

■ PRODUCT CHARACTERISTICS

VDSS	500V
$R_{DS(on)typ.} (@V_{GS}=10V)$	0.74Ω
Qg@type	28nC
ID	9A

■ APPLICATIONS

- High frequency switching mode power supply
- Electronic ballast
- LED power supply

■ FEATURES

- * Fast Switching Capability
- * Avalanche Energy Specified
- * Improved dv/dt Capability, High Ruggedness

■ ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	RST9N50D	TO-252	2500 pieces /Reel
N/A	RST9N50C	TO-251	70 pieces/Tube

■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise noted)

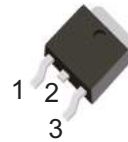
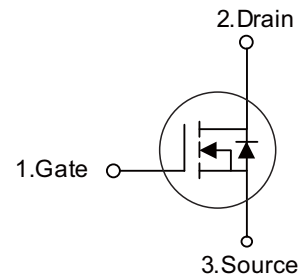
PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	500	V
Gate-Source Voltage		V _{GSS}	±30	V
Drain Current	Continuous (T _C =25°C)	I _D	9 (Note 5)	A
	Pulsed (Note 2)	I _{DM}	36 (Note 5)	A
Avalanche Current (Note 2)		I _{AR}	9	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	360	mJ
	Repetitive (Note 4)	E _{AR}	13.5	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation		P _D	44	W
Derate above 25°C			0.35	W/°C
Junction Temperature		T _J	+150	°C
Storage Temperature		T _{STG}	-55~+150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. L = 8mH, I_{AS} = 9A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
4. I_{SD} ≤ 9A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
5. Drain current limited by maximum junction temperature

Symbol



TO-252



TO-251

■ ELECTRICAL CHARACTERISTICS ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Off characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	500	-	-	V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =500V, V _{GS} =0V	-	-	1	μA
			V _{DS} =400V, T _C =125°C	-	-	10	
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =+30V, V _{DS} =0V	-	-	+100	nA
	Reverse		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
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =4.5A	-	0.74	0.8	Ω
Dynamic characteristics							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz	-	790	-	pF
Output Capacitance		C _{OSS}		-	130	-	pF
Reverse Transfer Capacitance		C _{RSS}		-	24	-	pF
Switching characteristics							
Total Gate Charge		Q _G	V _{GS} =10V, V _{DS} =400V, I _D =9A (Note 1, 2)	-	28	-	nC
Gate to Source Charge		Q _{GS}		-	4	-	nC
Gate to Drain Charge		Q _{GD}		-	15	-	nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =250V, I _D =9A, R _G =25Ω (Note 1, 2)	-	18	-	ns
Rise Time		t _R		-	65	-	ns
Turn-OFF Delay Time		t _{D(OFF)}		-	93	-	ns
Fall-Time		t _F		-	64	-	ns
Source-drain diode ratings and characteristics							
Maximum Body-Diode Continuous Current		I _S		-	-	9	A
Maximum Body-Diode Pulsed Current		I _{SM}		-	-	36	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =9A, V _{GS} =0V	-	-	1.4	V
Body Diode Reverse Recovery Time		t _{rr}	I _S =9A, V _{GS} =0V, dI _F /dt=100A/μs	-	335	-	ns
Body Diode Reverse Recovery Charge		Q _{RR}	(Note 1)	-	2.95	-	μC

Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

2. Essentially independent of operating temperature

TYPICAL CHARACTERISTICS

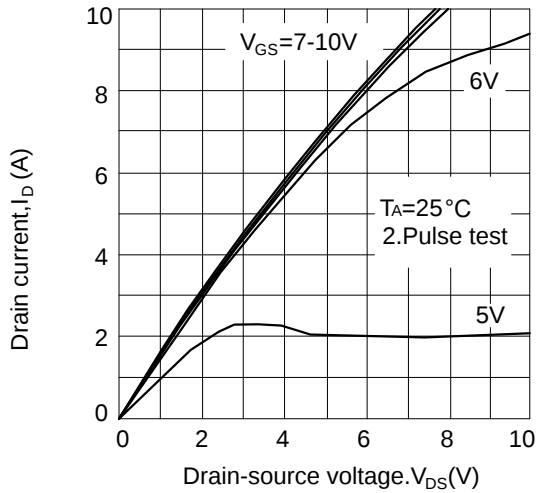


Figure 1: Drain current vs. drain-source voltage

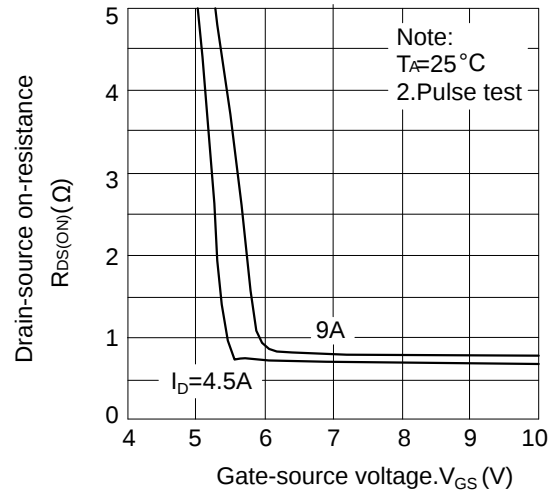


Figure 2: Drain-source on-resistance vs. gate source voltage

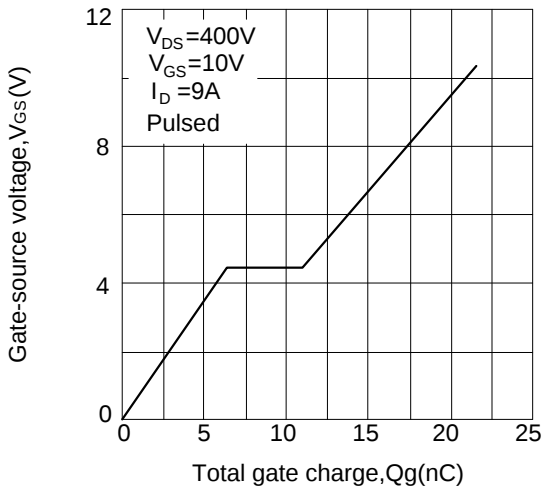


Figure 3: Gate charge characteristics

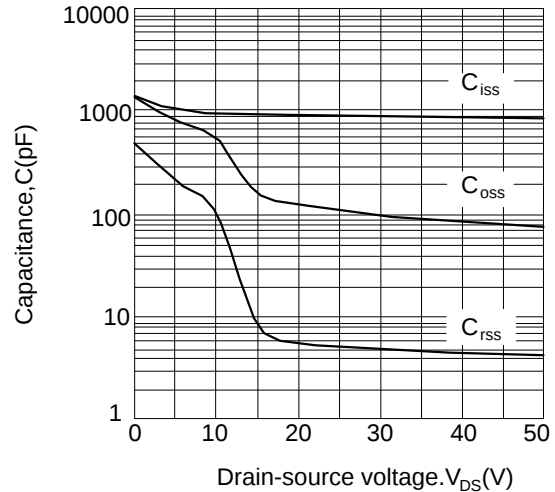


Figure 4: Capacitance characteristics

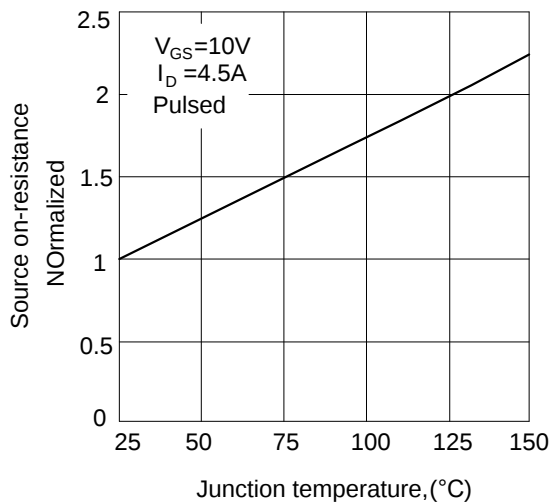


Figure 5: Drain-source on-resistance vs. junction temperature

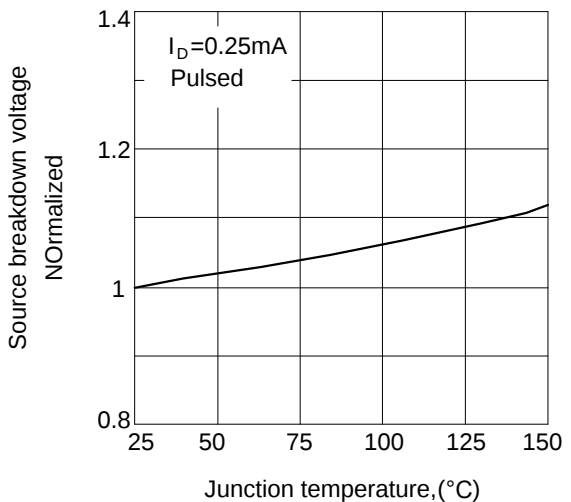


Figure 6: Breakdown voltage vs. junction temperature

TYPICAL CHARACTERISTICS(Cont.)

