

TO-220F Plastic-Encapsulate MOSFETS

N-Channel Power MOSFET

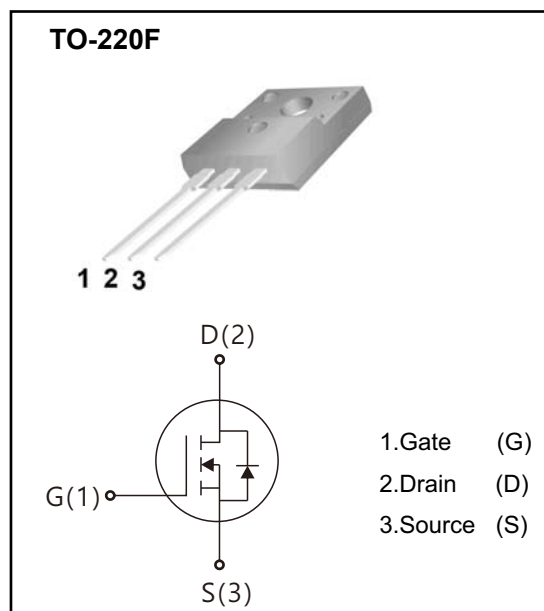
FEATURE

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge :Qg=29nC (Typ.).
- BVDSS=650V, I_D=7A
- R_{DS(on)} : 1.35Ω (Max) @V_G=10V
- 100% Avalanche Tested

MARKING



PF7N65 = Device code.
Solid dot = Green molding compound device,
if none, the normal device.
XXXX = Code.



Absolute Maximum Ratings (Ta=25°C unless otherwise)

Symbol	Parameter		Value	Unit
V _{DSS}	Drain-Source Voltage		650	V
I _D	Drain Current	T _j =25°C	7.0	A
		T _j =100°C	4.7	
V _{GS(TH)}	Gate Threshold Voltage		30	V
E _{AS}	Single Pulse Avalanche Energy (note1)		300	mJ
I _{AR}	Avalanche Current (note2)		7.0	A
P _D	Power Dissipation (T _j =25°C)		50	W
T _j	Junction temperature(Max)		150	°C
T _{stg}	Storage Temperature		-55~+150	°C
TL	Maximum lead temperature for soldering purpose, 1/8' from case for 5 seconds		300	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJC}	Thermal Resistance, Junction to Case	-	2.4	°C/W
R _{θJA}	Thermal Resistance, Junction to Ambient	-	62.5	°C/W

ELECTRICAL CHARACTERISTICS (T_a=25°C unless otherwise specified)

Electrical Characteristics (T_a=25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =250μA , V _{GS} =0	650	-	-	V
△BVDSS/△T _J	Breakdown Voltage Temperature Coefficient	I _D =250μA ,Reference to 25℃	-	0.67	-	V/℃
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =650V, V _{GS} =0V	-	-	10	μA
		V _{DS} =520V, T _j =125℃			100	
I _{GSSF}	Gate-body leakage Current, Forward	V _{GS} =+30V, V _{DS} =0V	-	-	100	nA
I _{GSSR}	Gate-body leakage Current, Reverse	V _{GS} =-30V, V _{DS} =0V	-	-	-100	
On Characteristics						
V _{GS(TH)}	Date Threshold Voltage	I _D =250μA,V _{DS} =V _{GS}	2	-	4	V
R _{DS(ON)}	Static Drain-Source On-Resistance	I _D =3.5A,V _{GS} =10V	-	1.25	1.35	Ω
Dynamic Characteristics						
Ciss	Input Capacitance	V _{DS} =25V , V _{GS} =0 , f=1.0MHz	-	1000	-	pF
Coss	Output Capacitance		-	95	-	
Crss	Reverse Transfer Capacitance		-	2.4	-	
Switching Characteristics						
Td(on)	Turn-On Delay Time	V _{DD} =325V , I _D =7A R _G =25Ω (Note 3,4)	-	30	70	nS
Tr	Turn-On Rise Time		-	80	170	
Td(off)	Turn-Off Delay Time		-	65	140	
Tf	Turn-Off Rise Time		-	60	130	
Qg	Total Gate Charge	V _{DS} =520V,V _{GS} =10V , I _D =7A (Note 3,4)	-	29	38	nC
Qgs	Gate-Source Charge		-	7	-	
Qgd	Gate-Drain Charge		-	14.5	-	
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Max. Diode Forward Current	-	-	-	7	A
I _{SM}	Max. Pulsed Forward Current	-	-	-	28	
V _{SD}	Diode Forward Voltage	I _D =7A	-	-	1.4	V
Trr	Reverse Recovery Time	I _S =7A,V _{GS} =0V diF/dt=100A/μs	-	293	-	nS
Qrr	Reverse Recovery Charge	(Note3)	-	1.7	-	μC

