

## N-Channel Enhancement Mode Field Effect Transistor

- Features**

100V/2.2A

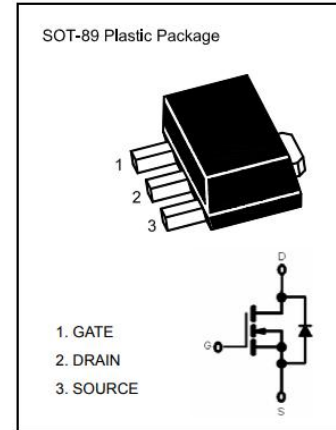
$R_{DS(ON)}=260m\Omega$  (typ.) @  $V_{GS}=10V$

$R_{DS(ON)}=270m\Omega$  (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**

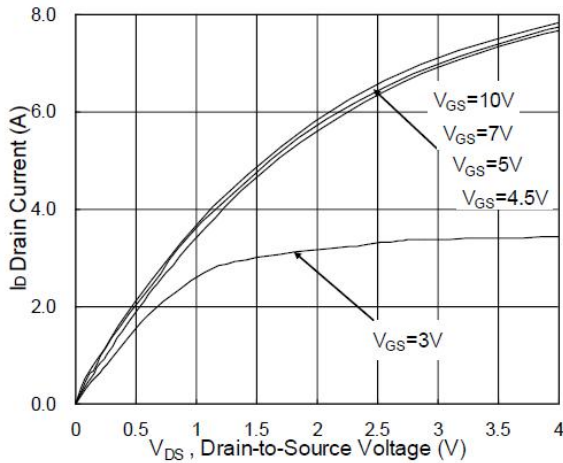
- Absolute Maximum Ratings @ $T_A=25^{\circ}C$  unless otherwise noted**

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

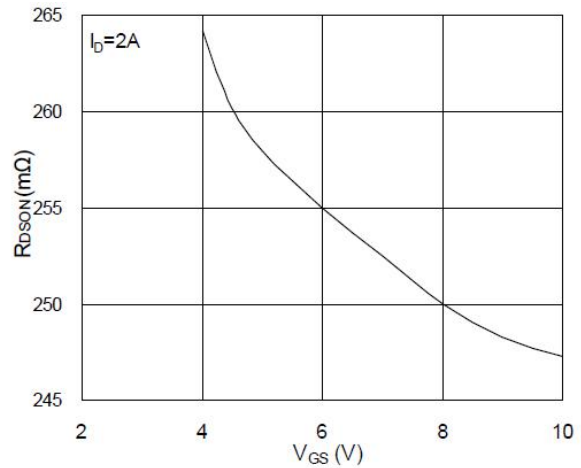
● **Electrical Characteristics** @ $T_A=25^{\circ}\text{C}$  unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D=250\mu A$	100	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 80V, V_{GS} = 0V$	--	--	1	$\mu A$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_{DS}=250\mu A$	1	1.75	2.5	V
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS}=0V$	--	--	100	nA
Drain-Source On-state Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D=2A$	--	260	310	m $\Omega$
		$V_{GS} = 4.5V, I_D=1A$	--	270	320	m $\Omega$
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
<b>Switching</b>						
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	$t_{d(on)}$	$V_{GS}=10V, V_{DD}=50V, I_D=2A$ $R_G=3.3\Omega$	--	2	--	ns
Turn-on Rise Time	$T_r$		--	21.6	--	ns
Turn-off Delay Time	$t_{d(off)}$		--	11.2	--	ns
Turn-off Fall Time	$T_f$		--	18.8	--	ns
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=15V, f=1.0MHz$	--	508	--	pF
Output Capacitance	$C_{oss}$		--	29	--	pF
Reverse Transfer Capacitance	$C_{rss}$		--	16.4	--	pF

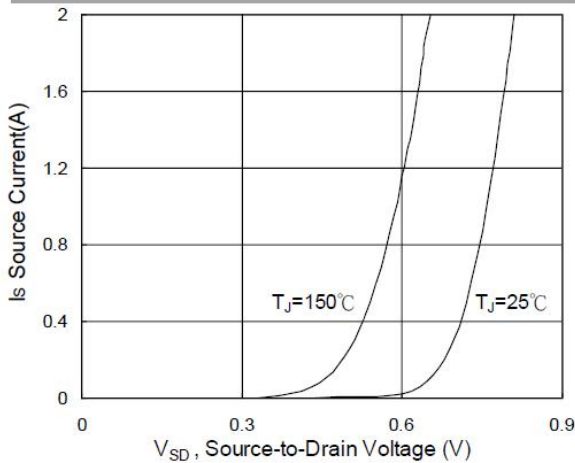
● **Typical Performance Characteristics**



