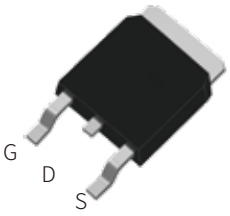
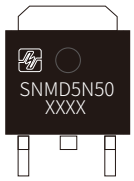
FEATURES

- Low Gate Charge
- Low ON Resistance
- Improved dv/dt Capability
- 100% Avalanche Tested



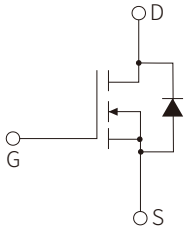
TO-252



Marking

APPLICATION

- Switching Mode Power Supplies (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC) (PFC)
- Charger



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_{GS}=0V)		V_{DS}	500	V
Continuous Drain Current[1]	T_C=25°C	I_D	5	A
	T_C=100°C		3	A
Drain current pulsed [2]		$I_{D,pulse}$	20	A
Gate-Source Voltage		V_{GS}	±30	V
Single pulsed Avalanche Energy [3]		E_{AS}	180	mJ
MOSFET dv/dt Ruggedness, V_{DS} = 0...480V		dv/dt	5	V/ns
Total power dissipation (@T_C=25°C)		P_D	48.3	W
Continuous Diode Forward Current		I_S	5	A
Diode Pulsed Current[2]		$I_{S,pulse}$	20	A
Operating Junction Temperature & Storage Temperature		T_{STG}, T_J	-55 to +150	°C
Thermal Resistance, Junction-to-Case		R_{thJC}	2.59	°C/W
Thermal Resistance, Junction-to-Ambient		R_{thJA}	62	°C/W

Notes
1. Limited by maximum junction temperature.
2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3 . L=10mH, ID=5A, Start TJ=25°C

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	500			V
Zero Gate Voltage Drain current	I_{DSS}	V_{DS}=500V, V_{GS}=0V,T_J=25°C			1	μA
		V_{DS}=500V, V_{GS}=0V,T_J=150°C			100	μA
Gate Leakage Current	I_{GSS}	V_{GS}=±30V			±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	2		4	V
Drain-Source On-State-Resistance	$R_{DS(on)}$	V_{GS}=10V ,I_D=2.5A		1.2	1.5	Ω
Gate Resistance	R_G	f = 1.0MHz open drain		2.5		Ω
Dynamic Characteristics						
Input capacitance	C_{ISS}	V_{DS} = 25V, V_{GS} = 0V, f=1MHz		488		pF
Output capacitance	C_{OSS}			60		pF
Reverse Transfer capacitance	C_{rss}			7.2		pF
Turn-on Delay Time	td(on)	V_{DD}=250V,I_D=5A, R_G=10Ω V_{GS}=10V		14		ns
Rising time	tf			18		ns
Turn-off Delay Time	td(off)			32		ns
Input capacitance	tf			11		ns
Total gate charge	Q_g	V_{DD}=400V,I_D=5A,V_{GS}=10V		16.5		nC
Gate-source charge	Q_{gs}			3.8		nC
Gate-drain charge	Q_{gd}			5.6		nC
Gate Plateau Voltage	$V_{Plateau}$			4.6		V
Drain-Source Body Diode Characteristics						
Diode forward voltage drop.	V_{SD}	I_{SD}=5A, V_{GS}=0V,T_J = 25°C			1.2	V
Reverse recovery time	Trr	V_R=400V, I_F=5A, di_F/dt=100A/us		328		ns
Reverse recovery Charge	Qrr			1.6		uC