Notes : 1, L=0.5mH, I_{AS}= 7A, V_{DD}=50V, R_G=25Ω, Starting T_J =25°C

2, Repetitive Rating : Pulse width limited by maximum junction temperature

3, Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

4, Essentially Independent of Operating Temperature

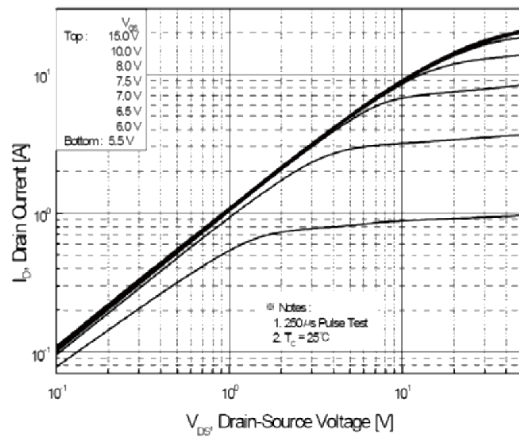


Figure 1. On-Region Characteristics

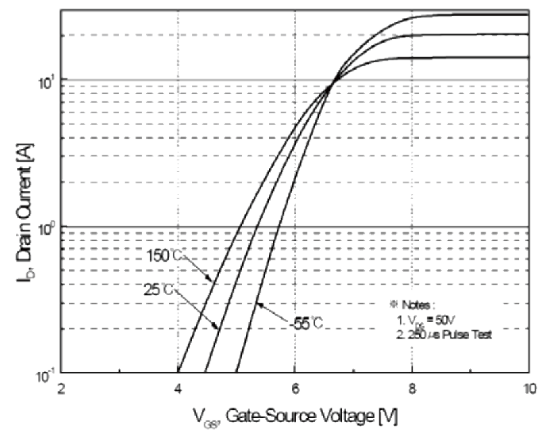


Figure 2. Transfer Characteristics

