N-Channel Enhancement Mode Field Effect Transistor

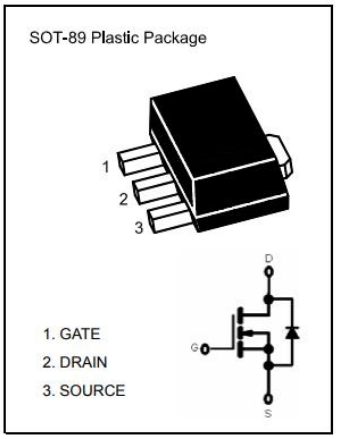
Features

100V/2.2A

$R_{DS(ON)}$=260mΩ (typ.) @ V_{GS}=10V

$R_{DS(ON)}$=270mΩ (typ.) @ V_{GS}=4.5V

SOT89 Package



General Description

The RCR10N02SM uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge . This device is suitable for use as a load switch or small power switching applications.

Marking:10N02

Absolute Maximum Ratings @T_A=25℃ unless otherwise noted

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current (Continuous)	T_A=25℃	I_D	2.2	A
	T_A=70℃		1.7	
Drain Current (Pulse)		I_{DM}	5.5	A
Power Dissipation	T_A=25℃	P_D	1.5	W
	T_A=70℃		0.97	
Operating Temperature/ Storage Temperature		T_{J}/T_{STG}	-55~150	℃

- **Electrical Characteristics** @T_A=25℃ unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D=250μA	100	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 80V , V_{GS} = 0V	--	--	1	μA
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS} = V_{DS} , I_{DS}=250μA	1	1.75	2.5	V
Gate Leakage Current	I_{GSS}	V_{GS} = ±20V , V_{DS}=0V	--	--	100	nA
Drain-Source On-state Resistance	$R_{DS(on)}$	V_{GS} =10V , I_D=2A	--	260	310	mΩ
		V_{GS} =4.5V , I_D=1A	--	270	320	mΩ
Forward Transconductance	g_{FS}	V_{DS}= 5V , I_D=2A	--	5.4	--	S
Diode Forward Voltage	V_{SD}	I_{SD}=1A , V_{GS}=0V	--	--	1.2	V
Maximum Body-Diode Continuous Current	I_S		--	--	2.2	A
Switching						
Total Gate Charge	Q_g	V_{GS}=10V, V_{DS}=50V, I_D=2A	--	9.1	--	nC
Gate-Source Charge	Q_{gs}		--	2	--	nC
Gate-Drain Charge	Q_{gd}		--	1.4	--	nC
Turn-on Delay Time	$t_{d(on)}$	V_{GS}=10V, V_{DD}=50V,I_D=2A R_G=3.3Ω	--	2	--	ns
Turn-on Rise Time	Tr		--	21.6	--	ns
Turn-off Delay Time	$t_{d(off)}$		--	11.2	--	ns
Turn-off Fall Time	Tf		--	18.8	--	ns
Dynamic						
Input Capacitance	Ciss	V_{GS}=0V,V_{DS}=15V,f=1.0MHz	--	508	--	pF
Output Capacitance	Coss		--	29	--	pF
Reverse Transfer Capacitance	Crss		--	16.4	--	pF

