Green Package

PFU6N70EG

700V N-Channel MOSFET

FEATURES

- Originative New Design
- 100% EAS Test
- Rugged Gate Oxide Technology
- Extremely Low Intrinsic Capacitances
- Remarkable Switching Characteristics
- Unequalled Gate Charge : 17 nC (Typ.)
- Extended Safe Operating Area
- Lower $R_{DS(ON)}$: 1.50 Ω (Typ.) @V_{GS}=10V
- Halogen Free & Short Lead PKG

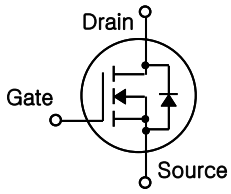
APPLICATION

- High current, High speed switching
- Suitable for power supplies, adaptors and PFC
- SMPS (Switched Mode Power Supplies)

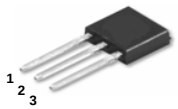
BV_{DSS} = 700 V

$R_{DS(on)}$ = 1.80 Ω

I_D = 5.3 A



I-PAK (TO-251)



1.Gate 2. Drain 3. Source

Absolute Maximum Ratings

T_C=25℃ unless otherwise specified

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	700	V
I_D	Drain Current – Continuous (T_C = 25℃)	5.3	A
	Drain Current – Continuous (T_C = 100℃)	3.35	A
I_{DM}	Drain Current – Pulsed (Note 1)	21.2	A
V_{GS}	Gate-Source Voltage	±30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	420	mJ
I_{AR}	Avalanche Current (Note 1)	5.3	A
E_{AR}	Repetitive Avalanche Energy (Note 1)	11.4	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	5.5	V/ns
P_D	Power Dissipation (T_C = 25℃)	114	W
	- Derate above 25℃	0.91	W/℃
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	℃
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	℃

* Drain current limited by maximum junction temperature

Thermal Resistance Characteristics

Symbol	Parameter	Typ	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	--	1.10	℃/W
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink	--	--	
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	110	

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	2.0	--	4.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 2.7 A	--	1.50	1.80	ohm
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 uA	700	--	--	V
ΔBV_{DSS} /ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250 uA, Referenced to25℃	--	0.6	--	V/℃
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 700 V, V_{GS} = 0 V	--	--	1	uA
		V_{DS} = 560 V, T_C = 125℃	--	--	10	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	--	1050	1365	pF
C_{oss}	Output Capacitance		--	91	119	pF
C_{rss}	Reverse Transfer Capacitance		--	2.5	5	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Time	V_{DS} = 350 V, I_D = 6.0 A, R_G = 25 Ω (Note 4,5)	--	17	34	ns
t_r	Turn-On Rise Time		--	12	24	ns
$t_{d(off)}$	Turn-Off Delay Time		--	45	90	ns
t_f	Turn-Off Fall Time		--	15	30	ns
Q_g	Total Gate Charge	V_{DS} = 560 V, I_D = 6.0 A, V_{GS} = 10 V (Note 4,5)	--	17	23	nC
Q_{gs}	Gate-Source Charge		--	5	--	nC
Q_{gd}	Gate-Drain Charge		--	5	--	nC
Source-Drain Diode Maximum Ratings and Characteristics						
I_S	Continuous Source-Drain Diode Forward Current		--	--	5.3	A
I_{SM}	Pulsed Source-Drain Diode Forward Current		--	--	21.2	
V_{SD}	Source-Drain Diode Forward Voltage	I_S = 5.3 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/μs (Note 4)	--	340	--	ns
Qrr	Reverse Recovery Charge		--	2.5	--	μC

