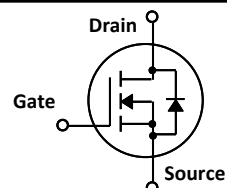
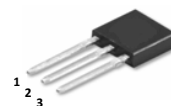


FEATURES

- Originative New Design
- 100% EAS Test
- Rugged Gate Oxide Technology
- Extremely Low Intrinsic Capacitances
- Remarkable Switching Characteristics
- Unequalled Gate Charge : 15.5 nC (Typ.)
- Extended Safe Operating Area
- Lower $R_{DS(ON)}$: 4.0 Ω (Typ.) @ $V_{GS}=10V$
- Halogen Free

APPLICATION

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

PFU3N80EG
800V N-Channel MOSFET
 $BV_{DSS} = 800\text{ V}$
 $R_{DS(on)} = 4.0\ \Omega$
 $I_D = 2.5\text{ A}$

I-PAK(TO-251)


1.Gate 2. Drain 3. Source

Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	800	V
I_D	Drain Current – Continuous ($T_C = 25^\circ\text{C}$)	2.5	A
	Drain Current – Continuous ($T_C = 100^\circ\text{C}$)	1.6	A
I_{DM}	Drain Current – Pulsed (Note 1)	10	A
V_{GS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	240	mJ
I_{AR}	Avalanche Current (Note 1)	2.5	A
E_{AR}	Repetitive Avalanche Energy (Note 1)	6.25	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.5	V/ns
P_D	Total Power Dissipation ($T_A=25^\circ\text{C}$) *	2.5	W
	Power Dissipation ($T_C = 25^\circ\text{C}$)	62.5	W
	- Derate above 25°C	0.5	W/ $^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

Thermal Resistance Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	--	2.0	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Junction-to-Ambient*	--	62	
$R_{\theta JA}$	Junction-to-Ambient	--	110	

* When mounted on the minimum pad size recommended (PCB Mount)

Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
On Characteristics						
V_{GS}	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	2.5	--	4.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS} = 10 \text{ V}, I_D = 1.5 \text{ A}$	--	4.0	4.8	Ω

Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	800	--	--	V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = 250 \mu\text{A}$, Referenced to 25°C	--	1.0	--	$\text{V}/^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 800 \text{ V}, V_{GS} = 0 \text{ V}$	--	--	10	μA
		$V_{DS} = 640 \text{ V}, T_C = 125^\circ\text{C}$	--	--	100	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 30 \text{ V}, V_{DS} = 0 \text{ V}$	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -30 \text{ V}, V_{DS} = 0 \text{ V}$	--	--	-100	nA

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 25 \text{ V}, V_{GS} = 0 \text{ V},$ $f = 1.0 \text{ MHz}$	--	720	940	pF
C_{oss}	Output Capacitance		--	55	75	pF
C_{rss}	Reverse Transfer Capacitance		--	8	12	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Time	$V_{DS} = 400 \text{ V}, I_D = 3.0 \text{ A},$ $R_G = 25 \Omega, R_L = 135 \Omega$ (Note 4,5)	--	12	30	ns
t_r	Turn-On Rise Time		--	21	55	ns
$t_{d(off)}$	Turn-Off Delay Time		--	22	55	ns
t_f	Turn-Off Fall Time		--	17	45	ns
Q_g	Total Gate Charge	$V_{DS} = 640 \text{ V}, I_D = 3.0 \text{ A},$ $V_{GS} = 10 \text{ V}$ (Note 4,5)	--	15.5	20	nC
Q_{gs}	Gate-Source Charge		--	4.5	--	nC
Q_{gd}	Gate-Drain Charge		--	5.3	--	nC

Source-Drain Diode Maximum Ratings and Characteristics

I_S	Continuous Source-Drain Diode Forward Current	--	--	2.5	A	
I_{SM}	Pulsed Source-Drain Diode Forward Current	--	--	10		
V_{SD}	Source-Drain Diode Forward Voltage	$I_S = 3.0 \text{ A}, V_{GS} = 0 \text{ V}$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$I_S = 3.0 \text{ A}, V_{GS} = 0 \text{ V}$	--	450	--	ns
Q_{rr}	Reverse Recovery Charge	$di_f/dt = 100 \text{ A}/\mu\text{s}$ (Note 4)	--	1.8	--	μC