CHARACTERISTIC CURVES

Fig.1 Transient Thermal Impedance

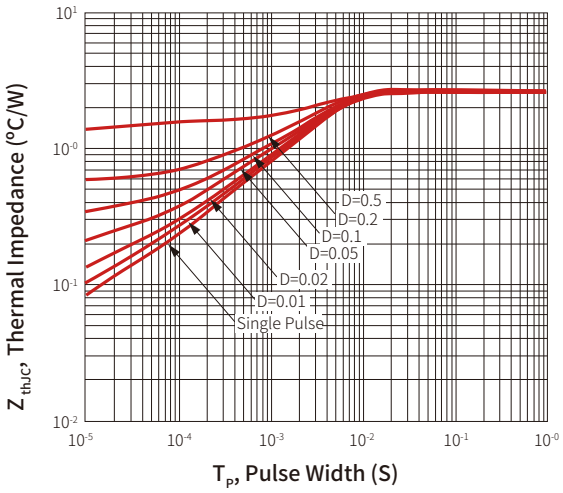


Fig.2 Transient Thermal Impedance

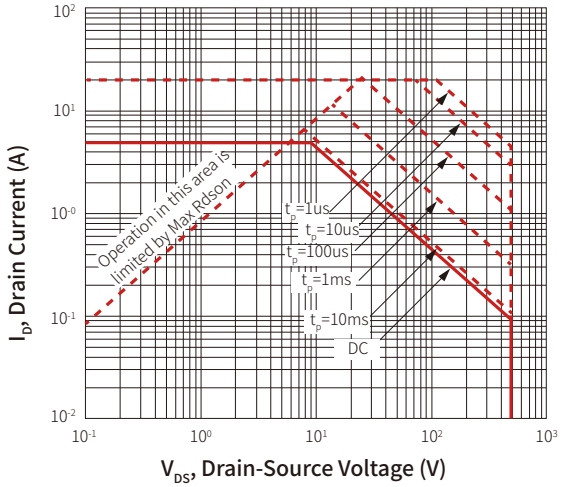


Fig.3 Transfer Characteristics

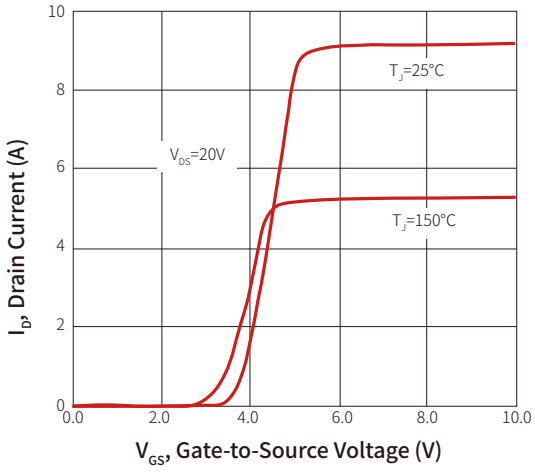


Fig.4 Capacitance Characteristics

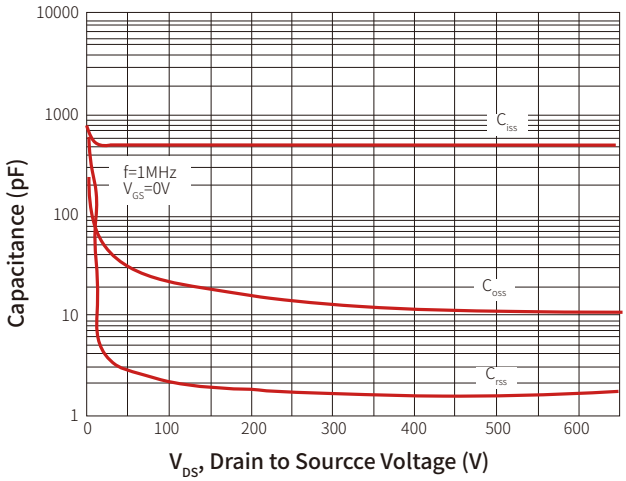


Fig.5 On-Resistance vs Drain Current

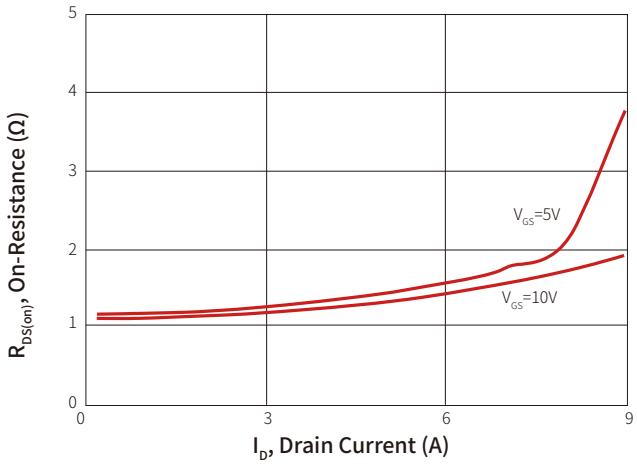


