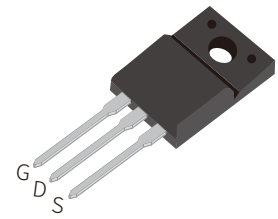


## FEATURES

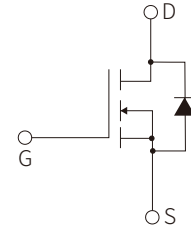
- | Low Gate Charge
- | Low Crss
- | Improved dv/dt Capability
- | Improved ESD Capability
- | 100% Avalanche energy test



TO-220F

## APPLICATION

- | High efficiency swith mode power supplies
- | Electronic lamp ballasts
- | UPS



Schematic Symbol

## APPROVALS

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

## ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C )

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	800	V
Continuous Drain Current	I <sub>D</sub>	T <sub>c</sub> =25°C	7
		T <sub>c</sub> =100°C	4.0
Plused Drain Current <sup>(note1)</sup>	I <sub>DM</sub>	28	A
Gate-Source Voltage	V <sub>GS</sub>	±30	V
Avalanche Current <sup>(note1)</sup>	I <sub>AR</sub>	7.0	A
Repetitive Avalanche Energy <sup>(note1)</sup>	E <sub>AR</sub>	18	mJ
Single Pulsed Avalanche Energy <sup>(note2)</sup>	E <sub>AS</sub>	418	mJ
Peak Diode Recovery <sup>(note3)</sup>	dv/dt	4.5	V/ns
Power Dissipation T <sub>c</sub> =25°C	P <sub>D</sub>	49	W
Power Dissipation Derating Factor Above 25°C	P <sub>D(DF)</sub>	0.39	W/°C
Maximum Temperature for Soldering	T <sub>L</sub>	300	°C
Operating Junction Temperature Range	T <sub>J</sub>	150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 to +150	°C
Thermal Resistance, Junction to Case	R <sub>thjc</sub>	2.55	°C/W
Thermal Resistance, Junction to Ambient	R <sub>thja</sub>	62.5	°C/W

\* Drain current limited by maximum junction temperature

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
<b>Off Characteristics</b>							
Drain-source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	800			V	
Breakdown voltage temperature coefficient	$\Delta BV_{DSS} / \Delta T_J$	$I_D=250\mu A$ , referenced to 25°C		0.7		V/°C	
Zero Gate Voltage Drain current	$I_{DSS}$	$V_{DS}=800V, V_{GS}=0V, T_C=25^\circ C$			10	$\mu A$	
		$V_{DS}=640V, T_C=125^\circ C$			100	$\mu A$	
Gate Leakage Current	$I_{GSS}$	$V_{GS}=30V, V_{DS}=0V$			100	nA	
		$V_{GS}=-30V, V_{DS}=0V$			-100	nA	
<b>On Characteristics</b>							
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0		4.0	V	
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=3.5A$			1.7	$\Omega$	
Forward Transconductance	$g_{FS}$	$V_{DS}=40V, I_D=3.5A$		5.0		S	
<b>Dynamic Characteristics</b>							
Input capacitance	$C_{iss}$	$V_{DS} = 25V, V_{GS} = 0V, f=1MHz$		1200		pF	
Output capacitance	$C_{oss}$				125		pF
Reverse Transfer capacitance	$C_{rss}$				12		pF
Turn-on Delay Time	td(on)	$V_{DD}=400V, I_D=7A, R_G=25\Omega$ (note 4,5)		35		ns	
Turn-On rise time	tr				100		ns
Turn-off Delay Time	td(off)				50		ns
Turn-off Fall time	tf				60		ns
Total gate charge	$Q_g$				27		nC
Gate-source charge	$Q_{gs}$	$V_{DS}=640V, I_D=7A, V_{GS}=10V$ (note 4,5)			8.2	nC	
Gate-drain charge	$Q_{gd}$				11		nC
Maximum Continuous Drain-Source Diode Forward Current	$I_S$				7	A	
Maximum Pulsed Drain-Source Diode Forward Current	$I_{SM}$				28	A	
Drain-Source Diode Forward Voltage	$V_{SD}$	$I_S=7A, V_{GS}=0V$			1.4	V	
Reverse recovery time	Trr	$I_S=7A, V_{GS}=0V,$ $di_f/dt=100A/\mu s$ (note 4)		650		ns	
Reverse recovery Charge	Qrr				7.0		$\mu C$