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

Fig.1 On Region Characteristics

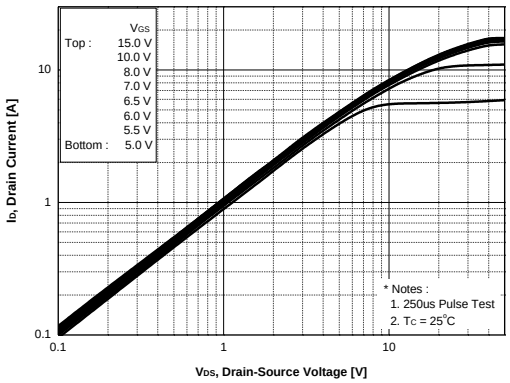


Fig.2 Transfer Characteristics

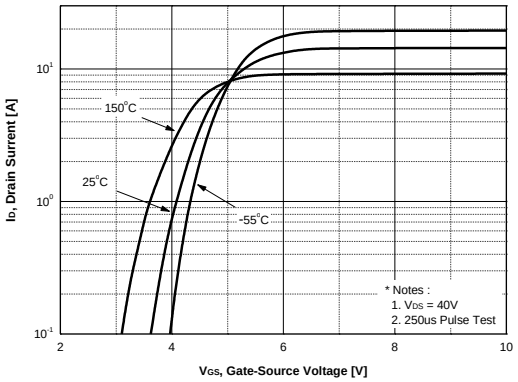


Fig. 3 On Resistance Variation vs. Drain Current and Gate Voltage

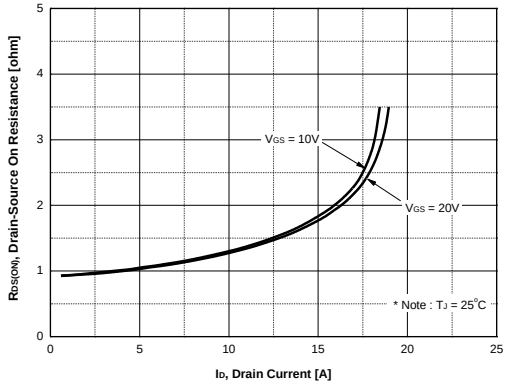


Fig. 4 Body Diode Forward Voltage Variation with Source Current and Temperature

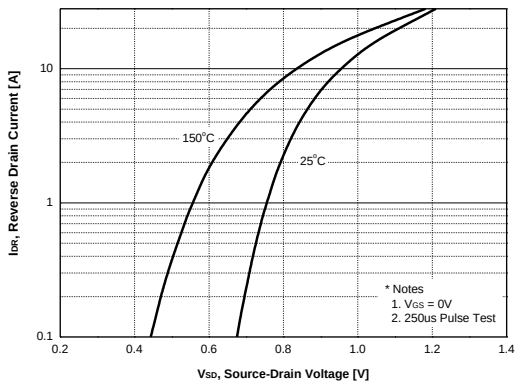


Fig. 5 Capacitance Characteristics

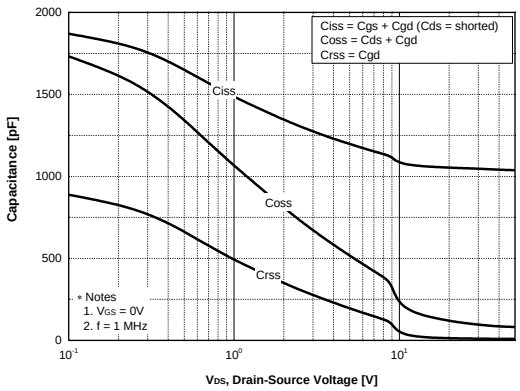
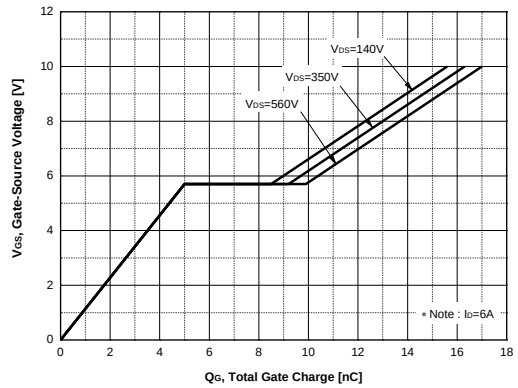