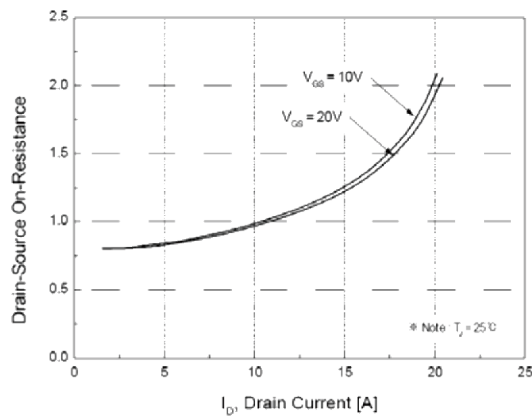


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

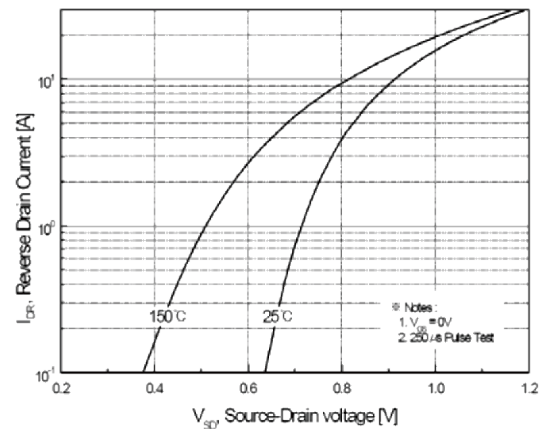


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

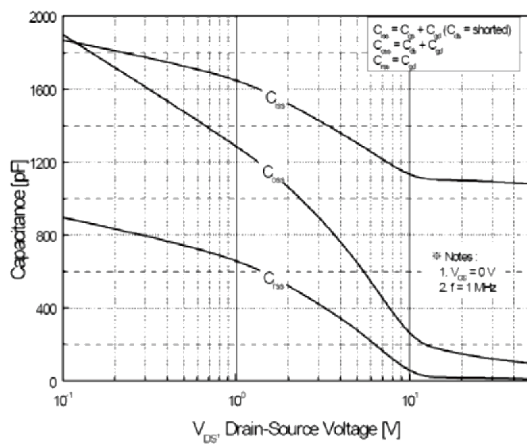


Figure 5. Capacitance Characteristics

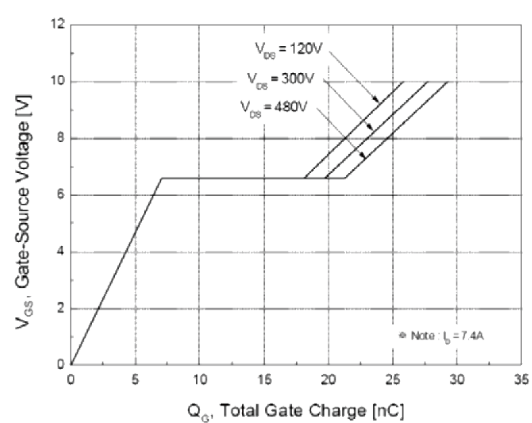


Figure 6. Gate Charge Characteristics

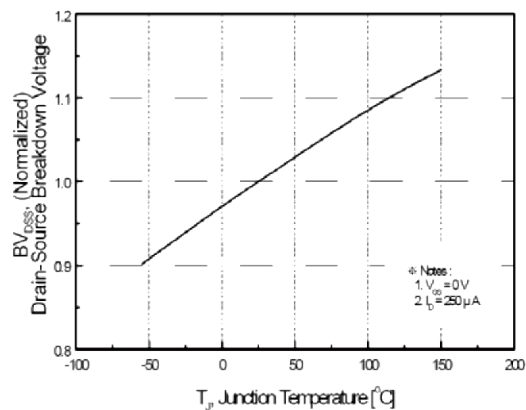


Figure 7. Breakdown Voltage Variation vs Temperature

