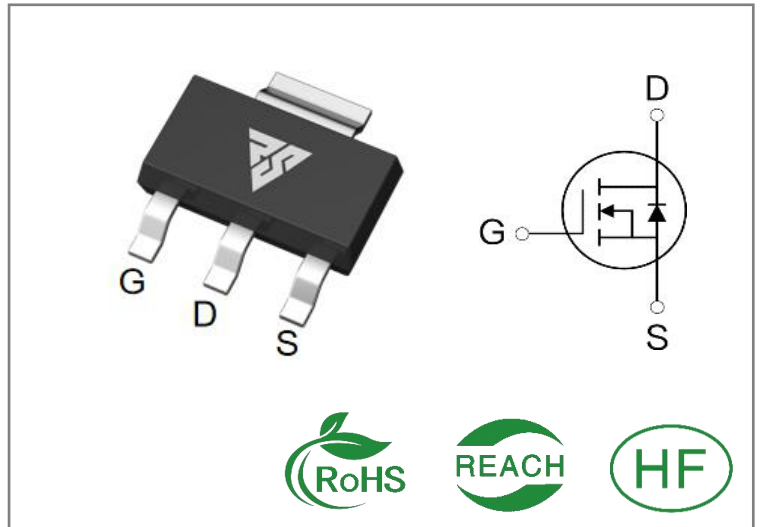


ID	R _{DS(ON)} (Typ)	VDSS
3A	2.5Ω	500V


Applications:

- Switch Mode Power Supply(SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

Features:

- Fast switching speed
- 100% avalanche tested
- Improved dv/dt capability

Ordering Information

Part Number	Package	Marking	Packing	Qty.
RS3N50C	SOT-223	RS3N50C	Tape&reel	4000 PCS

Absolute Maximum Ratings Tc= 25°C unless otherwise specified

Symbol	Parameter	RS3N50C	Units
VDSS	Drain-to-Source Voltage	500	V
ID	Continuous Drain Current	3	A
IDM	Pulsed Drain Current (Note*1)	12	
PD	Power Dissipation	5.56	W
VGS	Gate- to- Source Voltage	±30	V
EAS	Single Pulse Avalanche Energy L = 10.0mH, VDD = 50V, RG = 25 Ω	28.8	mJ
IAS	Avalanche Current (Note*1)	2.4	A
E _{AR}	Repetitive Avalanche Energy (Note*1)	0.12	mJ
TL TPKG	Maximum Temperature for Soldering	300	°C
	Leads at 0.063in(1.6mm)from Case for 10 seconds Package Body for 10 seconds	260	
TJ and TSTG	Operating Junction and Storage Temperature Range	-55 to 150	

* Drain Current Limited by Maximum Junction Temperature

Caution: Stresses greater than those listed in the " Absolute Maximum Ratings" Table may cause permanent damage to the device.

Thermal Resistance

Symbol	Parameter	RS3N50C	Units	Test Conditions
R θ JC	Junction-to-Case	22.5	°C / W	Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of + 150 °C
R θ JA	Junction-to-Ambient	62.5		1 cubic foot chamber, free air.

OFF Characteristics T_J= 25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BVDSS	Drain- to- source Breakdown Voltage	500	--	--	V	V _{GS} =0V, I _D =250μA
IDSS	Drain- to- Source Leakage Current	--	--	1	μA	V _D S=500V, V _{GS} =0V
IGSS	Gate- to- Source Forward Leakage	--	--	100	nA	V _{GS} =30V , V _D S=0V
	Gate- to- Source Reverse Leakage	--	--	-100		V _{GS} =-30V , V _D S=0V

ON Characteristics T_J=25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
R _{DS(on)}	Static Drain- to- Source On-Resistance(Note*2)	--	2.5	3	Ω	V _{GS} =10V, I _D =1.5A
V _{GS(TH)}	Gate Threshold Voltage	3	--	4	V	V _{GS} =V _D S, I _D =250μA

