100	uA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 30 V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -30 V, V_{DS} = 0 V	--	--	-100	nA
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	1175	1530	pF
C_{oss}	Output Capacitance		--	76	100	pF
C_{rss}	Reverse Transfer Capacitance		--	22	30	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Time	V_{DS} = 400 V, I_D = 6.0 A, R_G = 25 Ω, R_L = 67 Ω (Note 4,5)	--	26	55	ns
t_r	Turn-On Rise Time		--	18	40	ns
$t_{d(off)}$	Turn-Off Delay Time		--	53	110	ns
t_f	Turn-Off Fall Time		--	28	60	ns
Q_g	Total Gate Charge	V_{DS} = 640 V, I_D = 6.0 A, V_{GS} = 10 V (Note 4,5)	--	22.2	33	nC
Q_{gs}	Gate-Source Charge		--	8.5	--	nC
Q_{gd}	Gate-Drain Charge		--	4.2	--	nC
Source-Drain Diode Maximum Ratings and Characteristics						
I_S	Continuous Source-Drain Diode Forward Current		--	--	5.5	A
I_{SM}	Pulsed Source-Drain Diode Forward Current		--	--	22	
V_{SD}	Source-Drain Diode Forward Voltage	I_S = 6.0 A, V_{GS} = 0 V	--	--	1.5	V
trr	Reverse Recovery Time	I_S = 6.0 A, V_{GS} = 0 V di_F/dt = 100 A/us (Note 4)	--	530	--	ns
Qrr	Reverse Recovery Charge		--	4.3	--	uC

Notes ;

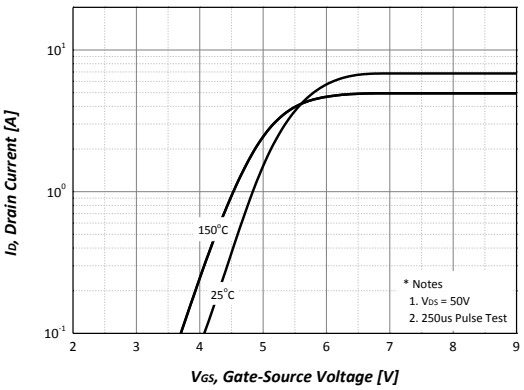
1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. I_{AS}=6.0A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C
3. I_{SD}≤6.0A, di/dt≤300A/μs, V_{DD}≤BV_{DSS} , Starting T_J=25°C
4. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
5. Essentially Independent of Operating Temperature