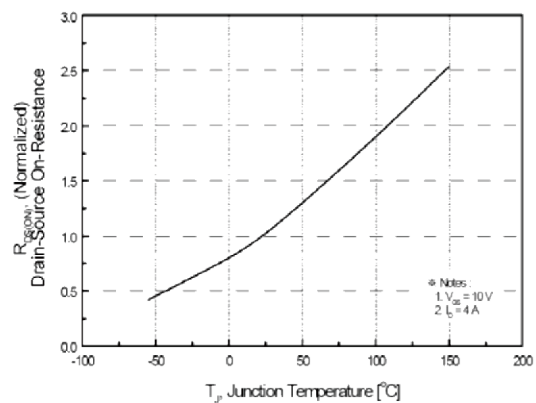


Figure 8. On-Resistance Variation vs Temperature

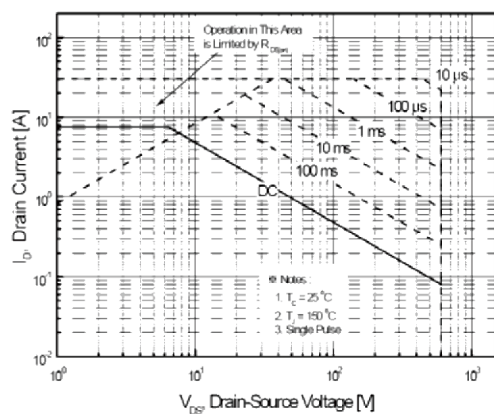


Figure 9-2. Maximum Safe Operating Area

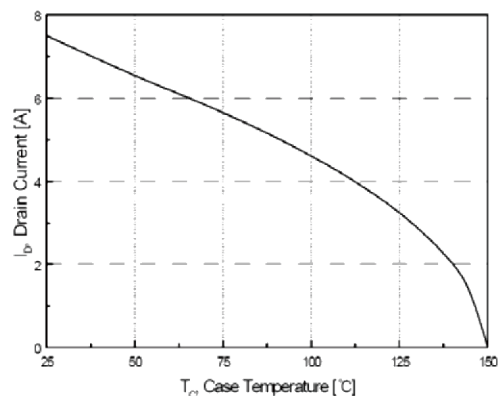


Figure 10. Maximum Drain Current vs Case Temperature

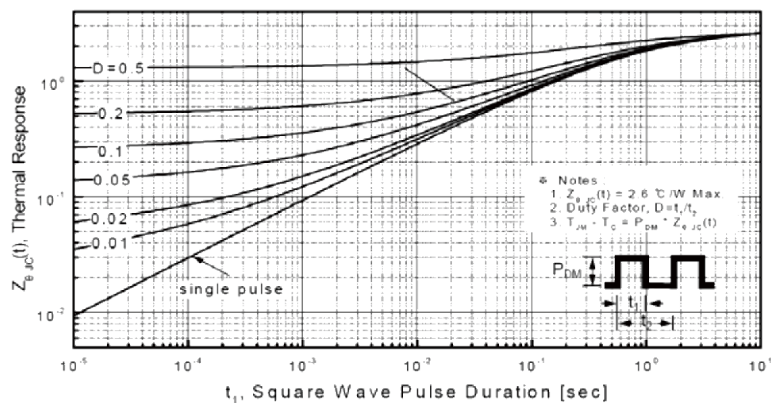
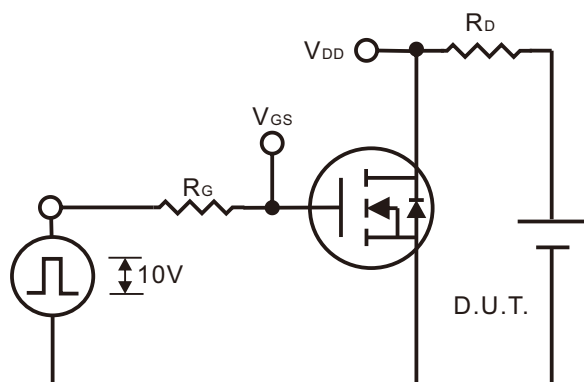
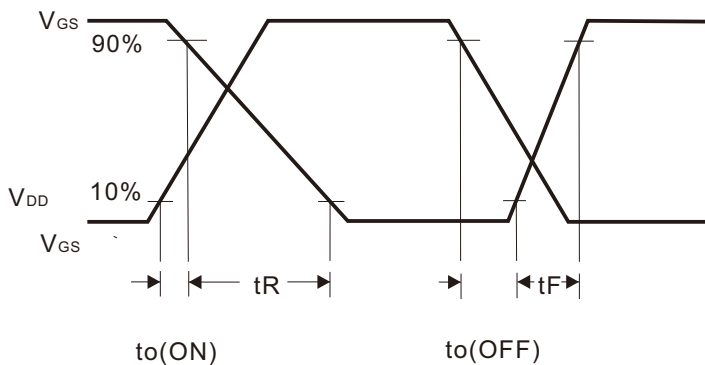