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
t _{d(ON)}	Turn- on Delay Time	--	33	--	nS	V _D S=250V I _D =3A R _G =25Ω
t _{rise}	Rise Time	--	5.5	--		
t _{d(OFF)}	Turn- OFF Delay Time	--	57	--		
t _{fall}	Fall Time	--	34	--		

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	267	--	pF	VGS=0V VDS=25V f=1.0MHz
Coss	Output Capacitance	--	35	--		
Crss	Reverse Transfer Capacitance	--	7	--		
Qg	Total Gate Charge	--	9	--	nC	VDS=400V ID=3A VGS=10V
Qgs	Gate- to- Source Charge	--	1.3	--		
Qgd	Gate-to-Drain(" Miller") Charge	--	5.1	--		

Source- Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	2	A	Integral pn- diode in MOSFET
ISM	Maximum Pulsed Current	--	--	8	A	
VSD	Diode Forward Voltage	--	--	1.4	V	IS=1.5A,VGS=0V
trr	Reverse Recovery Time	--	325	--	nS	VGS=0V IS=3A,di/dt=100A/ μs
Qrr	Reverse Recovery Charge	--	0.78	--	μC	

Notes:

- * 1. Repetitive rating, pulse width limited by maximum junction temperature.
- * 2. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 1\%$

Typical Feature Curve

Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)