- **Typical Performance Characteristics**

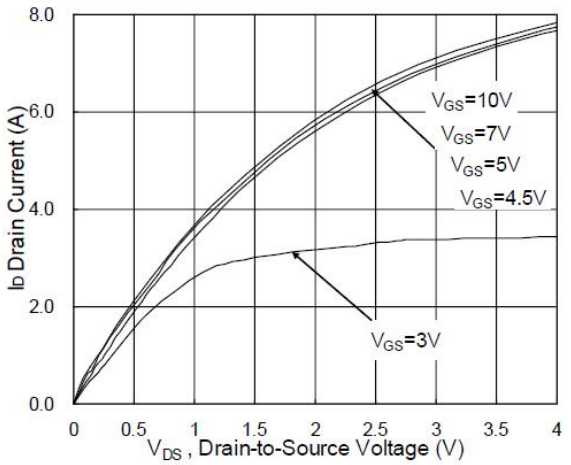


Fig.1 Typical Output Characteristics

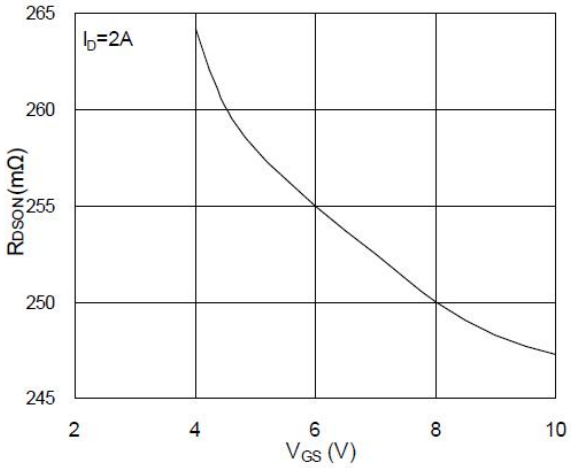


Fig.2 On-Resistance vs. Gate-Source

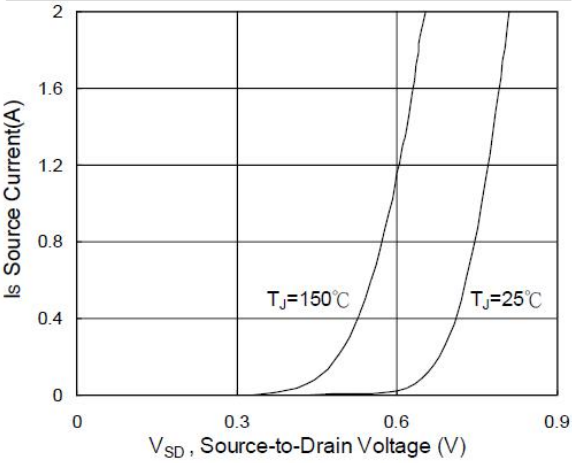


Fig.3 Forward Characteristics of Reverse

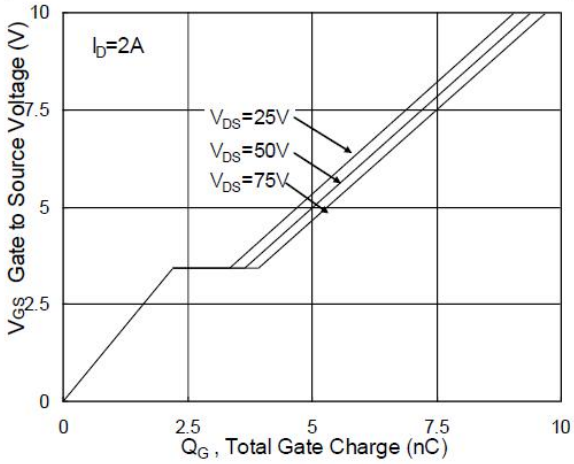


Fig.4 Gate-Charge Characteristics

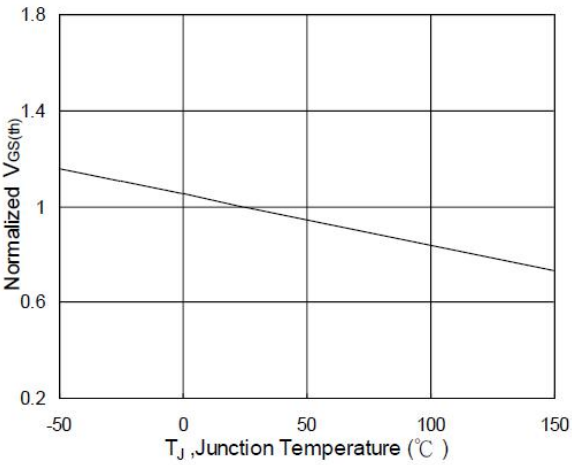


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