Notes ;

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $I_{AS}=3.0\text{A}, V_{DD}=50\text{V}, R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$
3. $I_{SD}\leq 3.0\text{A}, di/dt\leq 300\text{A}/\mu\text{s}, V_{DD}\leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$
4. Pulse Test : Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
5. Essentially Independent of Operating Temperature

Typical Characteristics

Figure 1. On Region Characteristics

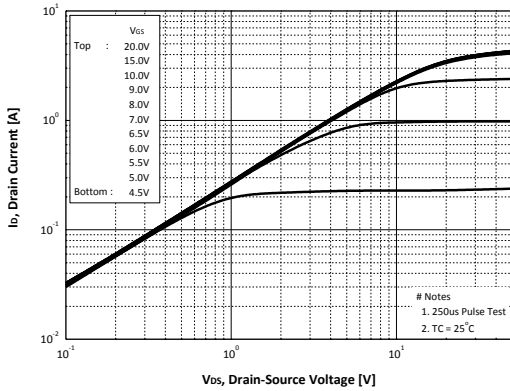


Figure 2. Transfer Characteristics

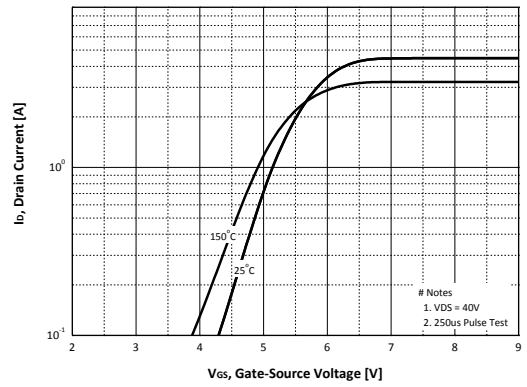


Figure 3. Static Drain-Source On Resistance

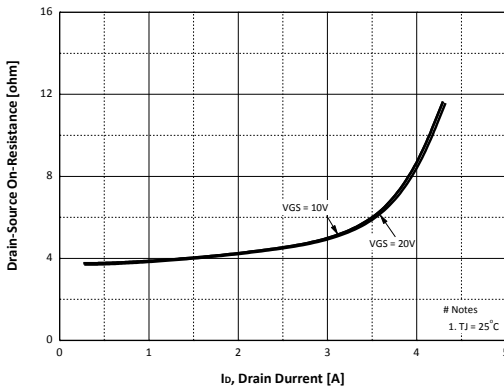


Figure 4. Body Diode Forward Voltage

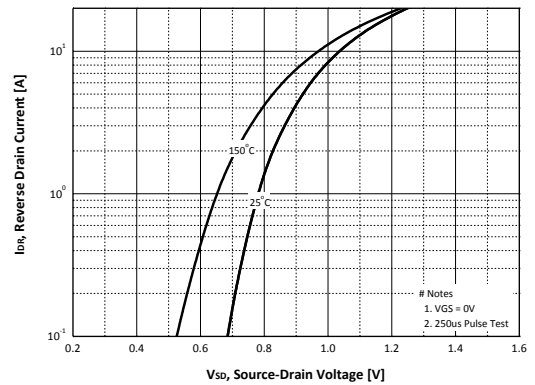


Figure 5. Capacitance Characteristics

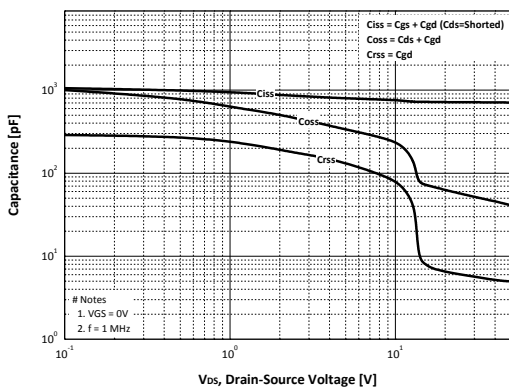
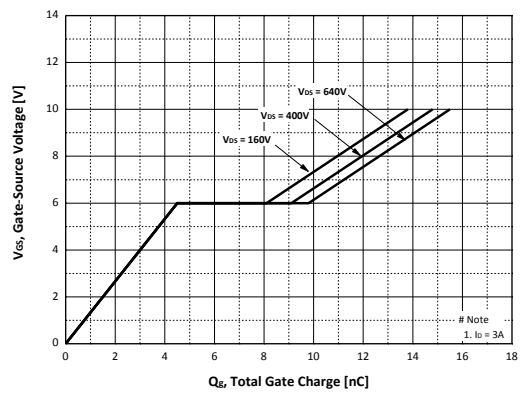