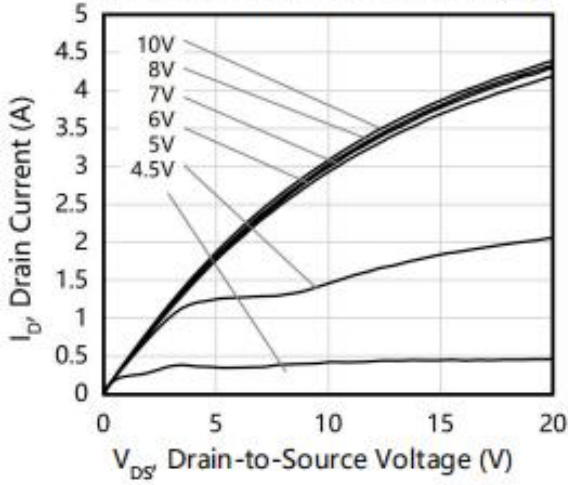


Figure 2. Body Diode Forward Voltage

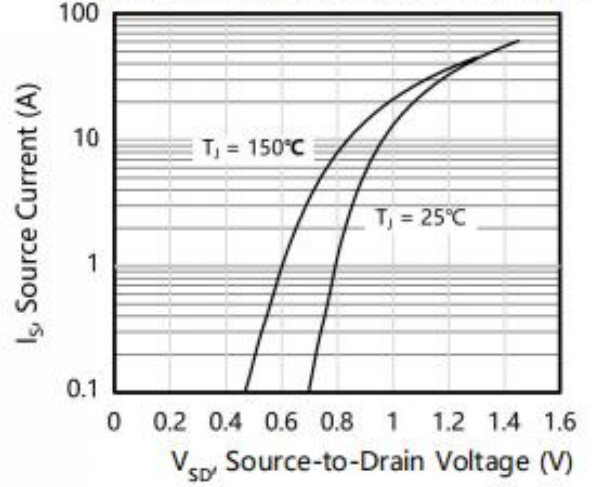


Figure 3. Drain Current vs. Temperature

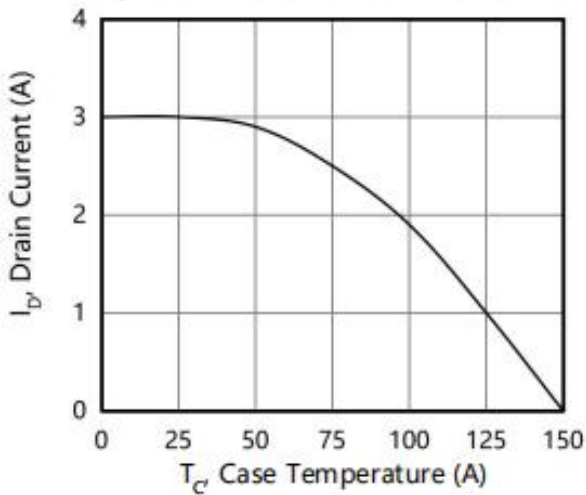


Figure 4. BV_{DSS} Variation vs. Temperature

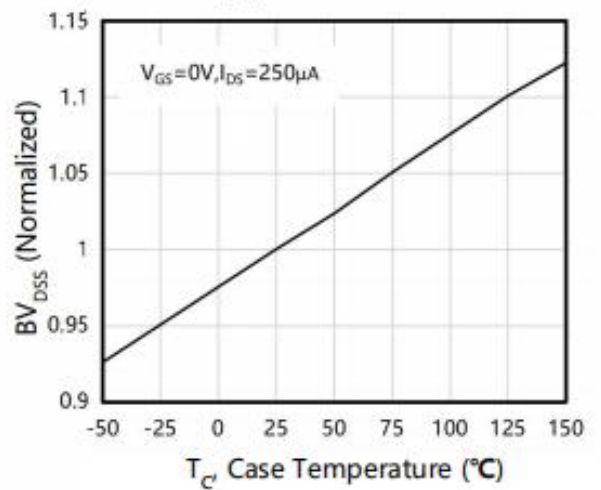


Figure 5. Transfer Characteristics