Fig. 6 Capacitance

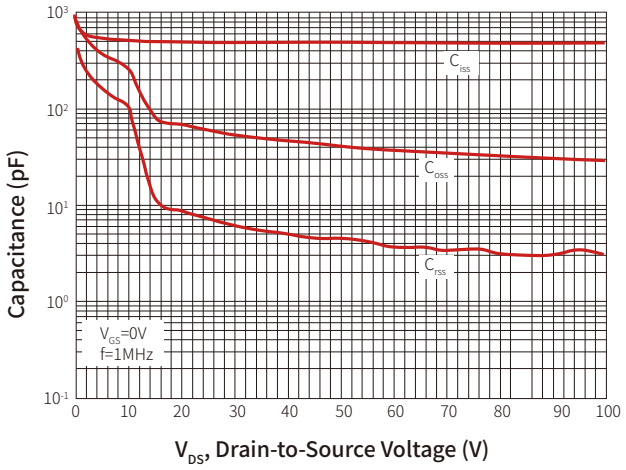


Fig.7 Gate Charge

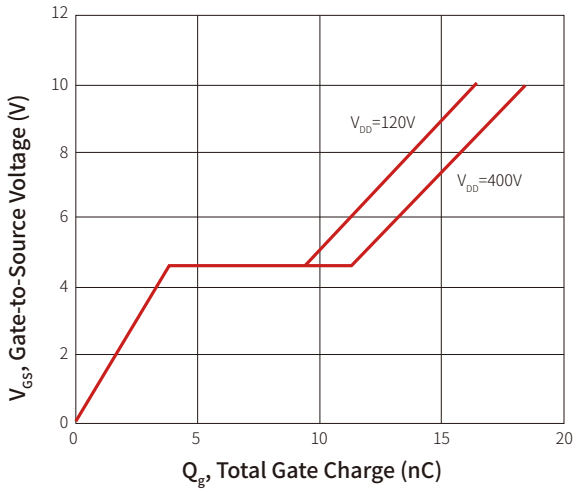


Fig.8 Body Diode Forward Voltage

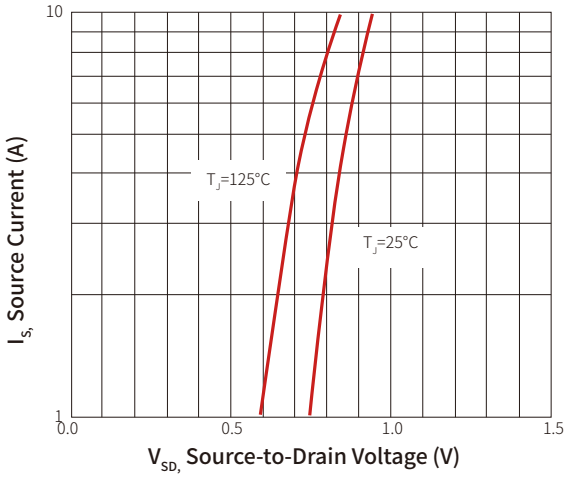


Fig.9 Breakdown Voltage vs Junction Temperature

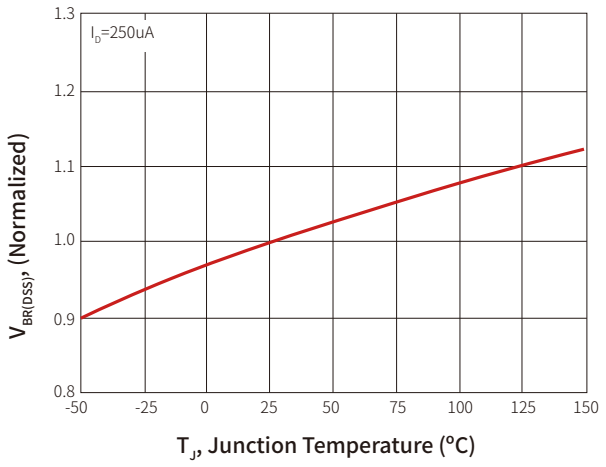


Fig. 10 On-Resistance vs Temperature

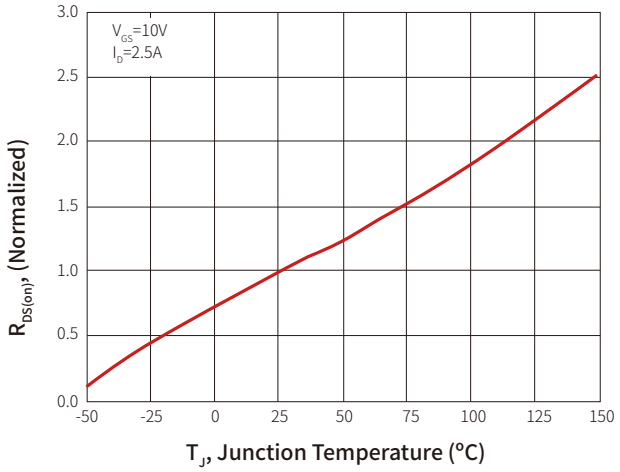
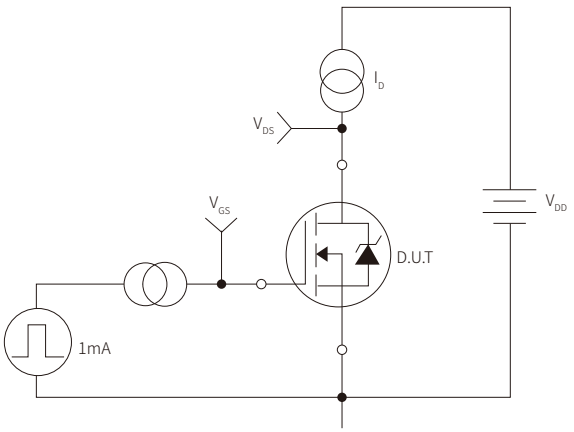