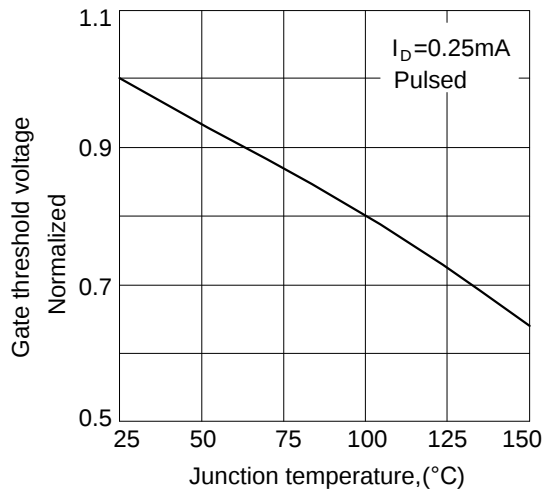


Figure 7: Gate threshold voltage vs. junction temperature

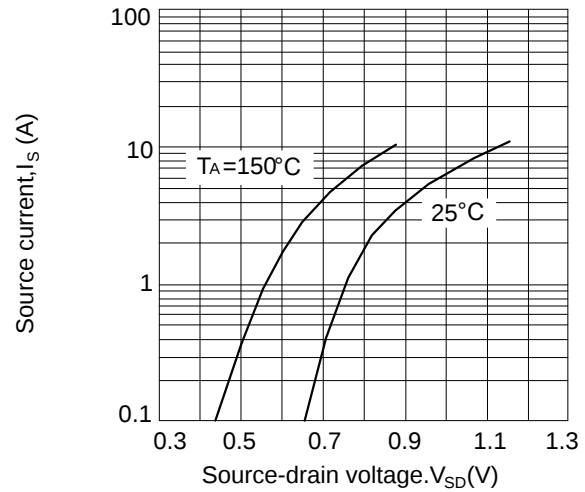


Figure 8: Source current vs. source-drain voltage

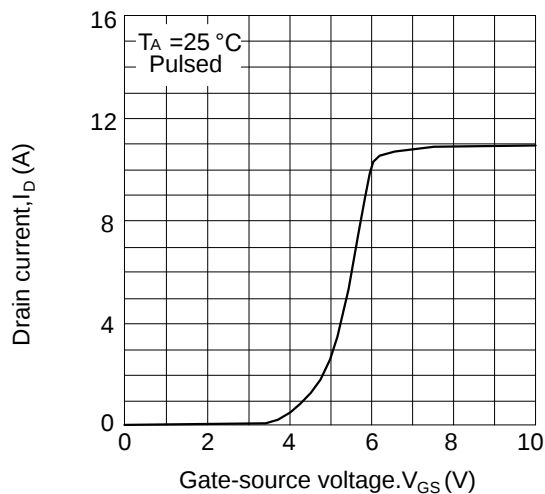


Figure 9: Drain current vs. case-source voltage

