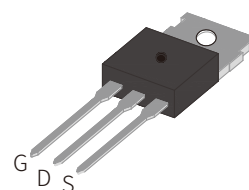


FEATURES

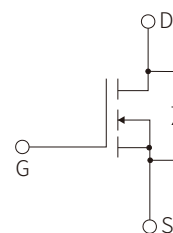
- | Low Gate Charge
- | Low Crss
- | Fast Switching
- | Improved dv/dt and ESD Capability
- | 100% Avalanche energy test

APPLICATION

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



TO-220C



Schematic Symbol

APPROVALS

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

ABSOLUTE MAXIMUM RATINGS ($T_A=25^{\circ}\text{C}$)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	650	V
Continuous Drain Current	$T_C=25^{\circ}\text{C}$	I_D	20*	A
	$T_C=100^{\circ}\text{C}$		14*	A
Pulsed 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 $T_C=25^{\circ}\text{C}$		P_D	240	W
Power Dissipation Derating Factor Above 25°C		$P_{D(DF)}$	2.0	W/ $^{\circ}\text{C}$
Maximum Temperature for Soldering		T_L	300	$^{\circ}\text{C}$
Operating Junction Temperature Range		T_J	150	$^{\circ}\text{C}$
Storage Temperature Range		T_{STG}	-55 to +150	$^{\circ}\text{C}$
Thermal Resistance, Junction to Case		$R_{th(j-c)}$	0.52	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Ambient		$R_{th(j-a)}$	62.5	$^{\circ}\text{C/W}$

* 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	I _S =18A, V _{GS} =0V			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