Fig. 6 Gate Charge Characteristics



Typical Characteristics (continued)

Fig. 7 Breakdown Voltage Variation vs. Temperature

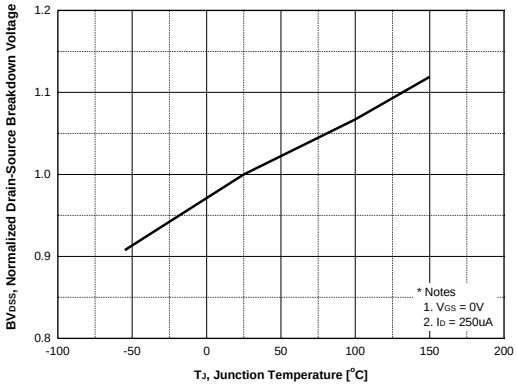


Fig. 8 On-Resistance Variation vs. Temperature

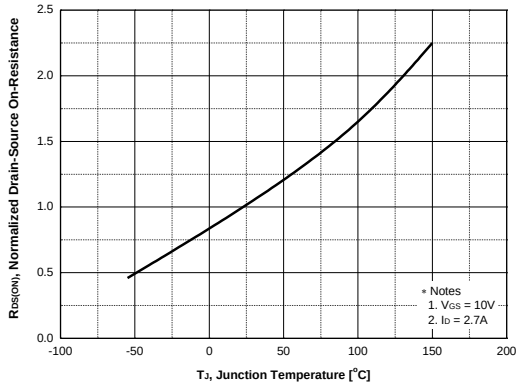


Fig. 9 Safe Operation Area

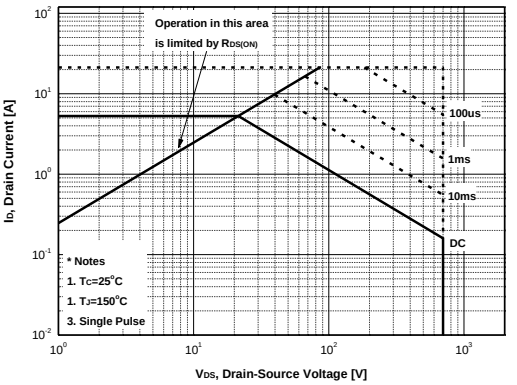


Fig. 10 Maximum Drain Current vs. Case Temperature

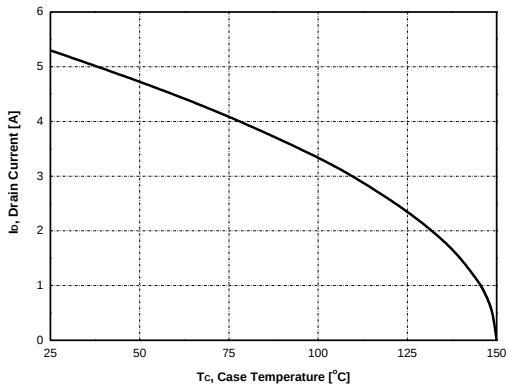
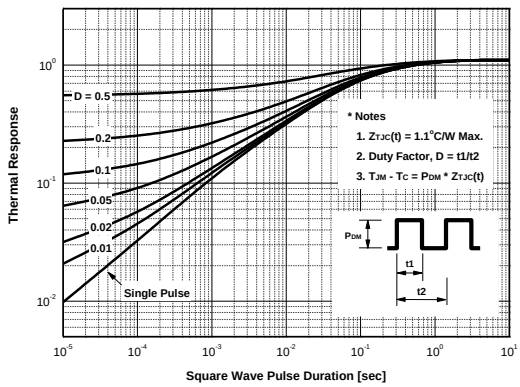