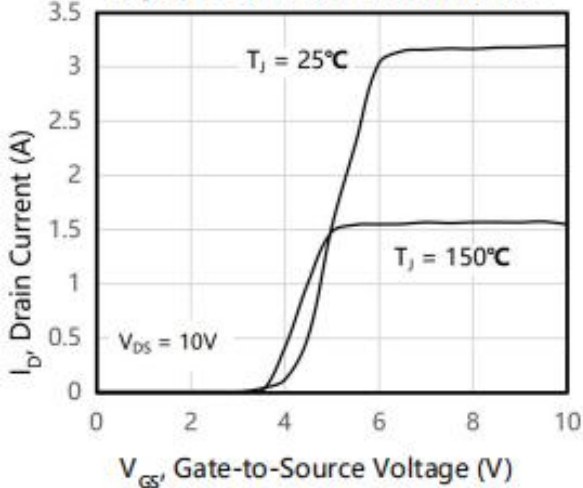


Figure 6. On-Resistance vs. Temperature

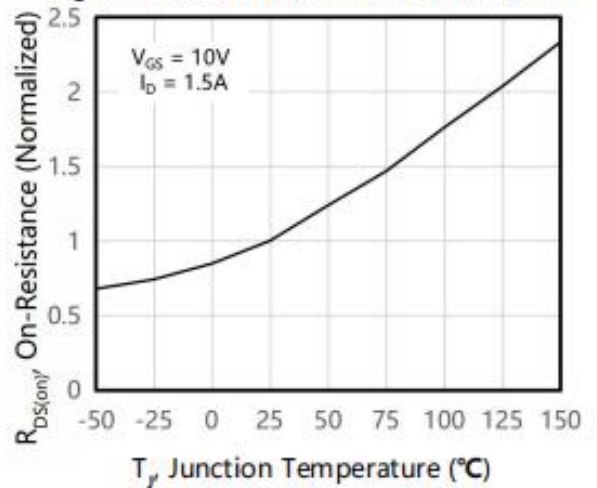


Figure 7. Capacitance

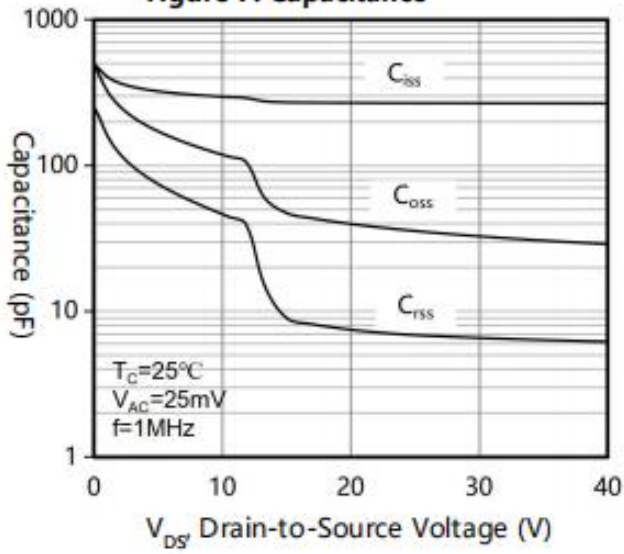


Figure 8. Gate Charge

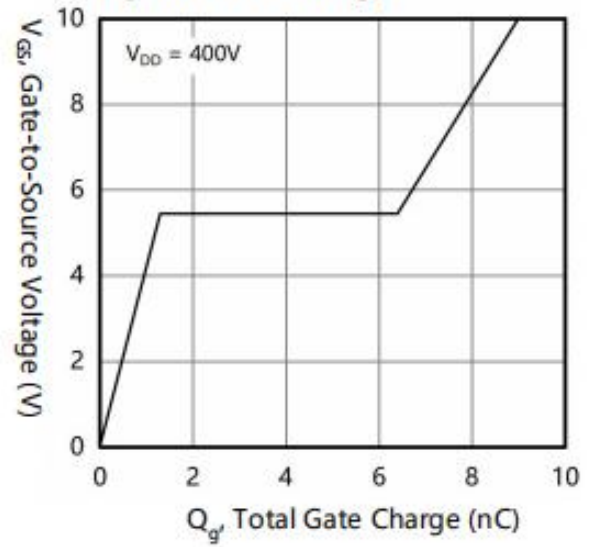
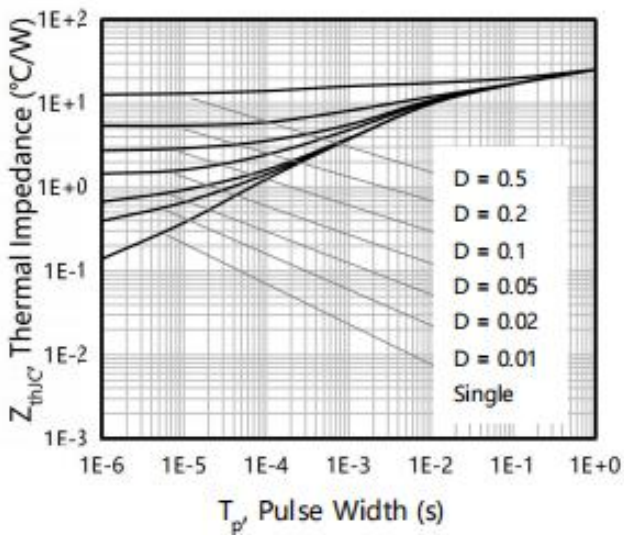


