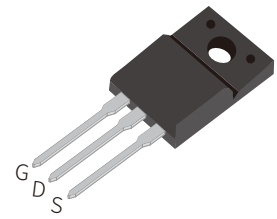


FEATURES

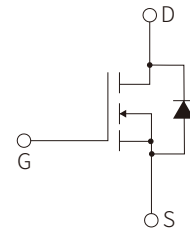
- | Low Gate Charge
- | Low Crss
- | Fast Switching
- | Improved dv/dt and ESD Capability
- | 100% Avalanche energy test



TO-220F

APPLICATION

- | High Frequency Switched-Mode Power Supply
- | Electronic lamp ballasts
- | UPS



Schematic Symbol

APPROVALS

- RoHS** | Compliance with 2011/65/EU
- HF** | Compliance with IEC61249-2-21:2003

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	800	V
Continuous Drain Current	I _D	T _C =25°C	12*
		T _C =100°C	6*
Plused Drain Current ^(note1)	I _{DM}	36	A
Gate-Source Voltage	V _{GS}	±30	V
Avalanche Current ^(note1)	I _{AR}	12	A
Repetitive Avalanche Energy ^(note1)	E _{AR}	20	mJ
Single Pulsed Avalanche Energy ^(note2)	E _{AS}	225	mJ
Peak Diode Recovery ^(note3)	dv/dt	4.5	V/ns
Power Dissipation T _C =25°C	P _D	49	W
Power Dissipation Derating Factor Above 25°C	P _{D(DF)}	0.39	W/°C
Maximum Temperature for Soldering	T _L	300	°C
Operating Junction Temperature Range	T _J	150	°C
Storage Temperature Range	T _{STG}	-55 to +150	°C
Thermal Resistance, Junction to Case	R _{th(j-c)}	2.55	°C/W
Thermal Resistance, Junction to Ambient	R _{th(j-a)}	62.5	°C/W

* Drain current limited by maximum junction temperature

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Off Characteristics							
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	800			V	
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} / ΔT _J	I _D =250μA, referenced to 25°C		0.7		V/°C	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =800V, V _{GS} =0V, T _C =25°C			1	μA	
		V _{DS} =640V, T _C =125°C			100	μA	
Gate Leakage Current	I _{GSS}	V _{GS} =30V, V _{DS} =0V			100	nA	
		V _{GS} =-30V, V _{DS} =0V			-100	nA	
On Characteristics							
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V	
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =6A		0.6	0.8	Ω	
Forward Transconductance	g _{FS}	V _{DS} =40V, I _D =6A (note 4)		5.7		S	
Dynamic Characteristics							
Input Capacitance	C _{iss}	V _{DS} = 25V, V _{GS} = 0V, f=1.0MHz		2100		pF	
Output Capacitance	C _{oss}				225		pF
Reverse Transfer Capacitance	C _{rss}				32		pF
Turn-On Delay Time	t _{d(on)}	V _{DD} =400V, I _D =12A, R _G =25Ω (note 4,5)		38		ns	
Turn-On Rise Time	t _r			105		ns	
Turn-Off Delay Time	t _{d(off)}			55		ns	
Turn-Off Fall Time	t _f			65		ns	
Total Gate Charge	Q _g	V _{DS} =640V, I _D =12A, V _{GS} =10V (note 4,5)		34		nC	
Gate-Source Charge	Q _{gs}			8.7		nC	
Gate-Drain Charge	Q _{gd}			13		nC	
Maximum Continuous Drain-Source Diode Forward Current	I _S				12	A	
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				36	A	
Drain-Source Diode Forward Voltage	V _{SD}	I _S =12A, V _{GS} =0V			1.4	V	
Reverse Recovery Time	t _{rr}	I _S =12A, V _{GS} =0V, dI _F /dt=100A/μs(note 4)		650		ns	
Reverse Recovery Charge	Q _{rr}				7.0		μC

Notes:

1: Pulse width limited by maximum junction temperature
 3: I_{SD} ≤ 12A, di/dt ≤ 300A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J=25°C
 5: Essentially independent of operating temperature

2: L=0.5mH, I_{AS}=30A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C
 4: Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

