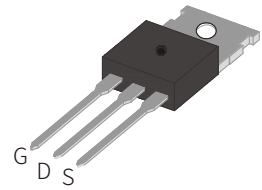


FEATURES

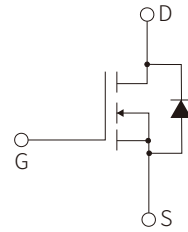
- | Low Gate Charge
- | Low Crss
- | Fast Switching
- | Improved dv/dt and ESD Capability
- | 100% Avalanche energy test



TO-220C

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}	650	V
Continuous Drain Current	I _D	T _C =25°C	20 [*]
		T _C =100°C	14 [*]
Plused Drain Current ^(note1)	I _{DM}	80	A
Gate-Source Voltage	V _{GS}	±30	V
Avalanche Current ^(note1)	I _{AR}	20	A
Repetitive Avalanche Energy ^(note1)	E _{AR}	81	mJ
Single Pulsed Avalanche Energy ^(note2)	E _{AS}	720	mJ
Peak Diode Recovery ^(note3)	dv/dt	4.5	V/ns
Power Dissipation T _C =25°C	P _D	240	W
Power Dissipation Derating Factor Above 25°C	P _{D(DF)}	2.0	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)}	0.52	°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	650			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} =650V, V _{GS} =0V, T _C =25°C			1	μA	
		V _{DS} =520V, T _C =125°C			10	μA	
Gate-Body Leakage Current, Forward	I _{GSSF}	V _{GS} =30V, V _{DS} =0V			100	nA	
Gate-Body Leakage Current, Reverse	I _{GSSR}	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 =9A		0.36	0.45	Ω	
Forward Transconductance	g _{FS}	V _{DS} =40V, I _D =9A (note 4)		11.0		S	
Dynamic Characteristics							
Input Capacitance	C _{iss}	V _{DS} = 25V, V _{GS} = 0V, f=1.0MHz		2418		pF	
Output Capacitance	C _{oss}				168		pF
Reverse Transfer Capacitance	C _{rss}				20		pF
Turn-On Delay Time	t _{d(on)}	V _{DD} =350V, I _D =18A, R _G =25Ω (note 4,5)		48		ns	
Turn-On Rise Time	t _r			27		ns	
Turn-Off Delay Time	t _{d(off)}			133		ns	
Turn-Off Fall Time	t _f			45		ns	
Total Gate Charge	Q _G	V _{DS} =560V, I _D =18A, V _{GS} =15V (note 4,5)		59		nC	
Gate-Source Charge	Q _{GS}			10		nC	
Gate-Drain Charge	Q _{GD}			20		nC	
Maximum Continuous Drain-Source Diode Forward Current	I _S				20	A	
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				80	A	
Drain-Source Diode Forward Voltage	V _{SD}	I _S =18A, V _{GS} =0V			1.4	V	
Reverse Recovery Time	t _{rr}	I _S =18A, V _{GS} =0V, di _F /dt=100A/μs(note 4)		450		ns	
Reverse Recovery Charge	Q _{rr}				3.4		μC

Notes:

1: Pulse width limited by maximum junction temperature
 3: I_{SD} ≤ 18A, di/dt ≤ 300A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J=25°C
 5: Essentially independent of operating temperature