Fig. 11 Transient Thermal Response Curve



Characteristics Test Circuit & Waveform

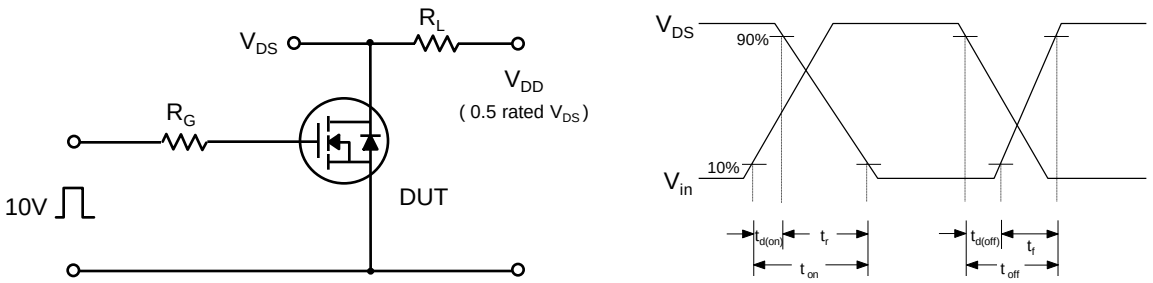


Fig 14. Resistive Switching Test Circuit & Waveforms

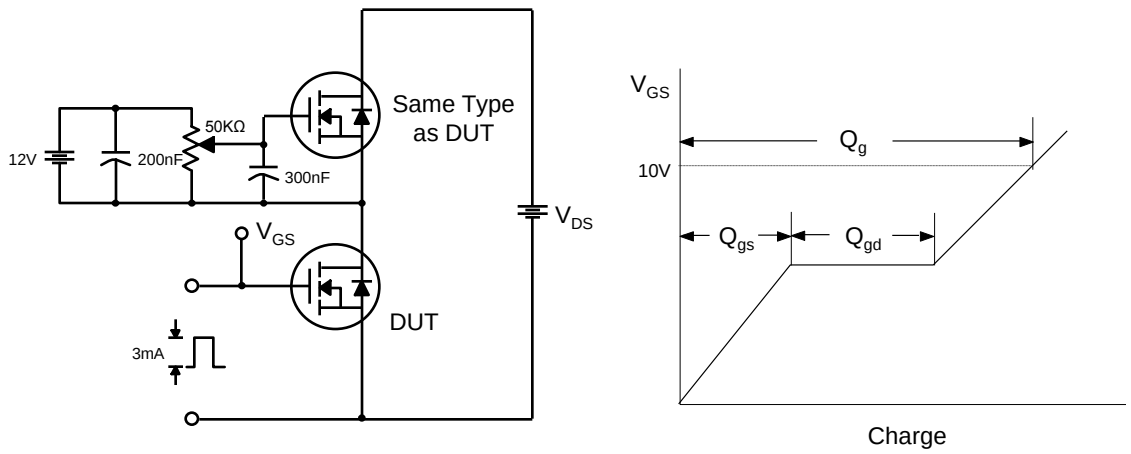


Fig 15. Gate Charge Test Circuit & Waveform

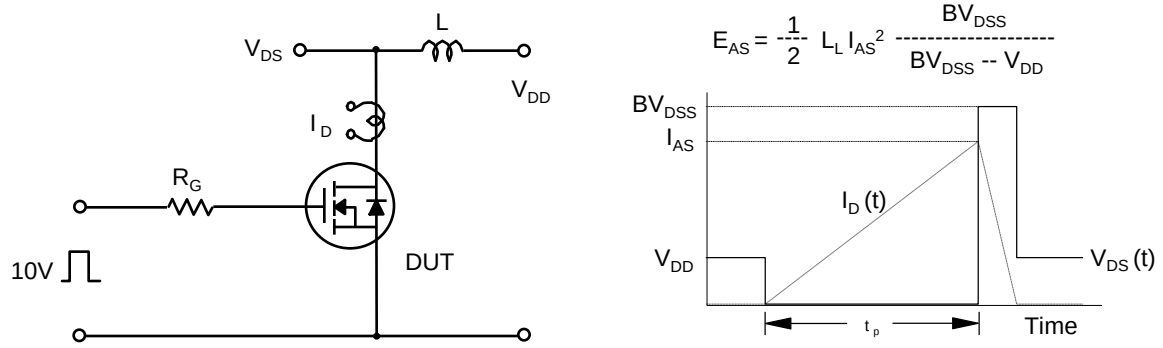