CHARACTERISTIC CURVES

Fig.1 On-State Characteristics

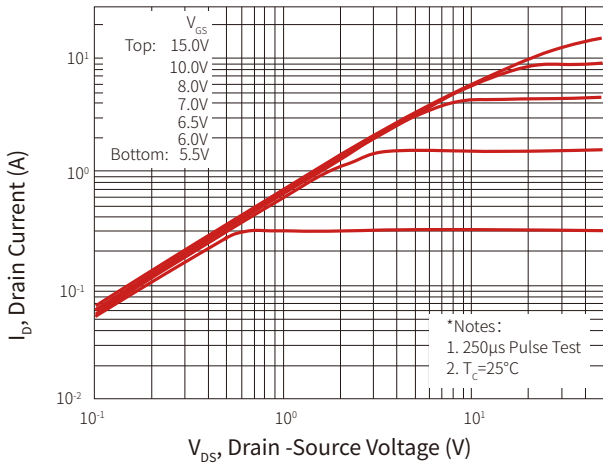


Fig.2 Transfer Characteristics

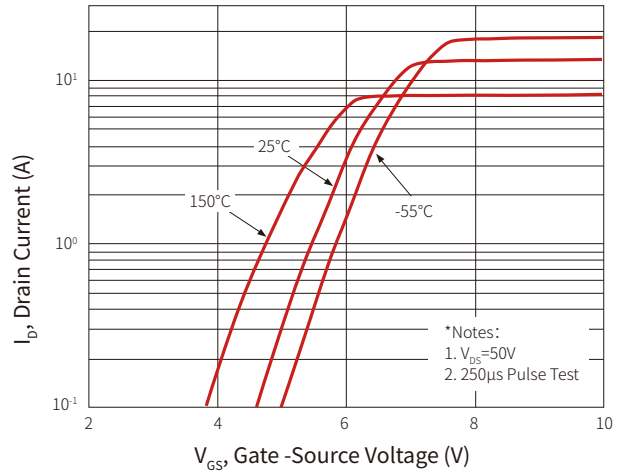


Fig.3 Capacitance Characteristics

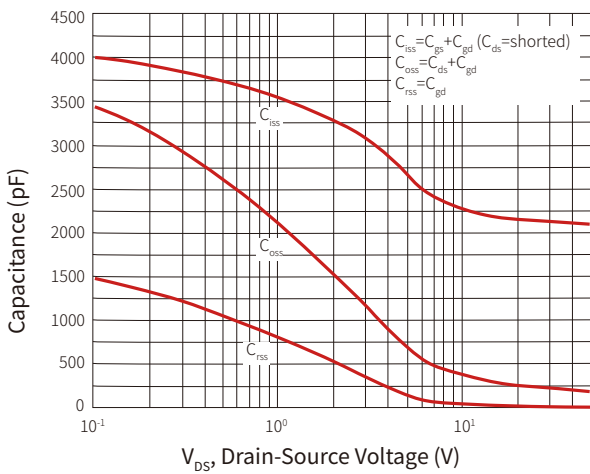


Fig. 4 Gate Charge Characteristics

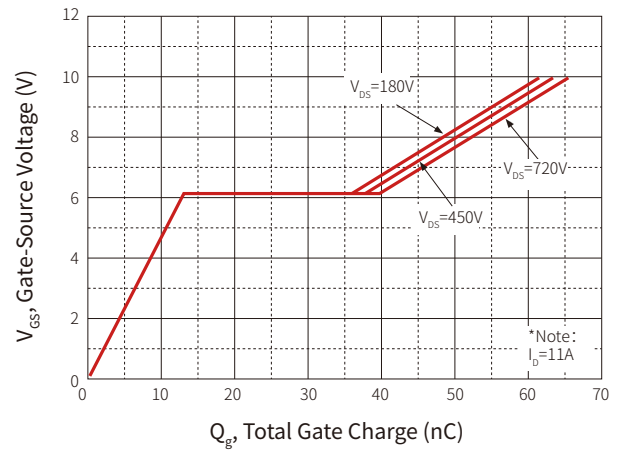


Fig.5 Maximum Safe Operating Area