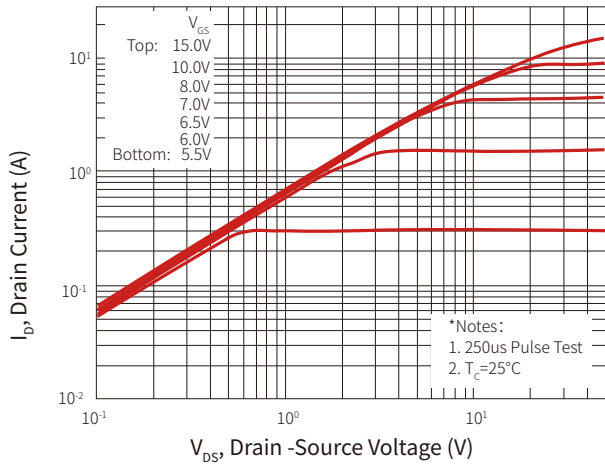
**Notes:**

1: Pulse width limited by maximum junction temperature  
 3:  $I_{SD} \leq 7A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS}$ , Starting  $T_J=25^\circ C$   
 5: Essentially independent of operating temperature

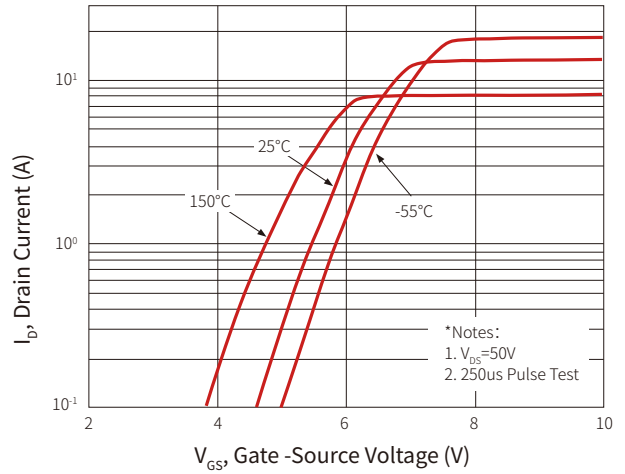
2:  $L=16mH, I_{AS}=7A, V_{DD}=50V, R_G=25\Omega$ , Starting  $T_J=25^\circ C$   
 4: Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$