Figure 9. Transient Thermal Impedance



Test Circuits and Waveforms

Figure A: Gate Charge Test Circuit and Waveform

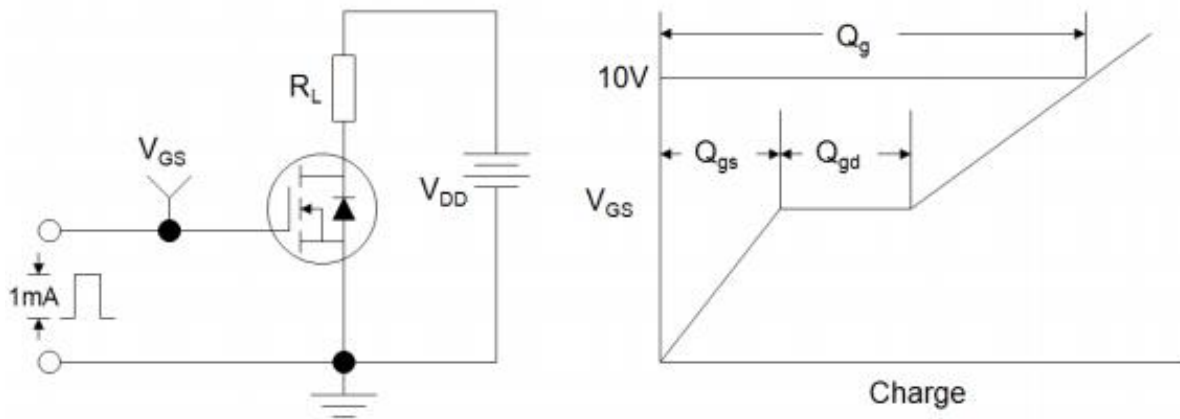


Figure B: Resistive Switching Test Circuit and Waveform

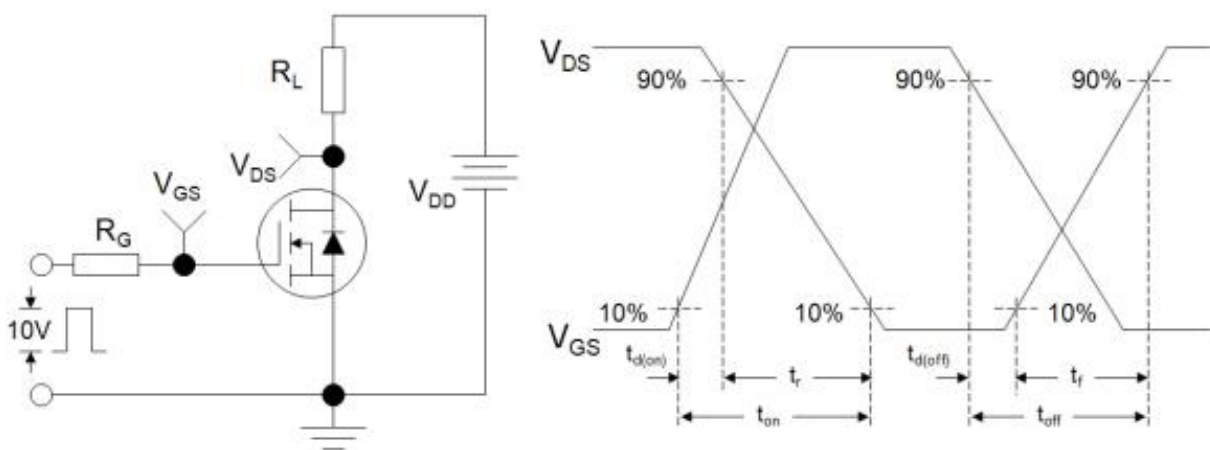
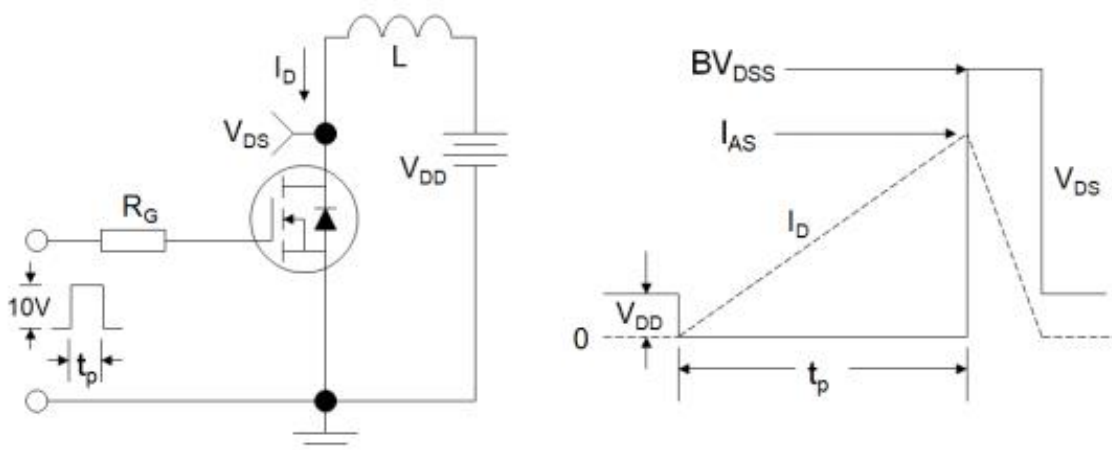
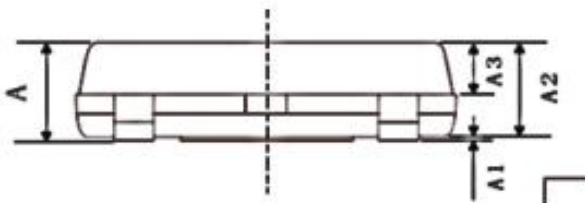
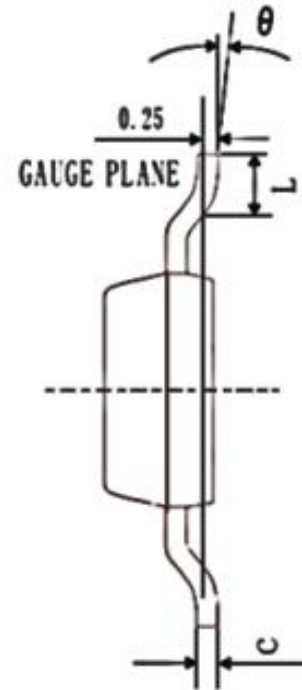