Typical Characteristics

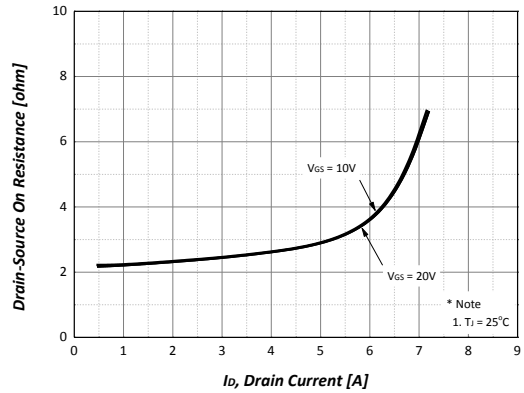
On Region Characteristics



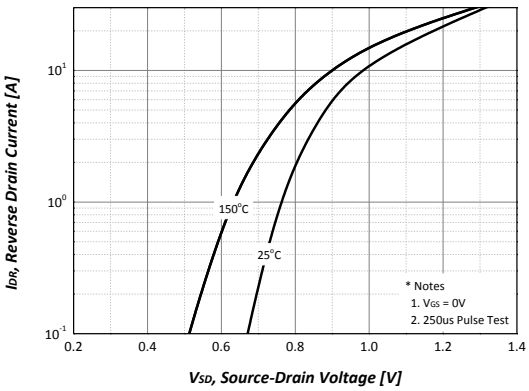
Transfer Characteristics



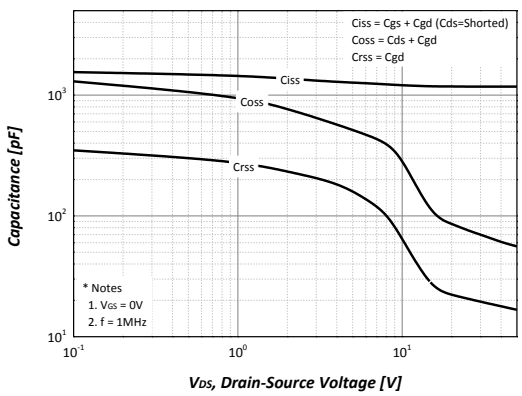
Static Drain-Source On Resistance



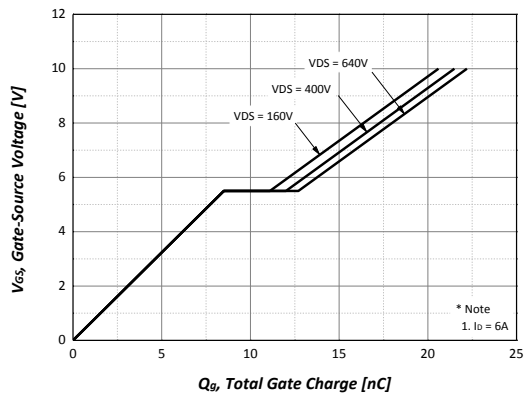
Body Diode Forward Voltage



Capacitance Characteristics

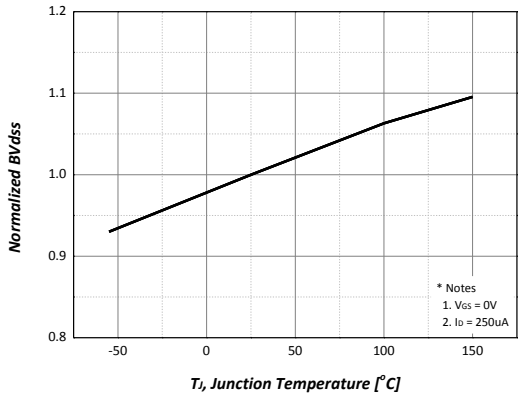


Gate Charge Characteristics

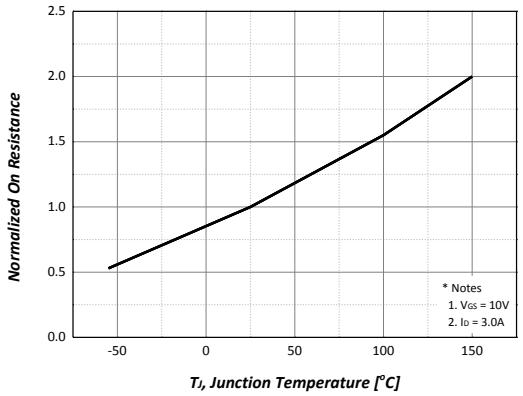


Typical Characteristics

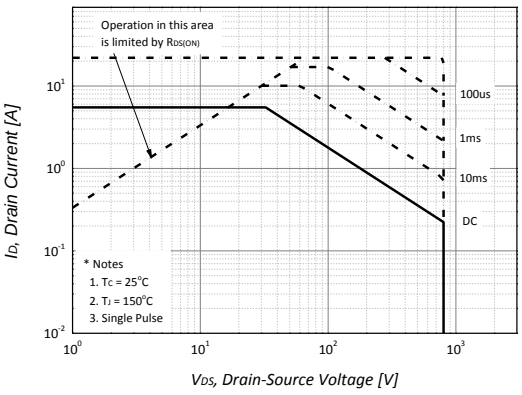
BVdss Variation vs. Temperature



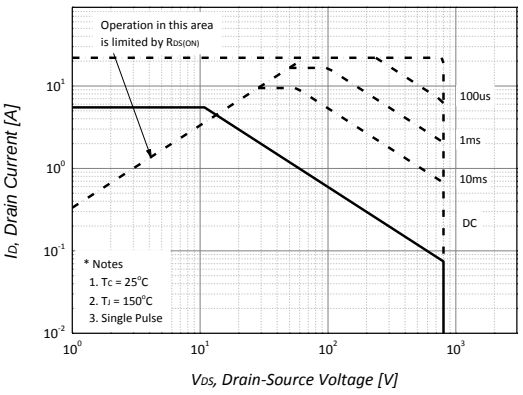
On Resistance Variation vs. Temperature



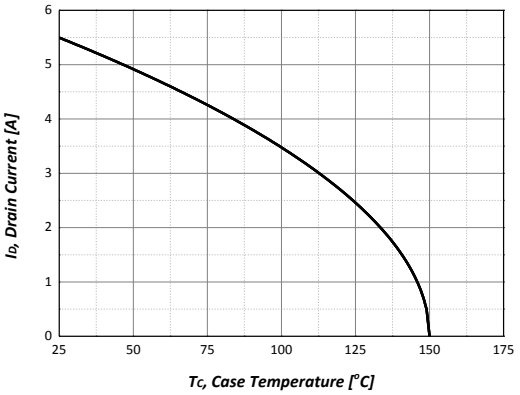
Safe Operation Area (TO-220)



Safe Operation Area (TO-220F)