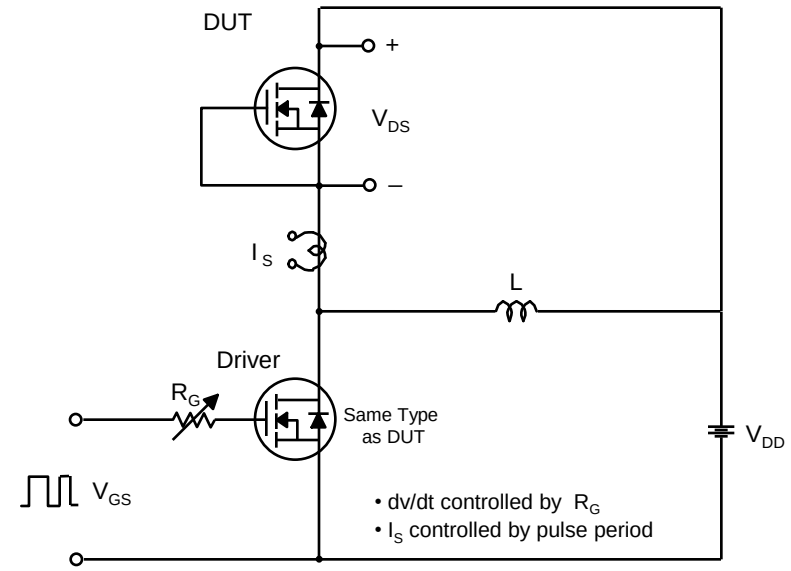


Fig 16. Unclamped Inductive Switching Test Circuit & Waveforms

Characteristics Test Circuit & Waveform (continued)



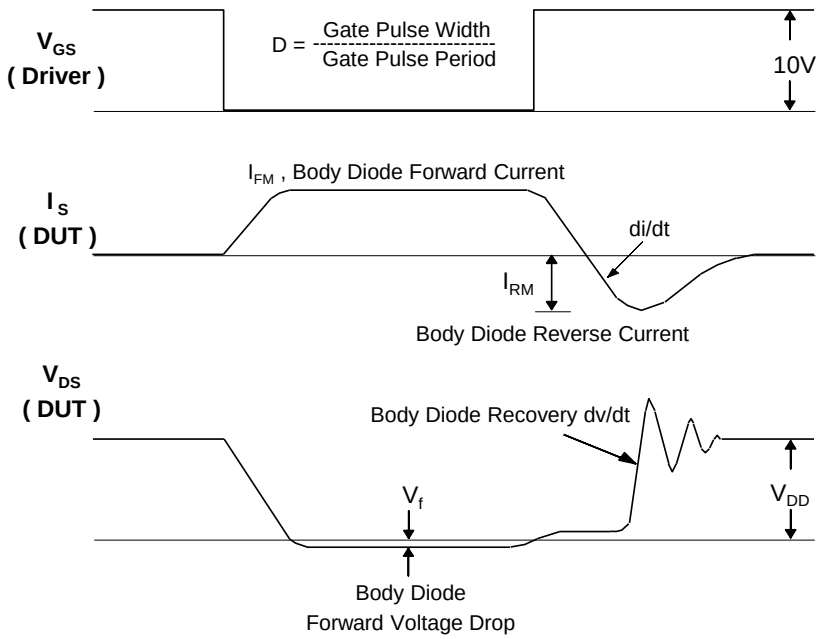


Fig 17. Peak Diode Recovery dv/dt Test Circuit & Waveforms

Package Dimension

I-PAK (TO-251)