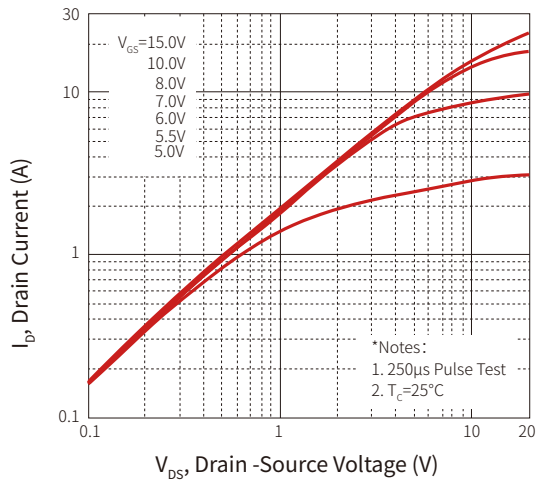


Fig.2 Transfer Characteristics

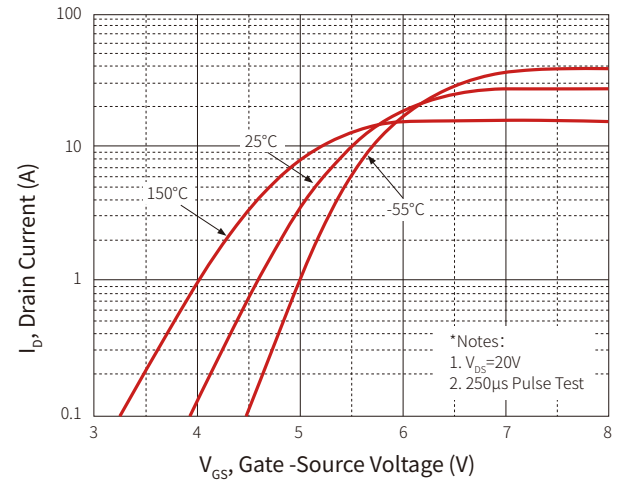


Fig.3 Breakdown Voltage Variation vs Temperature

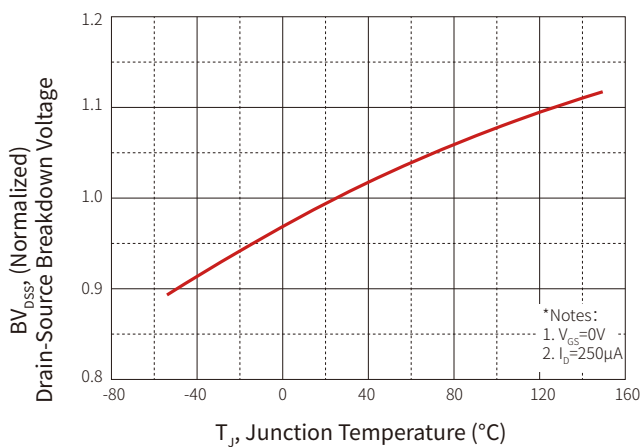


Fig. 4 On-Resistance Variation vs Temperature

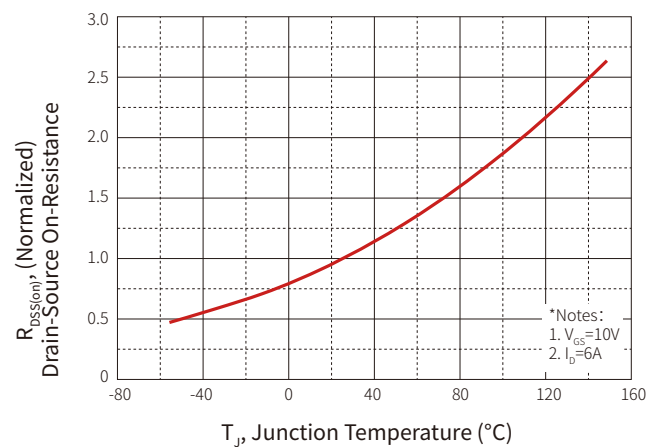


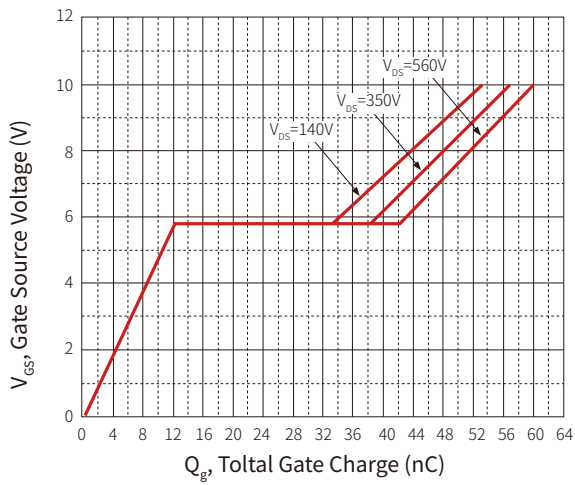
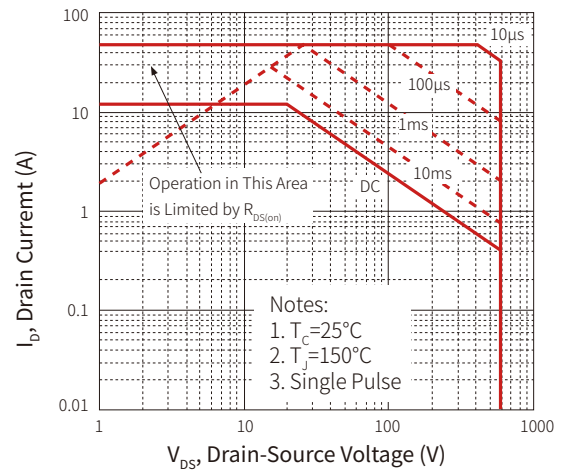
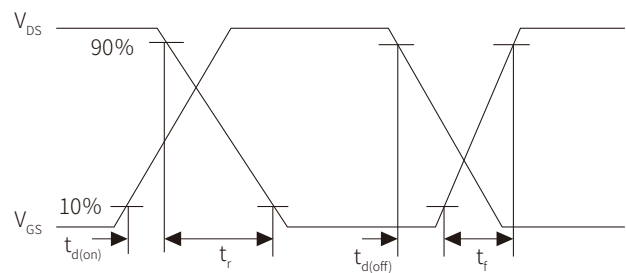