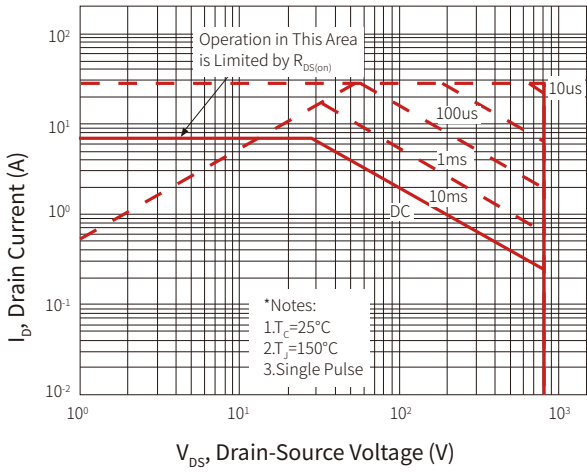


Fig.6 Maximum Drain Current vs Case Temperature

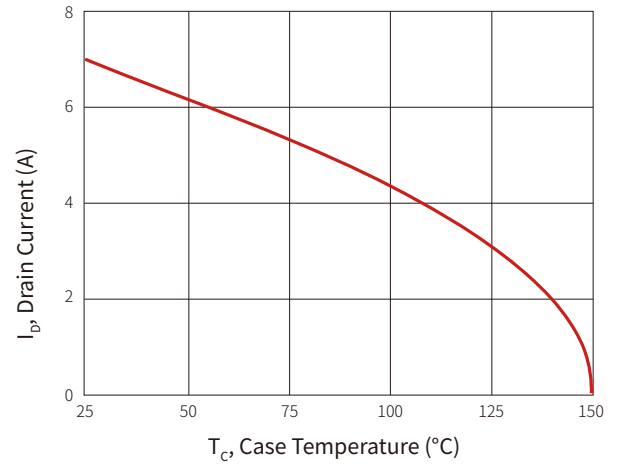


Fig.7 Transient Thermal Response Curve

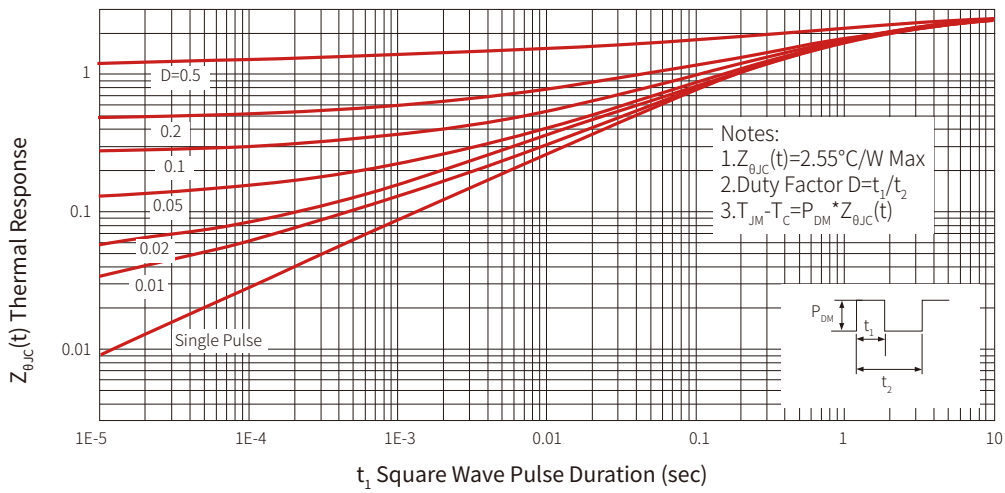


Fig.8 Resistive Switching Test Circuit & Waveforms

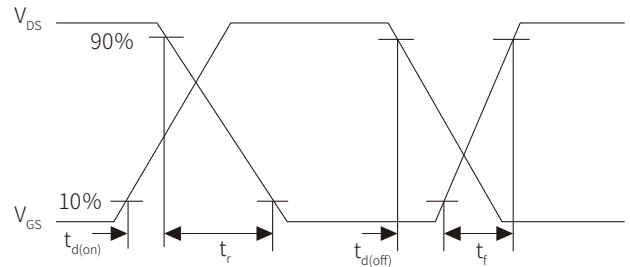
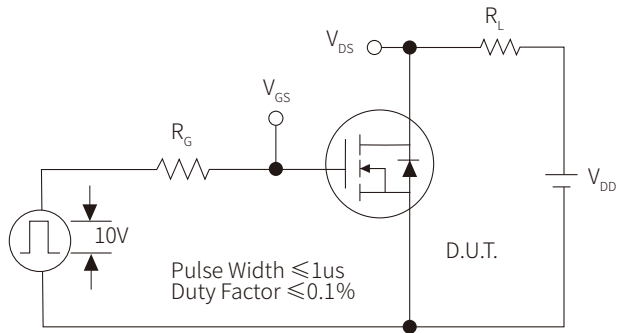