Figure 11-2. Transient Thermal Response Curve

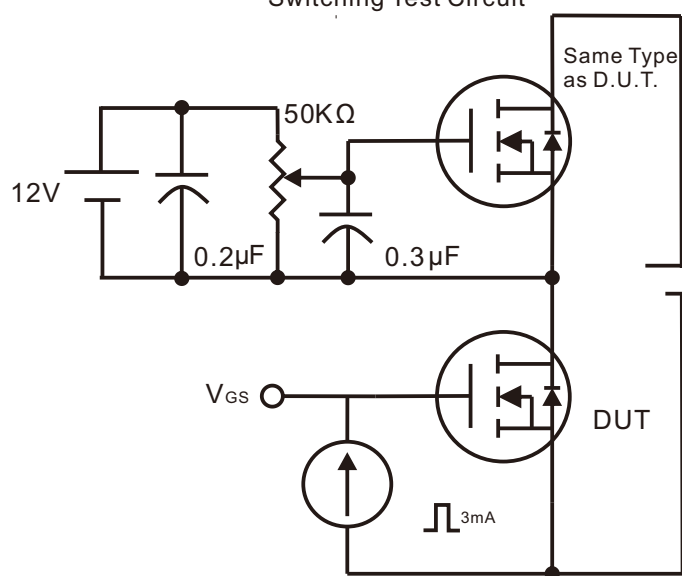
Gate Charge Test Circuit & Waveform



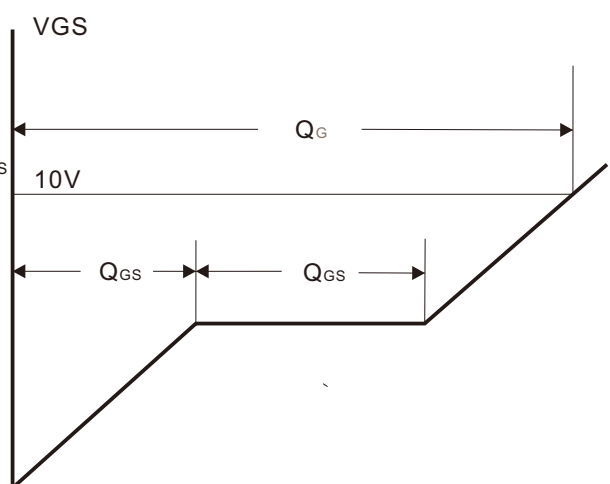
Switching Test Circuit



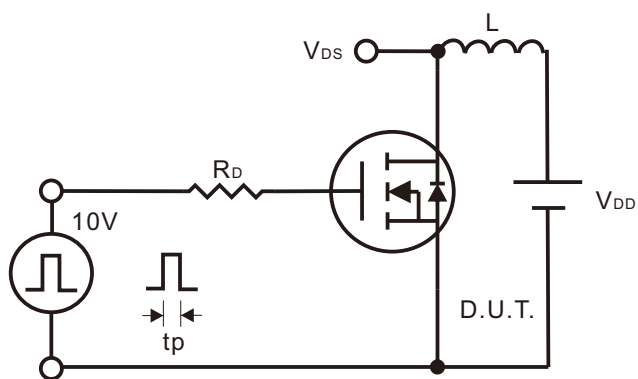
Switching Waveforms



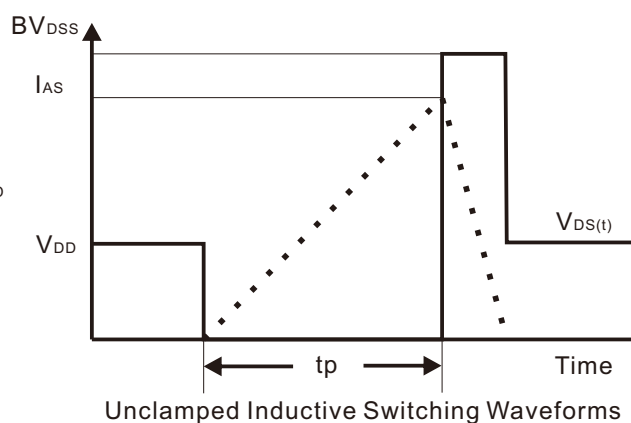