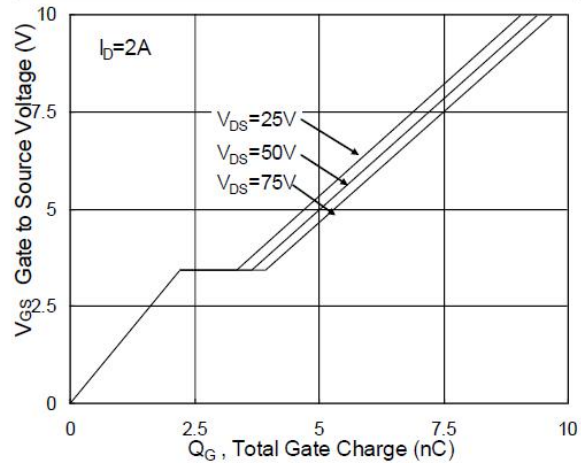
**Fig.1 Typical Output Characteristics**



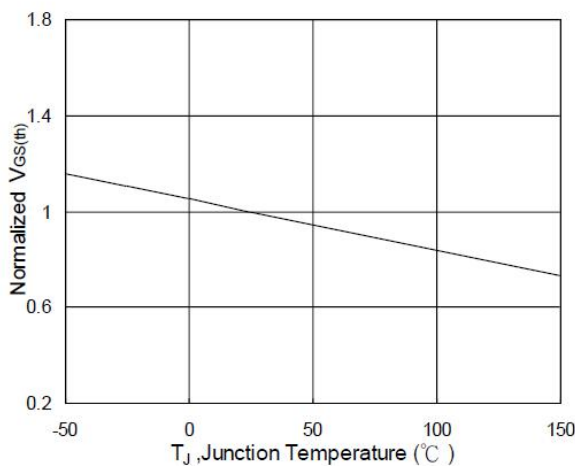
**Fig.2 On-Resistance vs. Gate-Source**



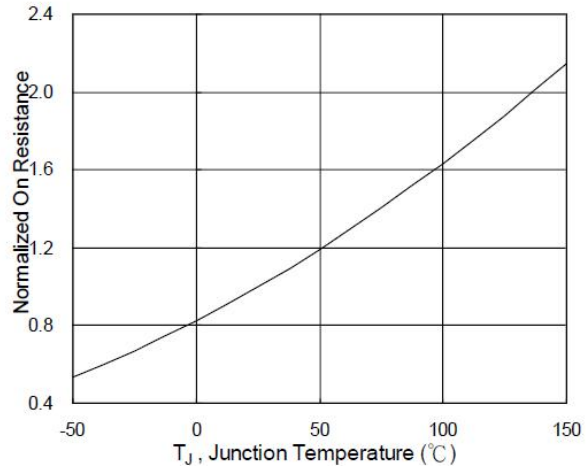
**Fig.3 Forward Characteristics of Reverse**