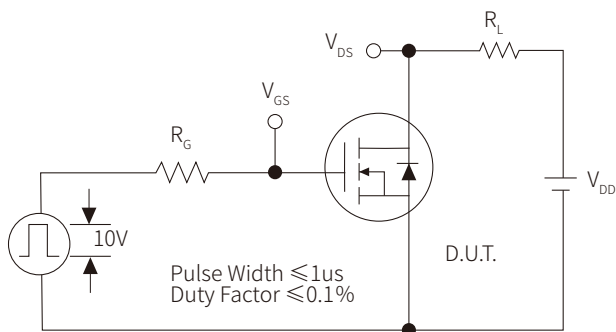
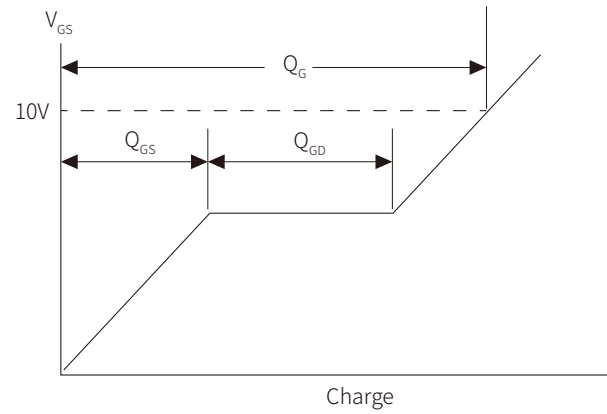
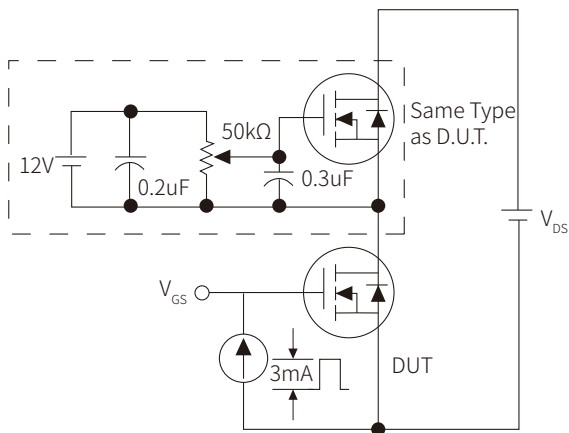
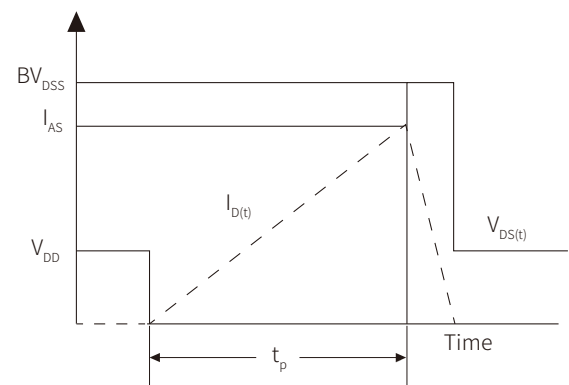
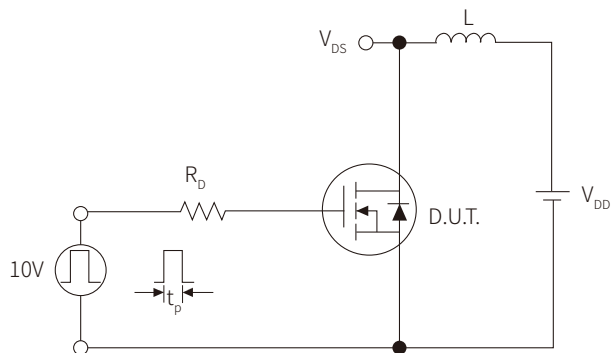
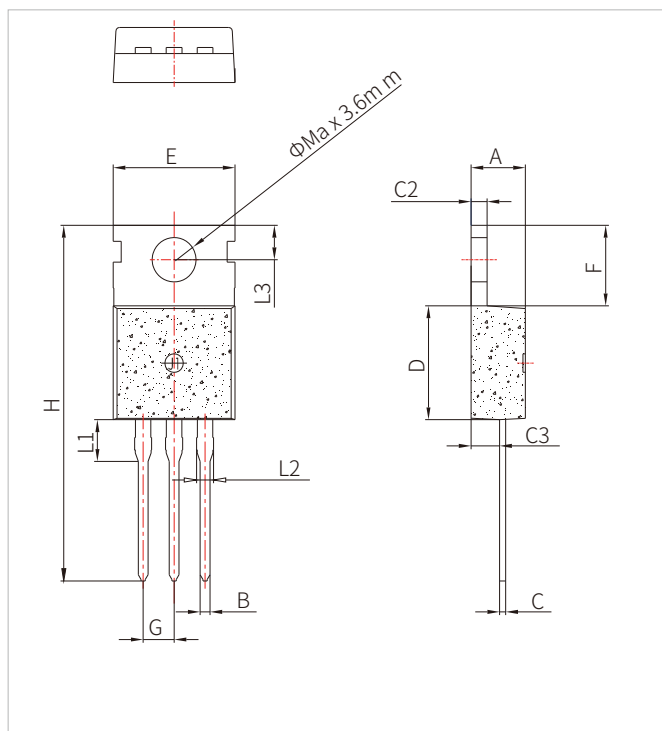
Fig.5 Gate Charge Characteristics

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		3.65			0.144	
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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