Fig.11 Gate Charge Test Circuit and Waveform



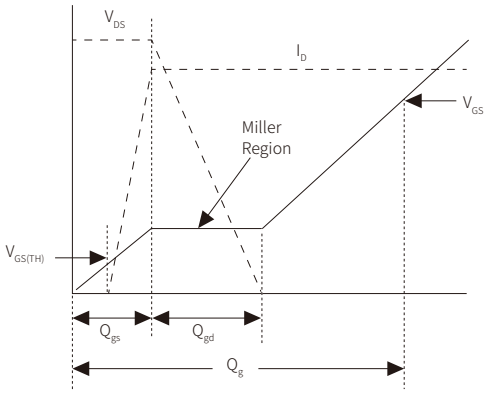


Fig.12 Resistive Switching Test Circuit and Waveform

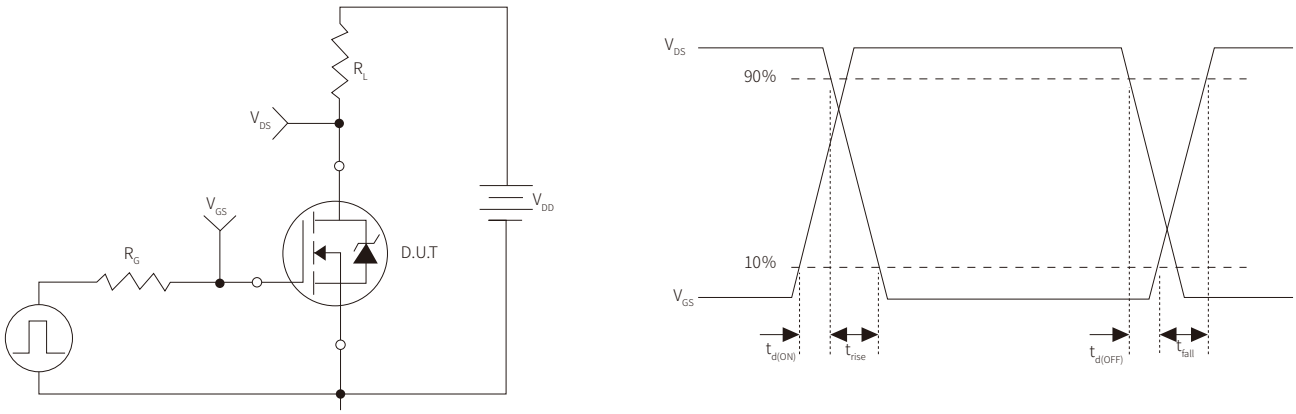
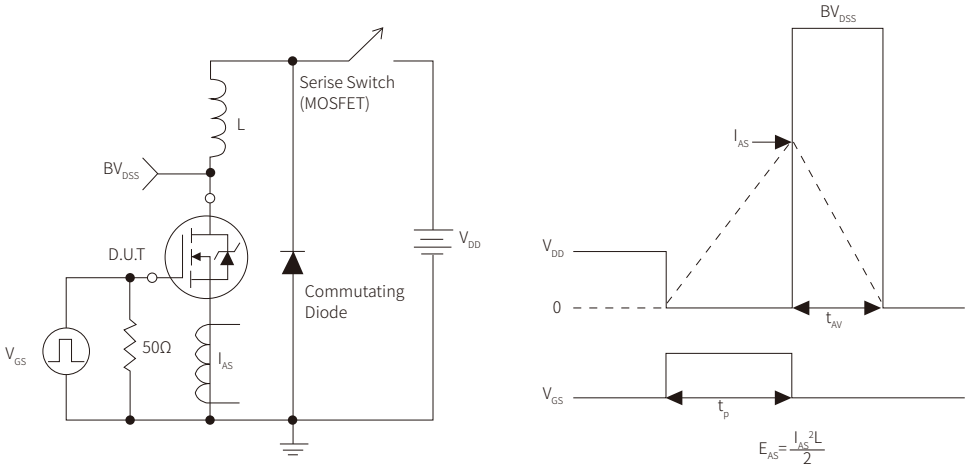
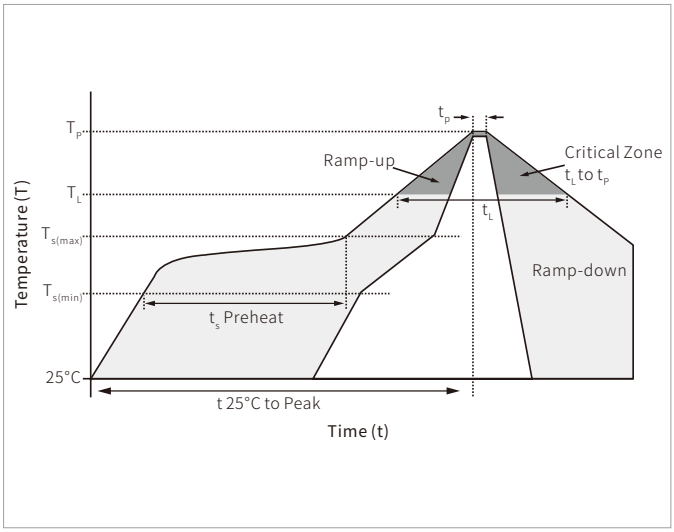