2: L=4.5mH, I_{AS}=18A, 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

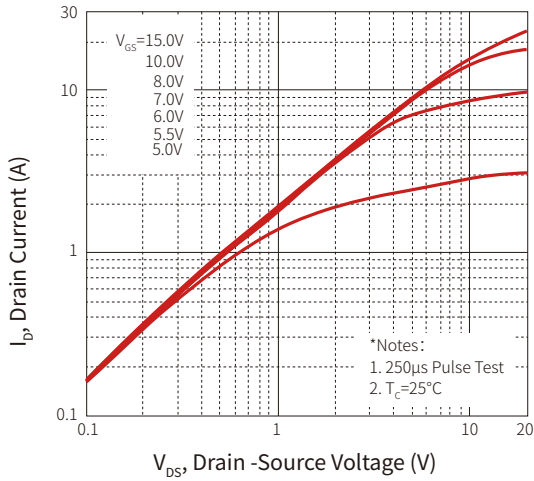


Fig.2 Transfer Characteristics

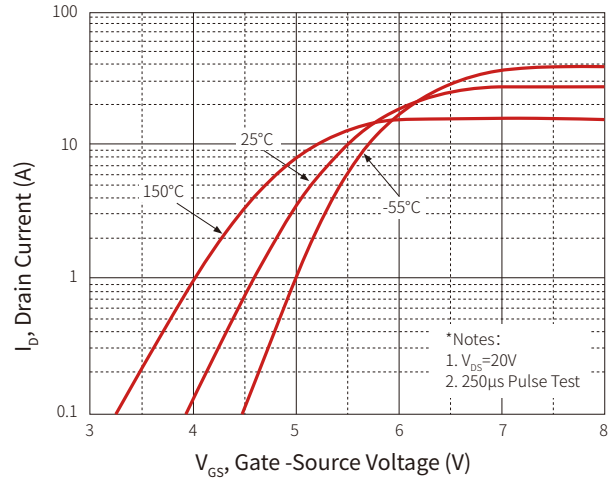


Fig.3 Breakdown Voltage Variation vs Temperature

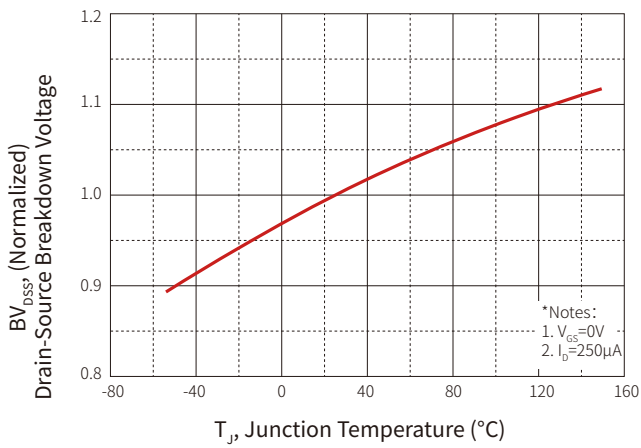


Fig. 4 On-Resistance Variation vs Temperature