# CHARACTERISTIC CURVES

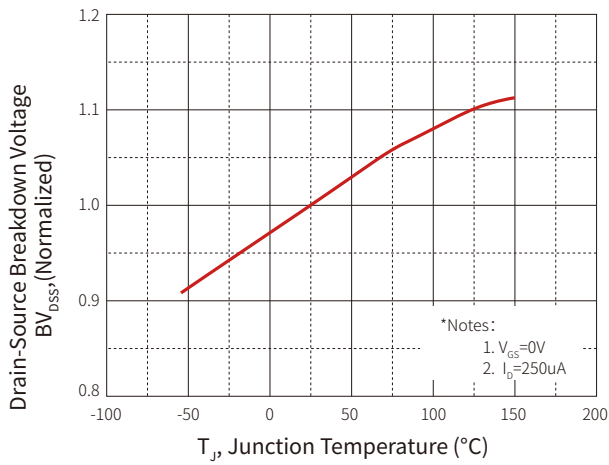
**Fig.1 On-State Characteristics**



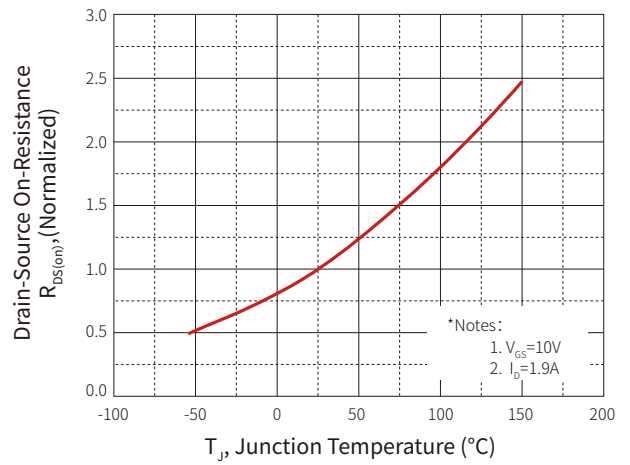
**Fig.2 Transfer Characteristics**



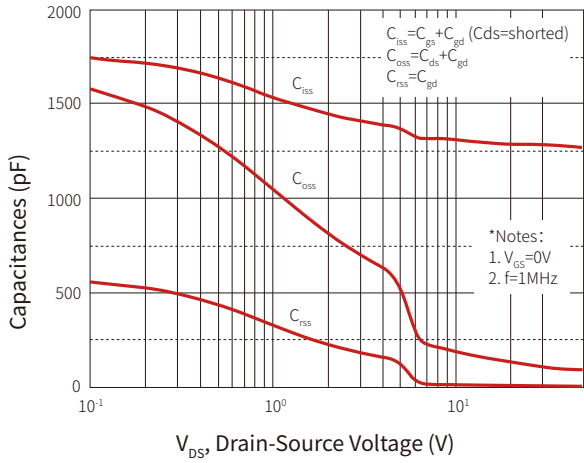
**Fig.3 Breakdown Voltage Variation vs Temperature**



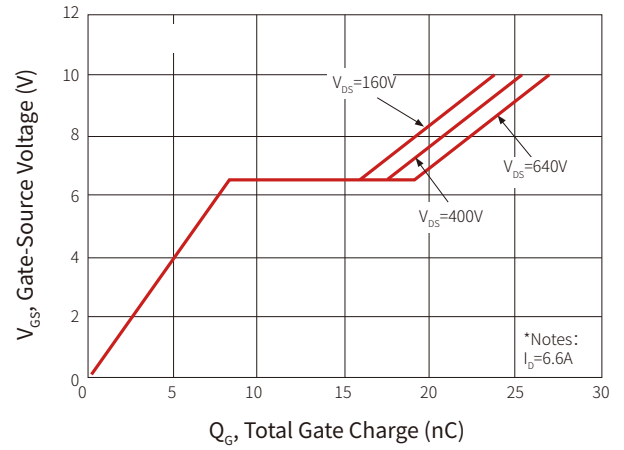
**Fig.4 On-Resistance Variation vs Temperature**