Fig.13 Unclamped Inductive Switching Test Circuit and Waveform

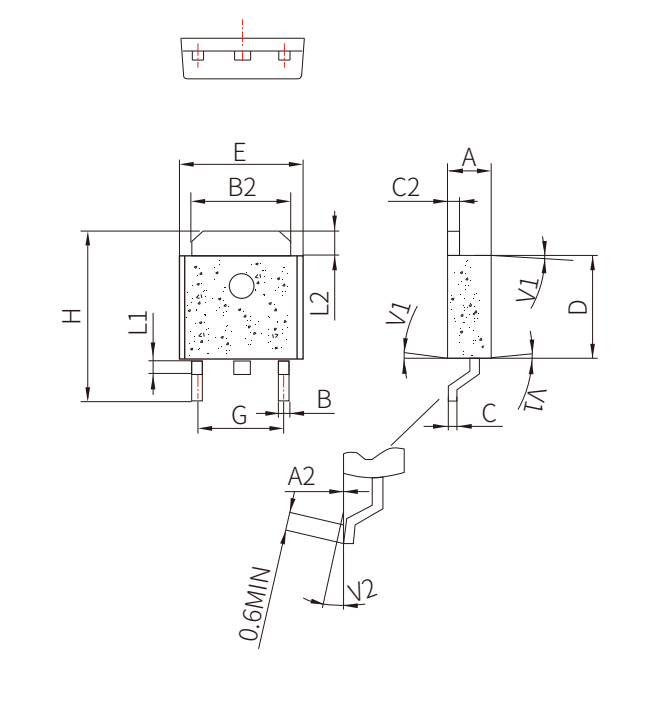


SOLDERING PARAMETERS

Reflow Condition		Lead–free assembly
Pre Heat	Temperature Max ($T_{s(min)}$)	150°C
	Temperature Max ($T_{s(max)}$)	200°C
	Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus Temp (T_L) to peak		3°C/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	Temperature (T_L) (Liquidus)	217°C
	Time (min to max) (t_L)	60 – 150 seconds
Peak Temperature (T_P)		260°C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes max.
Do not exceed		260°C



TO-252 PACKAGE MECHANICAL DATA



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0.03		0.23	0.001		0.009
B	0.55		0.65	0.022		0.026
B2	5.10		5.40	0.200		0.213
C	0.45		0.62	0.018		0.024
C2	0.48		0.62	0.019		0.024
D	6.00		6.20	0.236		0.244
E	6.40		6.80	0.252		0.268
G	4.40		4.70	0.173	0.1	0.185
H	9.35		10.7	0.368		0.421
L1	1.30		1.70	0.051	0.143	0.067
L2	1.37		1.50	0.054		0.059
V1		4°			0.130	
V2	0°		8°	0°		8°

ORDERING INFORMATION

Part Number	Component Package	QTY/Reel	Reel Size
SNMD5N50	TO-252	5000PCS	13”

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