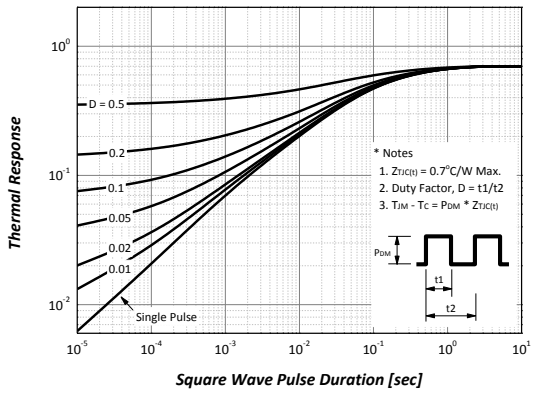


Maximum Drain Current vs. Case Temperature

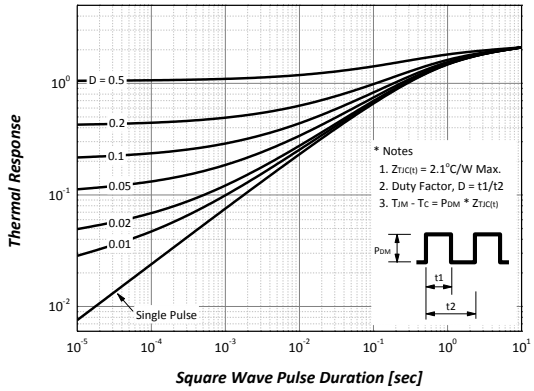


Typical Characteristics

Transient Thermal Response Curve (TO-220)



Transient Thermal Response Curve (TO-220F)