Figure 6. Gate Charge Characteristics



Typical Characteristics

Figure 7. Breakdown Voltage Variation vs. Temperature

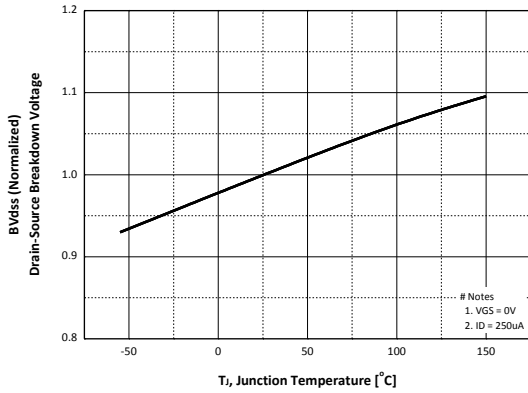


Figure 8. On-Resistance Variation vs. Temperature

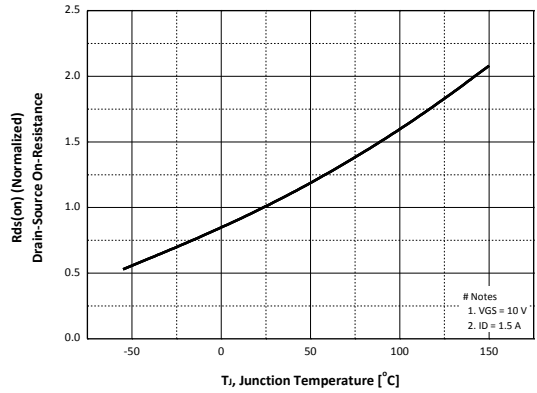


Figure 9. Safe Operation Area

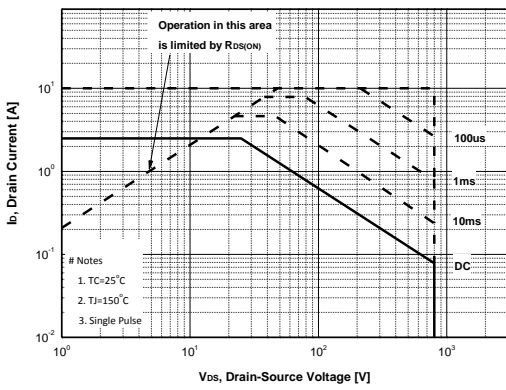


Figure 10. Maximum Drain Current vs. Case Temperature

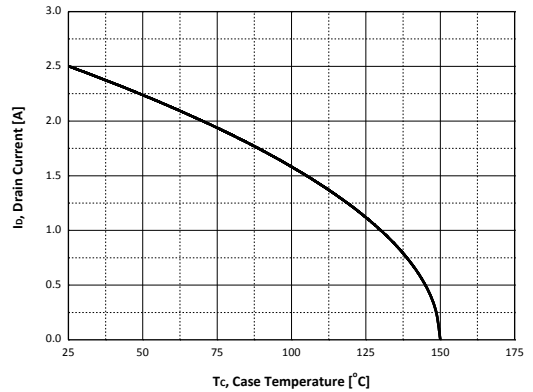