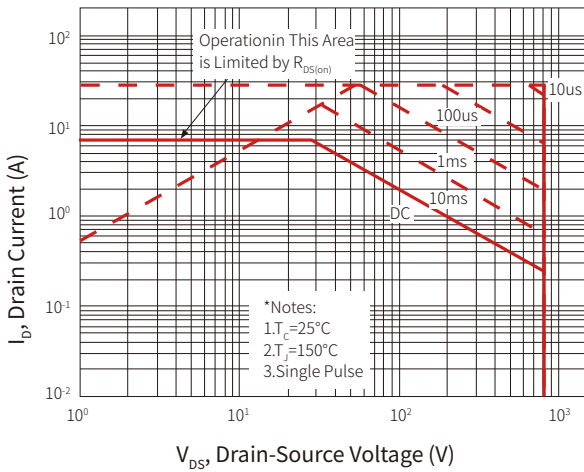
**Fig.5 Capacitance Characteristics**



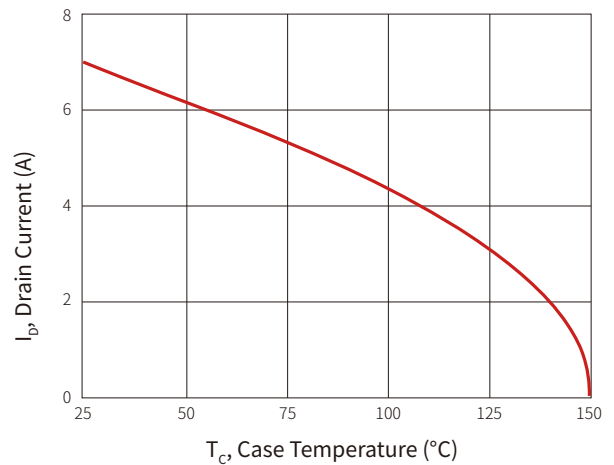
**Fig. 6 Gate Charge Characteristics**



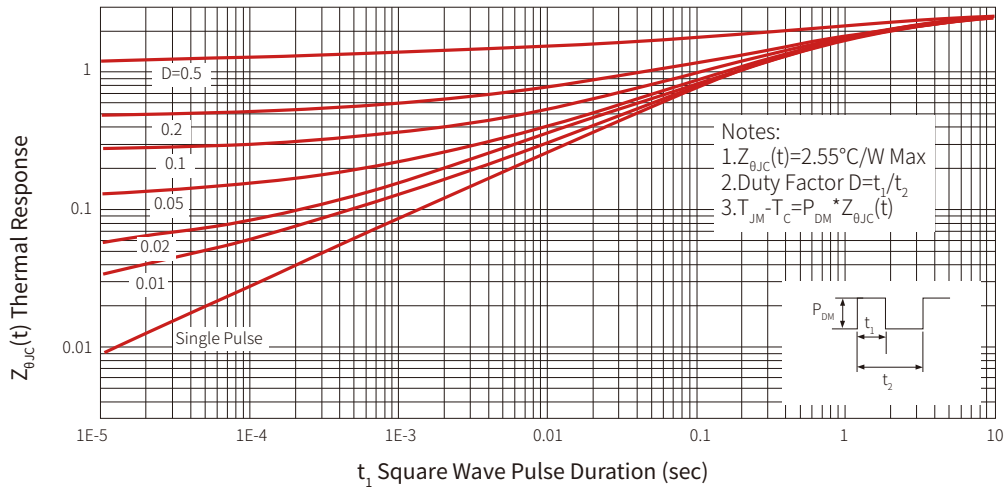
**Fig.7 Maximum Safe Operating Area**



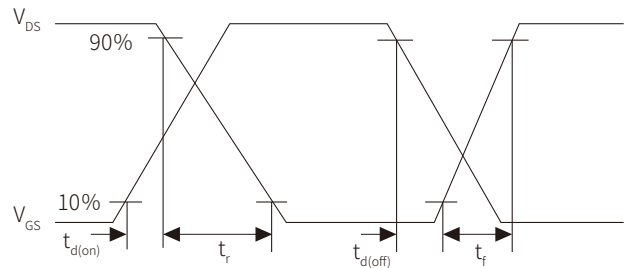
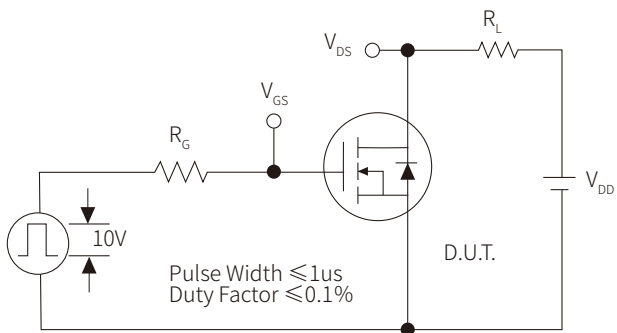
**Fig.8 Maximum Drain Current vs Case Temperature**



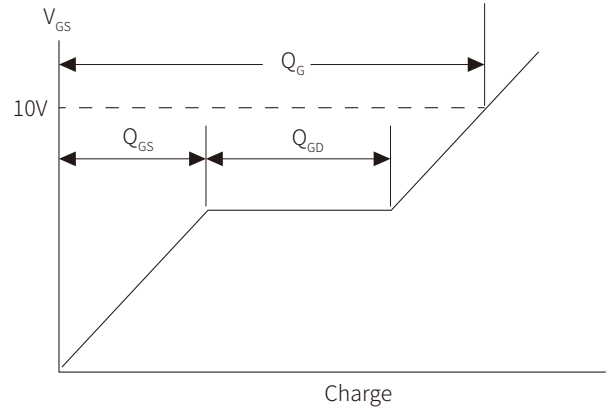
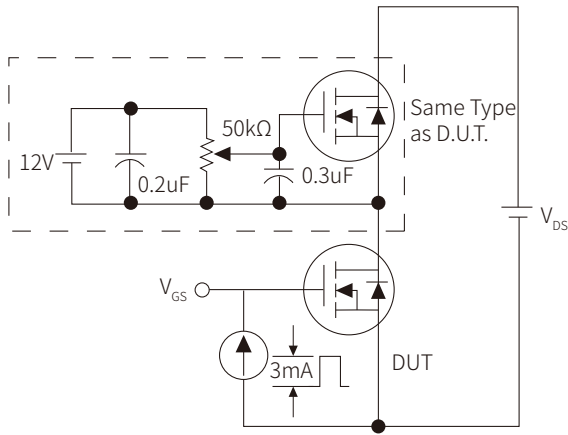
**Fig.9 Transient Thermal Response Curve**