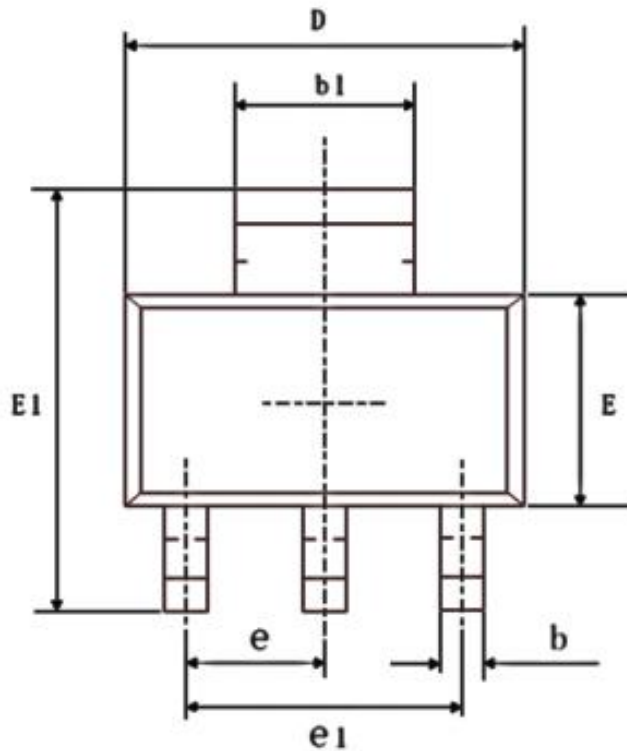


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



Package outline drawing

SOT-223



SYMBOLS	MILLIMETERS	
	MIN	MAX
A	--	1.80
A1	0.00	0.10
A2	1.50	1.70
A3	0.85	0.95
b	0.66	0.80
b1	2.96	3.10
C	0.25	0.35
D	6.30	6.70
E	3.30	3.70
E1	6.80	7.20
e1	4.40	4.80
L	0.90	1.15
e	0.00	10.00
e	2.3BSC	

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