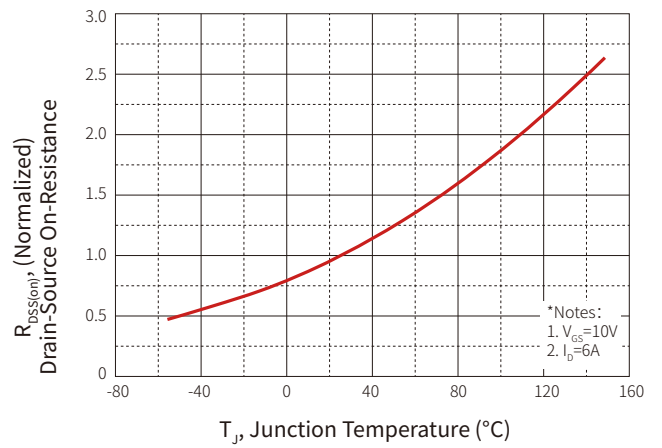


Fig.5 Gate Charge Characteristics

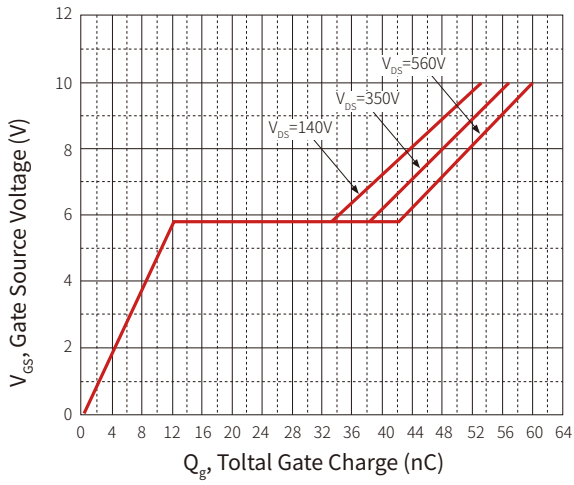


Fig.6 Maximum Safe Operating Area

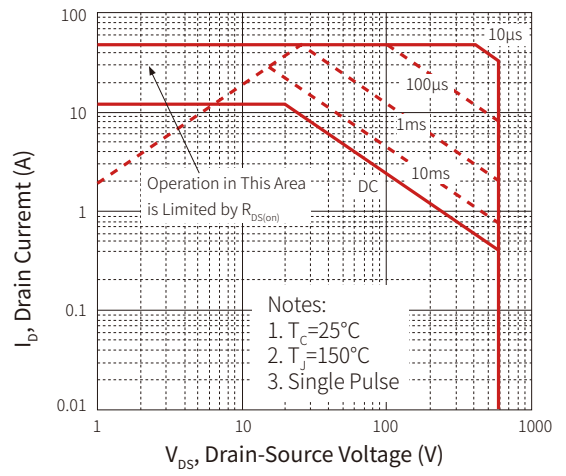


Fig.7 Resistive Switching Test Circuit & Waveforms

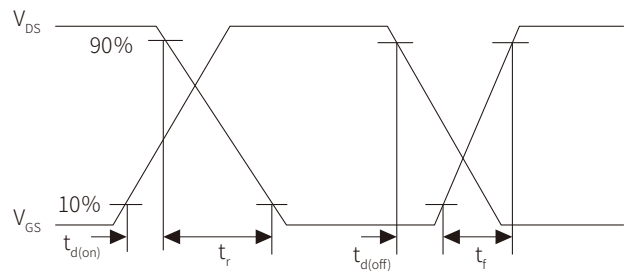
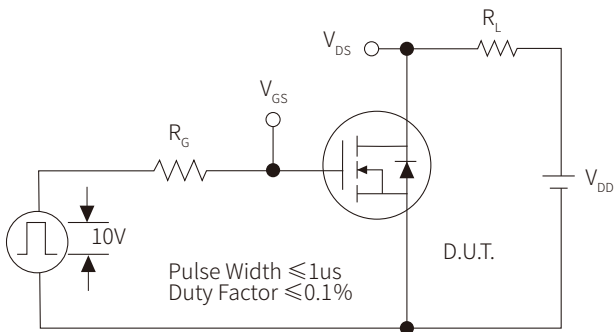