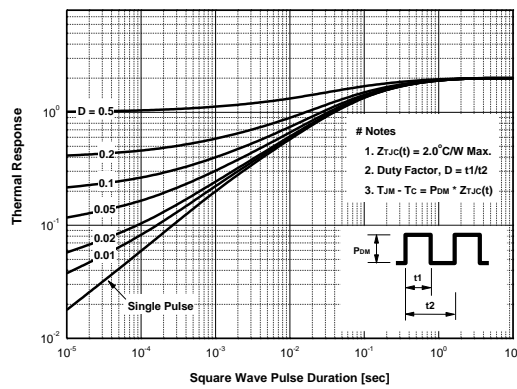


Figure 11. Transient Thermal Response Curve



Characteristics Test Circuit & Waveform

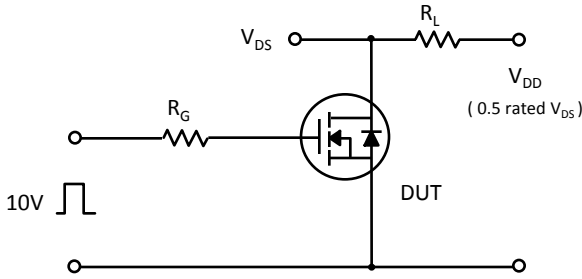


Fig 14. Resistive Switching Test Circuit & Waveforms

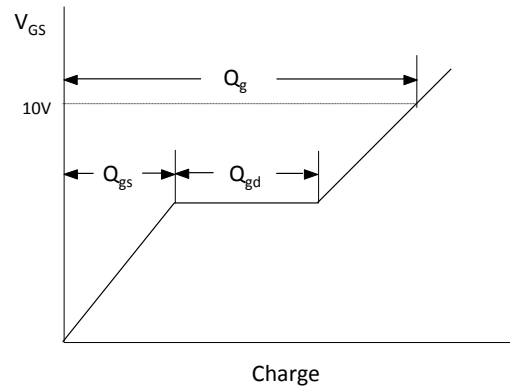
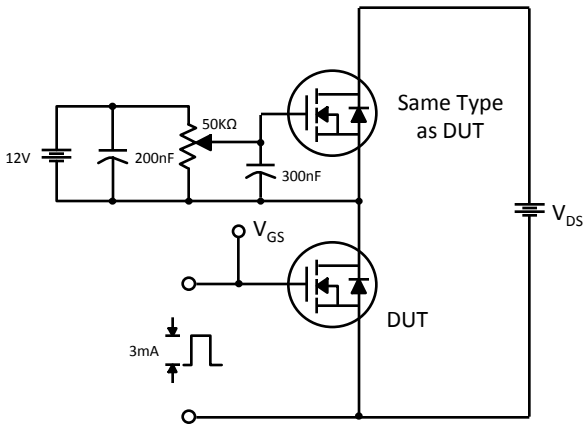


Fig 15. Gate Charge Test Circuit & Waveform

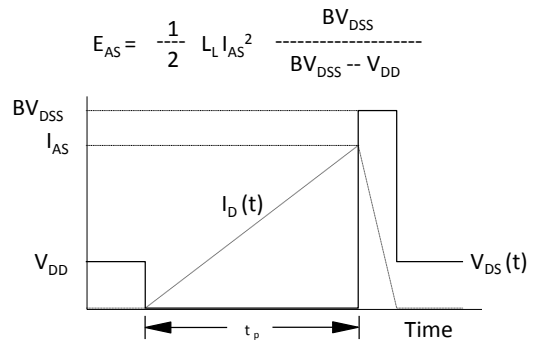
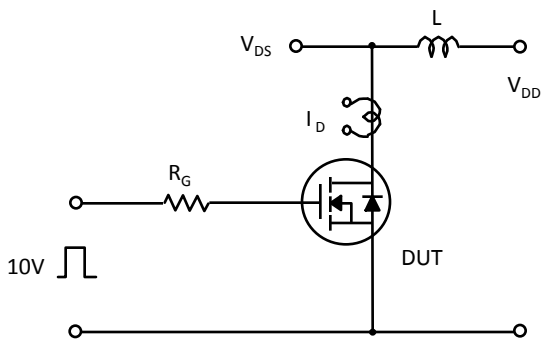