Gate Charge Test Circuit



Gate Charge Waveform

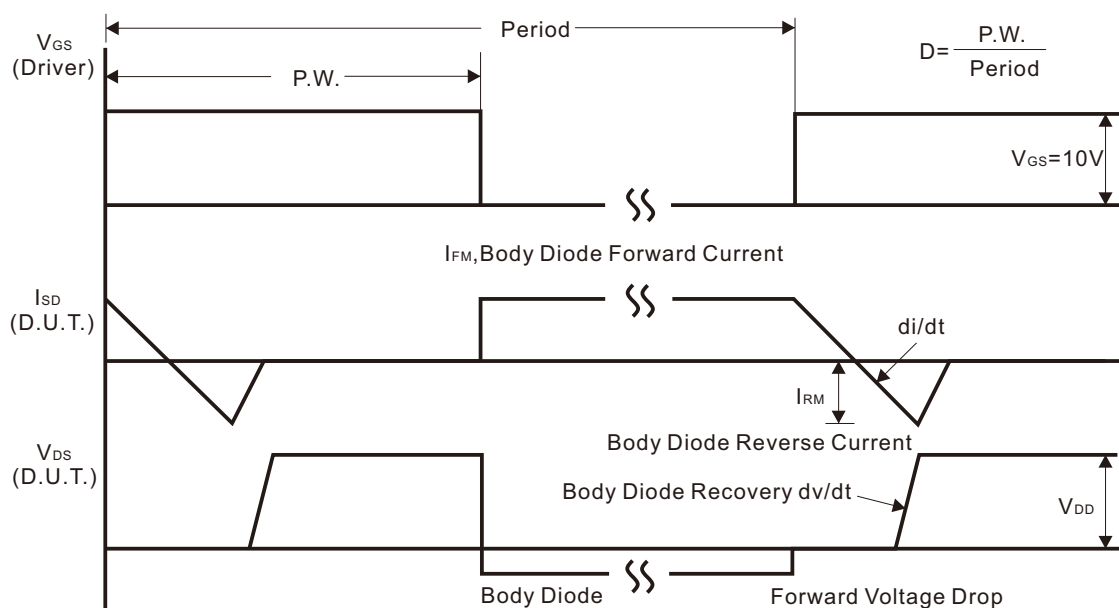
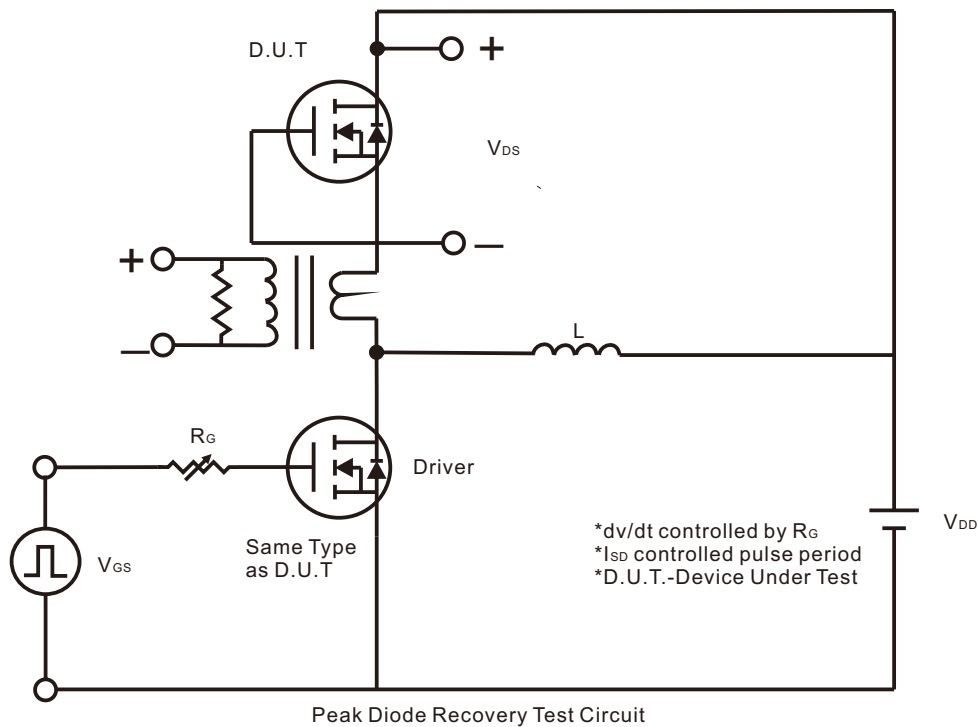


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

Peak Diode Recovery dv/dt Test Circuit & Waveform



TO-220F Package Outline Dimensions