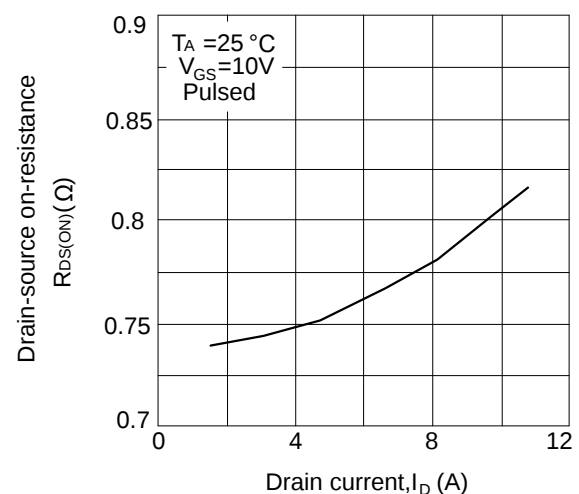


Figure 10: Drain-source on-resistance vs. drain current

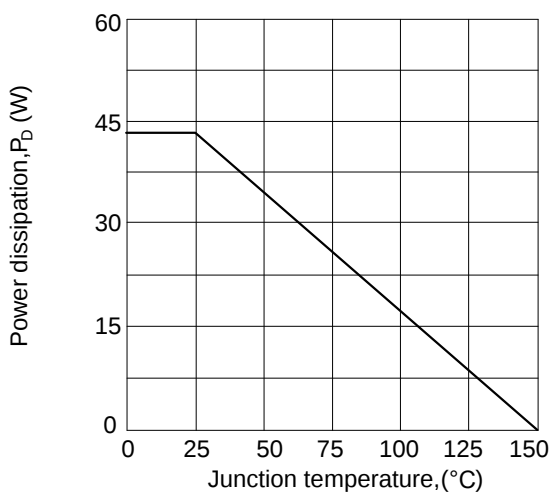


Figure 11: Power dissipation vs. junction temperature

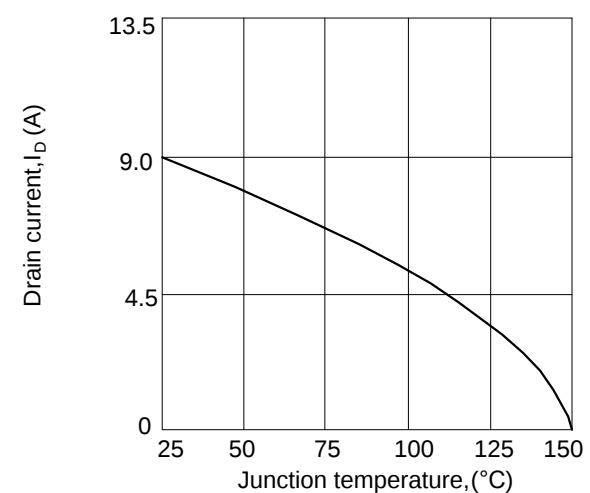


Figure 12: Drain current vs. junction temperature

TYPICAL CHARACTERISTICS(Cont.)