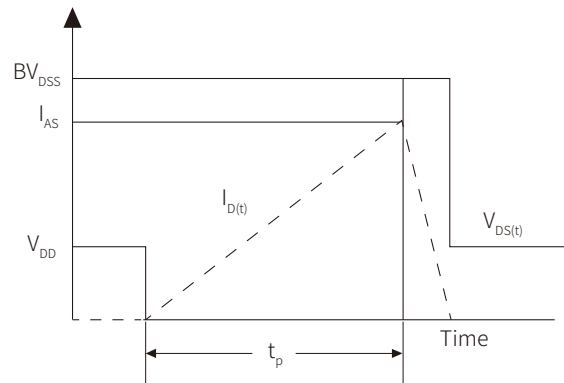
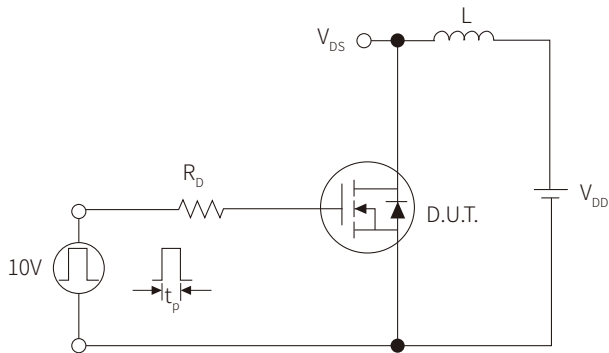
**Fig.10 Resistive Switching Test Circuit & Waveforms**



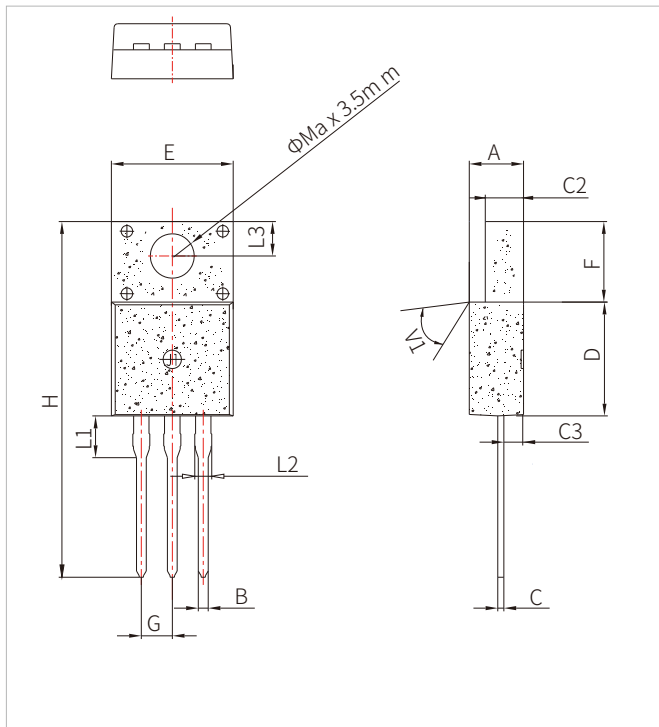
**Fig.11 Gate Charge Test Circuit & Waveform**



**Fig.12 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
SNM7N80F	TO-220F	 7N80 XXXX	50PCS	1000PCS

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**Customer Service**

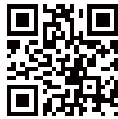
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