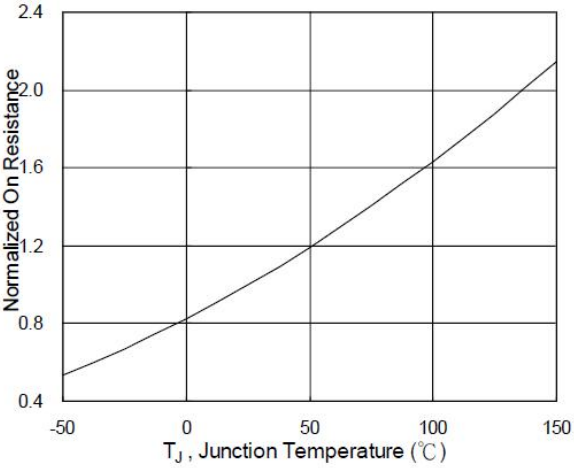


Fig.6 Normalized R_{DSON} vs. T_J

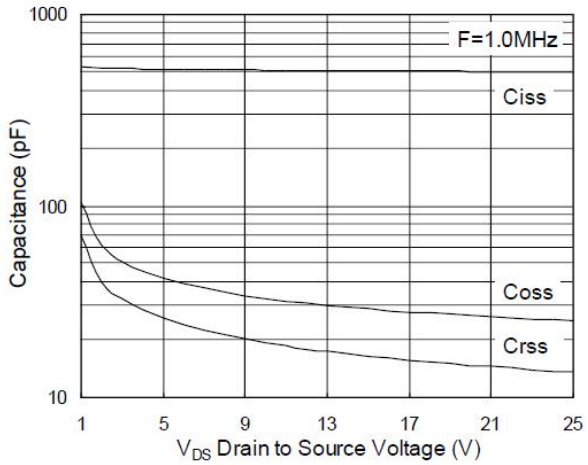


Fig.7 Capacitance

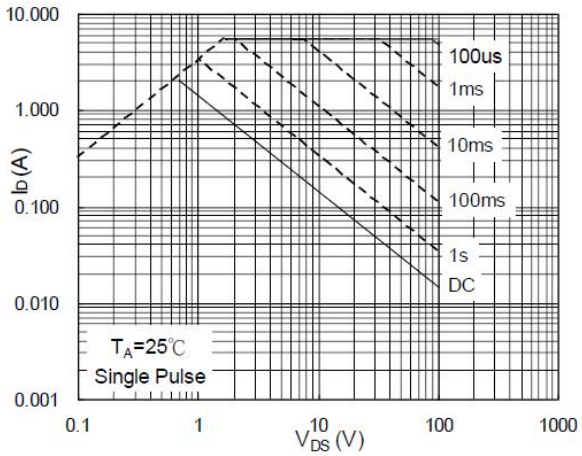


Fig.8 Safe Operating Area

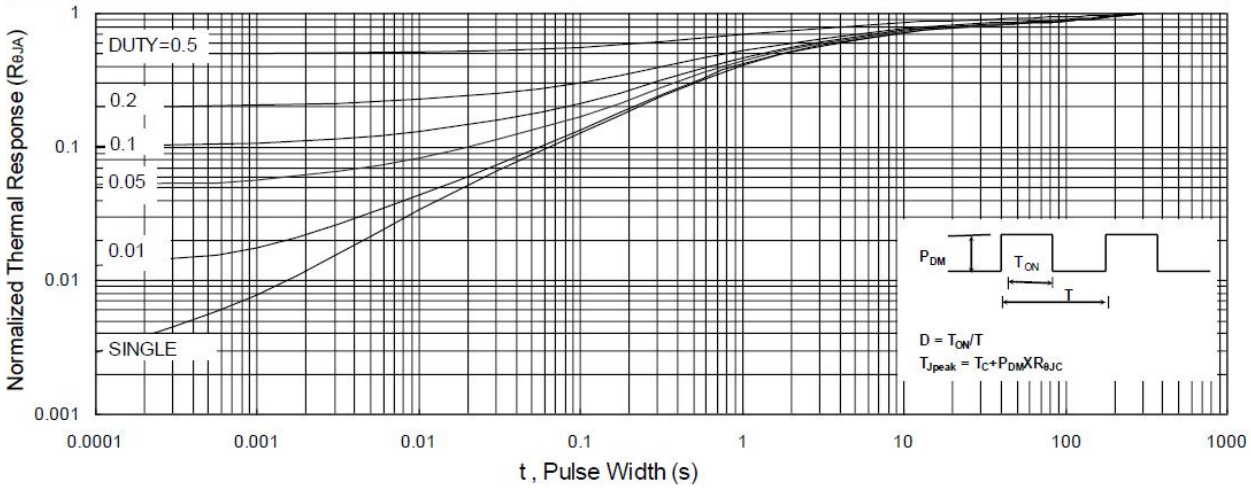


Fig.9 Normalized Maximum Transient Thermal Impedance

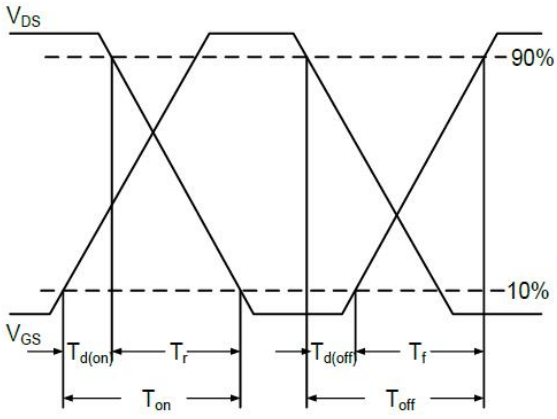


Fig.10 Switching Time Waveform

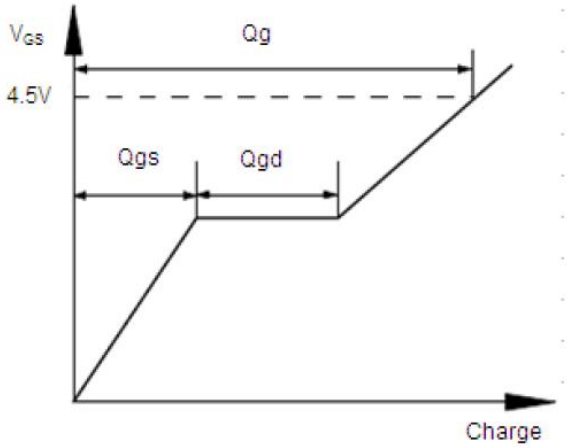


Fig.11 Gate Charge Waveform