Characteristics Test Circuit & Waveform

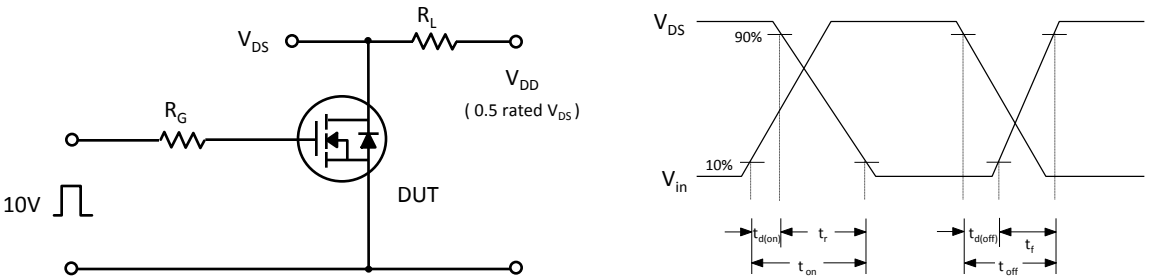


Fig 14. Resistive Switching Test Circuit & Waveforms

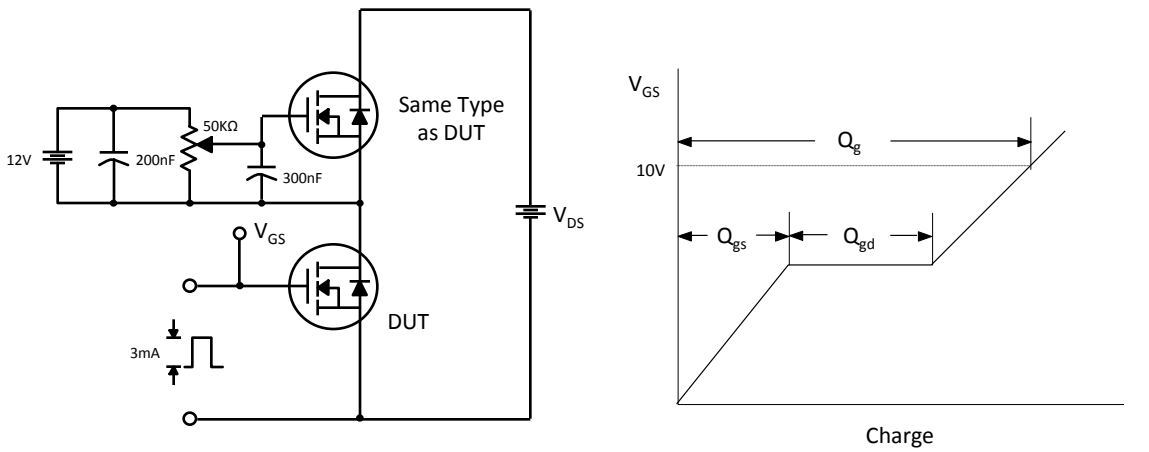


Fig 15. Gate Charge Test Circuit & Waveform

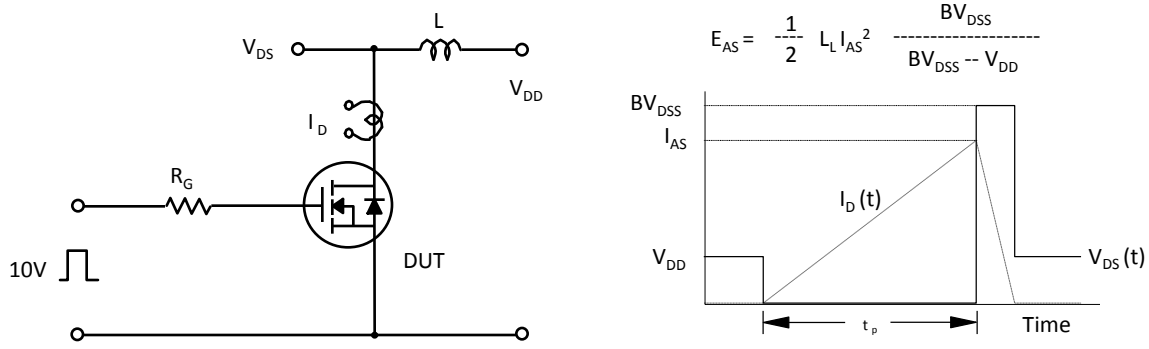
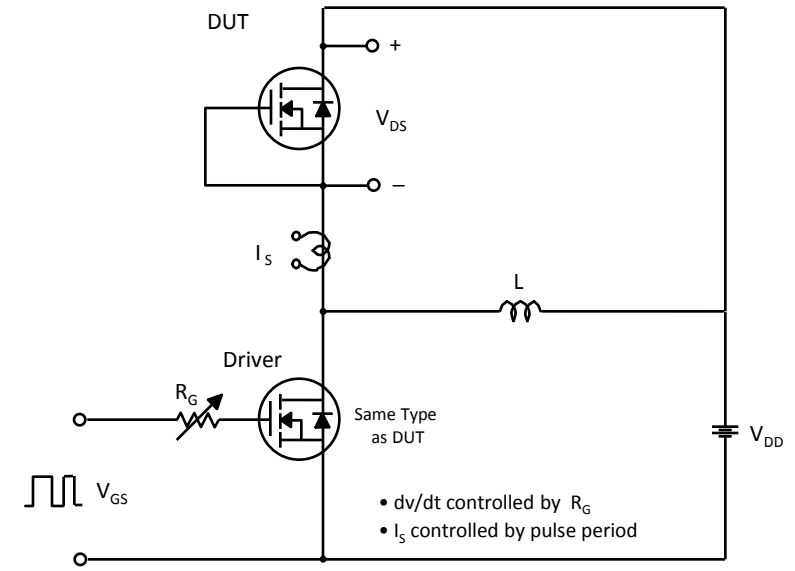


Fig 16. Unclamped Inductive Switching Test Circuit & Waveforms

Characteristics Test Circuit & Waveform (continued)



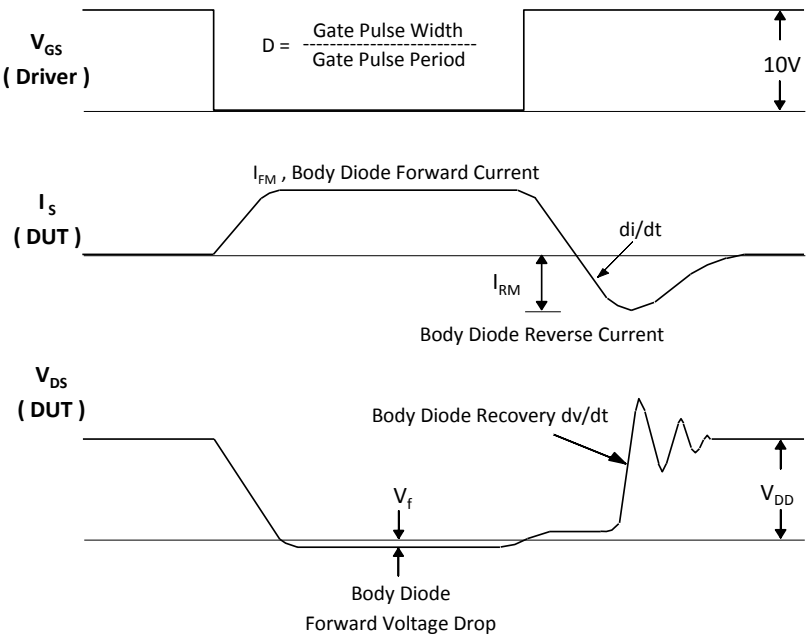


Fig 17. Peak Diode Recovery dv/dt Test Circuit & Waveforms