Fig.8 Gate Charge Test Circuit & Waveform

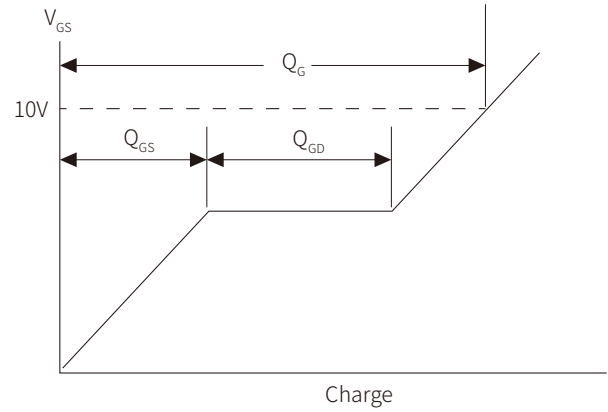
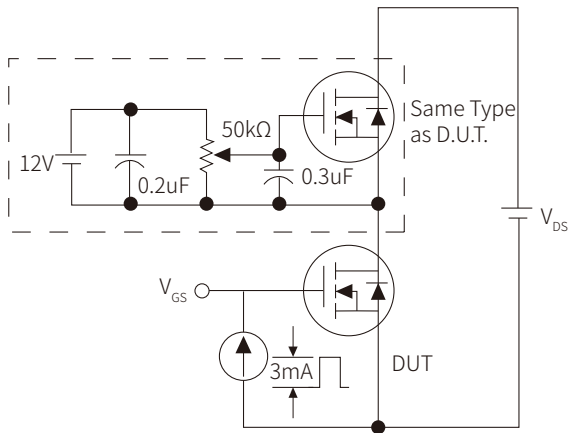
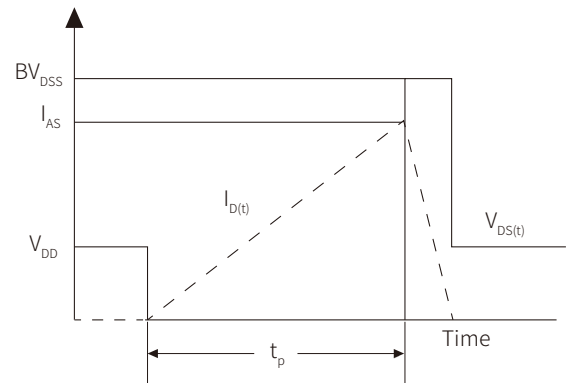
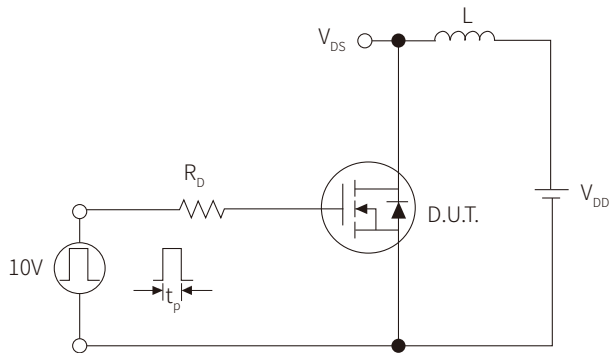
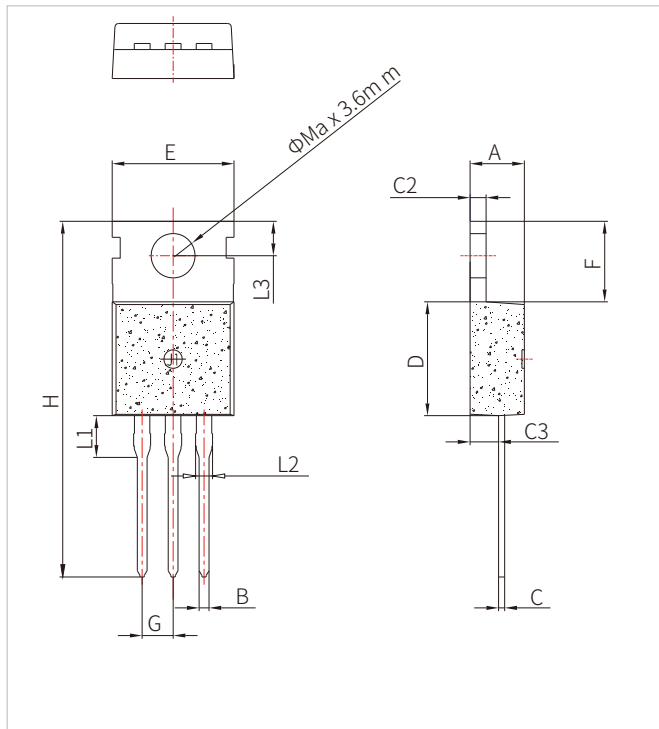


Fig.9 Unclamped Inductive Switching Test Circuit & Waveforms




TO-220C PACKAGE MECHANICAL DATA



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.30		4.70	0.169		0.185
B	0.70		0.90	0.028		0.035
C	0.45		0.60	0.018		0.024
C2	1.23		1.32	0.048		0.052
C3	2.20		2.60	0.087		0.102
D	8.80		10.0	0.346		0.394
E	9.90		10.3	0.390		0.406
F	6.30		6.90	0.248		0.272
G		2.54			0.1	
H	28.0		30.0	1.102		1.181
L1		3.10			0.122	
L2	1.14		1.70	0.045		0.067
L3	2.65		2.95	0.104		0.116
Φ		3.6			0.142	

ORDERING INFORMATION

Part Number	Package	Marking	Qty/pcs		
			Tube	Inner Box	Carton
SNM20N65C	TO-220C	 20N65 XXXX	50	1000	5000

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