Fig.9 Gate Charge Test Circuit & Waveform

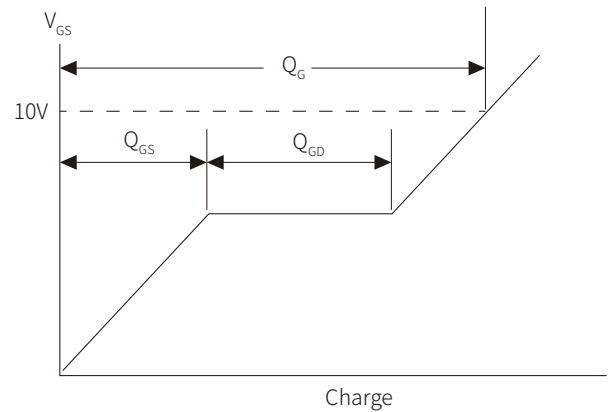
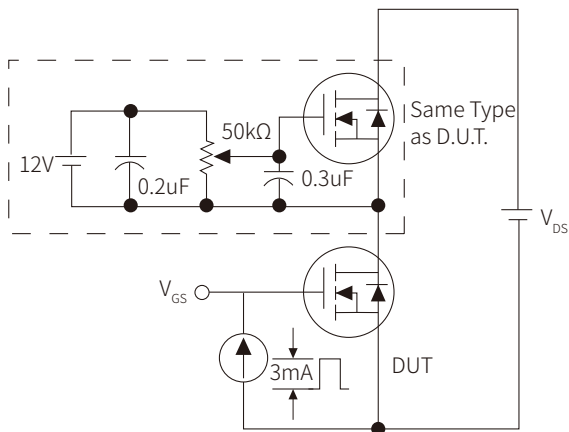
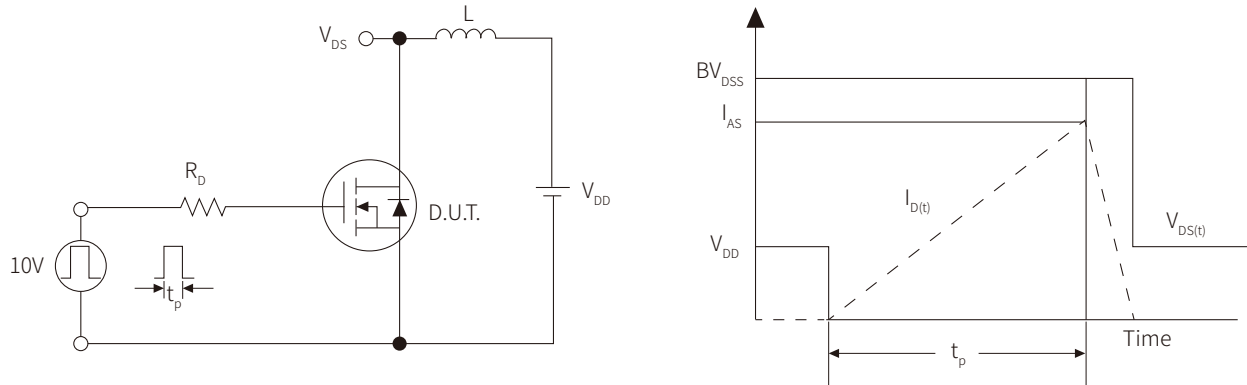
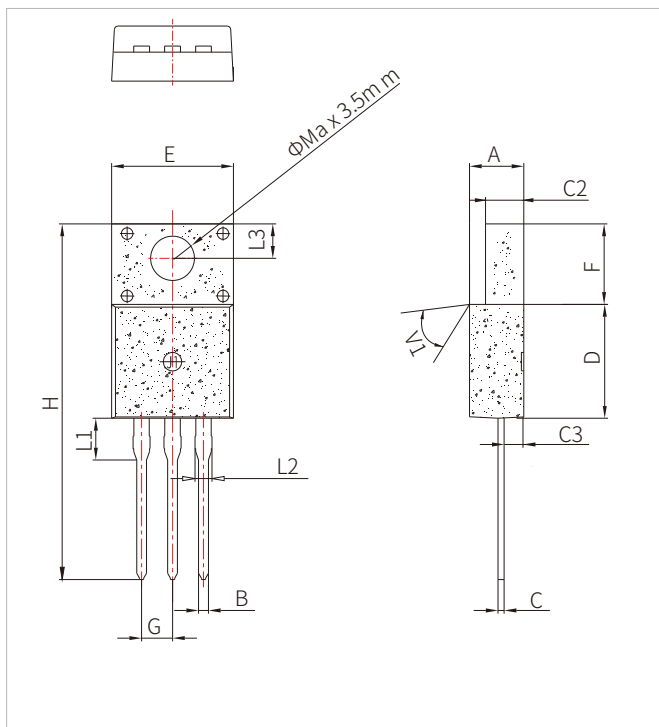



Fig.10 Unclamped Inductive Switching Test Circuit & Waveforms


TO-220F PACKAGE MECHANICAL DATA



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.90	0.173		0.193
B	0.74	0.80	0.83	0.029		0.033
C	0.45		0.75	0.018		0.030
C2	2.40		2.70	0.094		0.106
C3	2.60		3.00	0.102		0.118
D	8.80		9.30	0.346		0.366
E	9.70		10.4	0.382		0.409
F	6.40		7.00	0.252		0.276
G		2.54			0.1	
H	28.0		30.0	1.102		1.181
L1		3.55			0.140	
L2	1.14		1.70	0.045		0.067
L3		3.30			0.130	
V1		45°			45°	

ORDERING INFORMATION

Part Number	Component Package	Marking	QTY/Tube	Box	Carton
SNM12N80F	TO-220F	 12N80 XXXX	50PCS	1000PCS	5000PCS

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By QR Code

Website



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