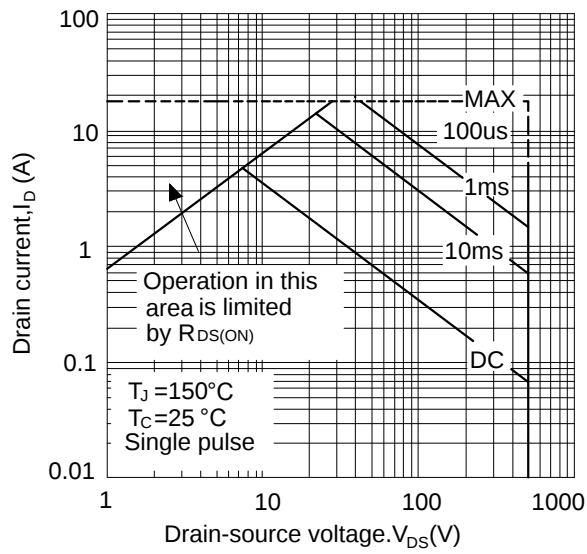
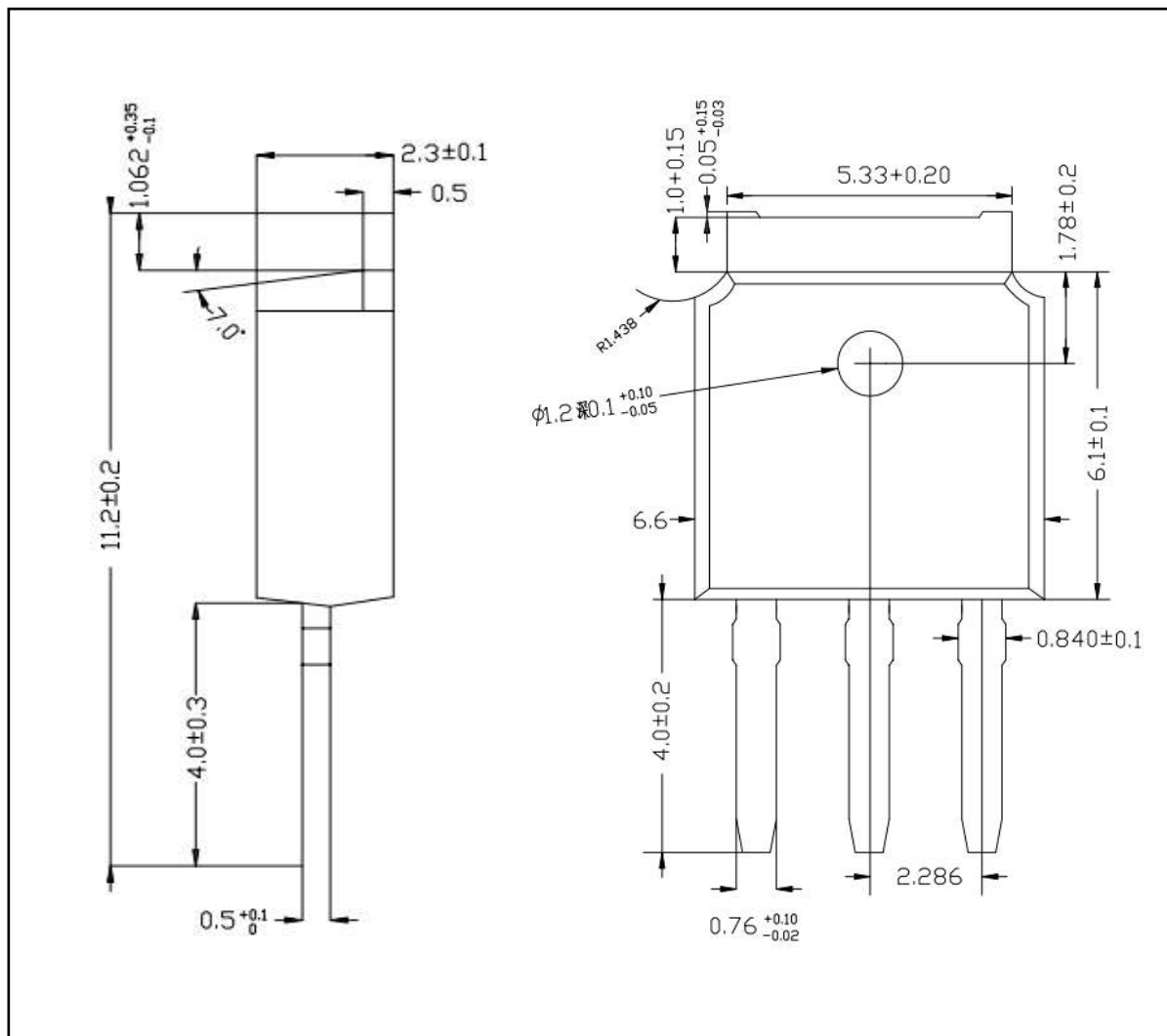


Figure 13: Safe operating area

■ TO-251 PACKAGE OUTLINE DIMENSIONS



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