Fig 16. Unclamped Inductive Switching Test Circuit & Waveforms

Characteristics Test Circuit & Waveform (continued)

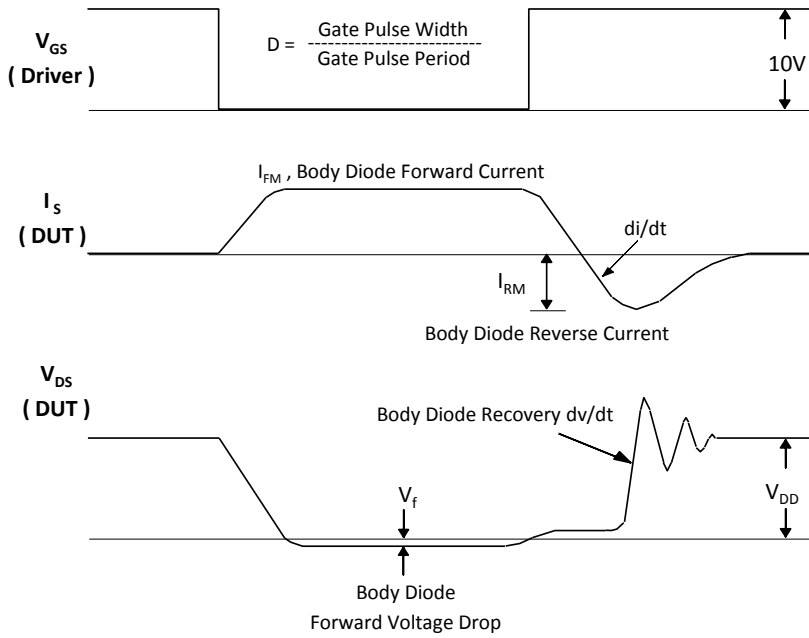
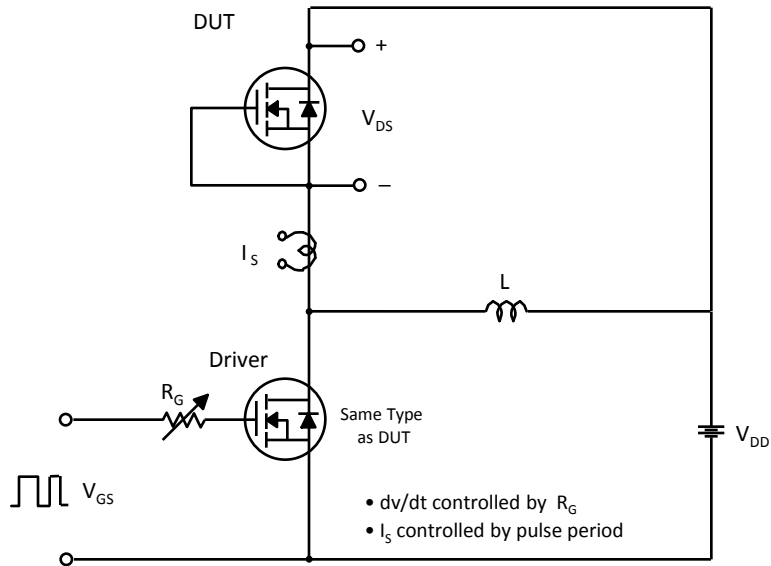


Fig 17. Peak Diode Recovery dv/dt Test Circuit & Waveforms

Package Dimension

Z

PFU3N80EG

I-PAK(TO-251)