**Fig.4 Gate-Charge Characteristics**



**Fig.5 Normalized V<sub>GS(th)</sub> vs. T<sub>J</sub>**



**Fig.6 Normalized R<sub>DS(on)</sub> vs. T<sub>J</sub>**

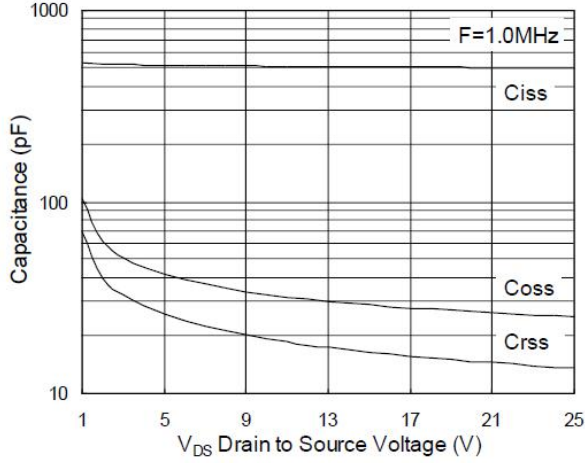


Fig.7 Capacitance

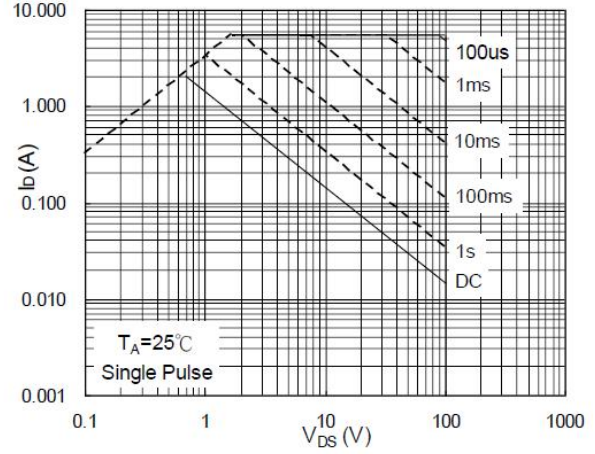


Fig.8 Safe Operating Area

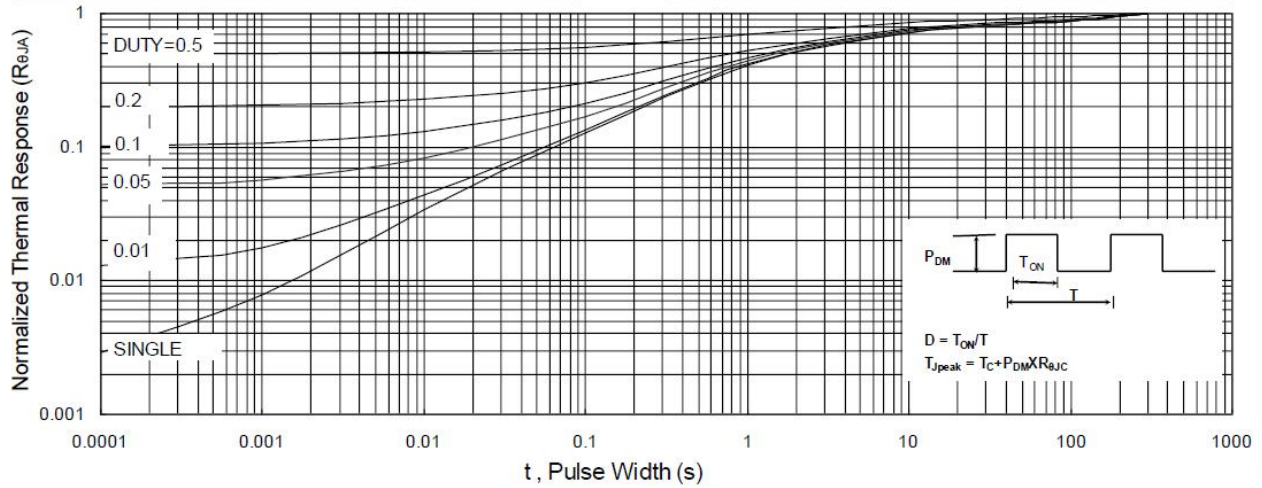


Fig.9 Normalized Maximum Transient Thermal Impedance

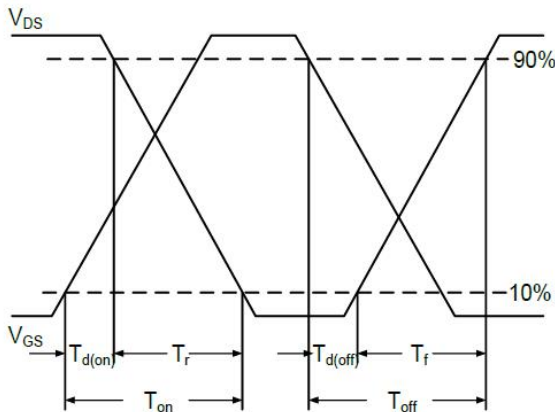


Fig.10 Switching Time Waveform

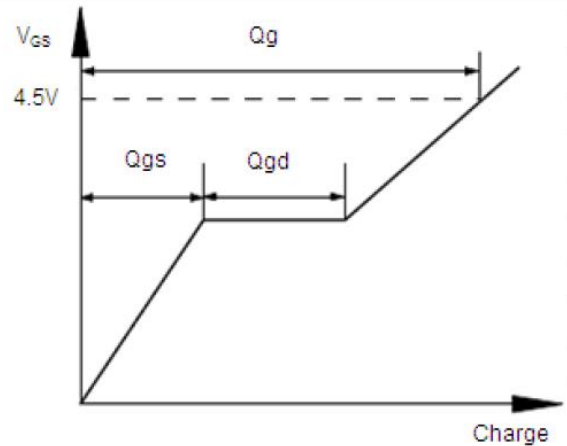
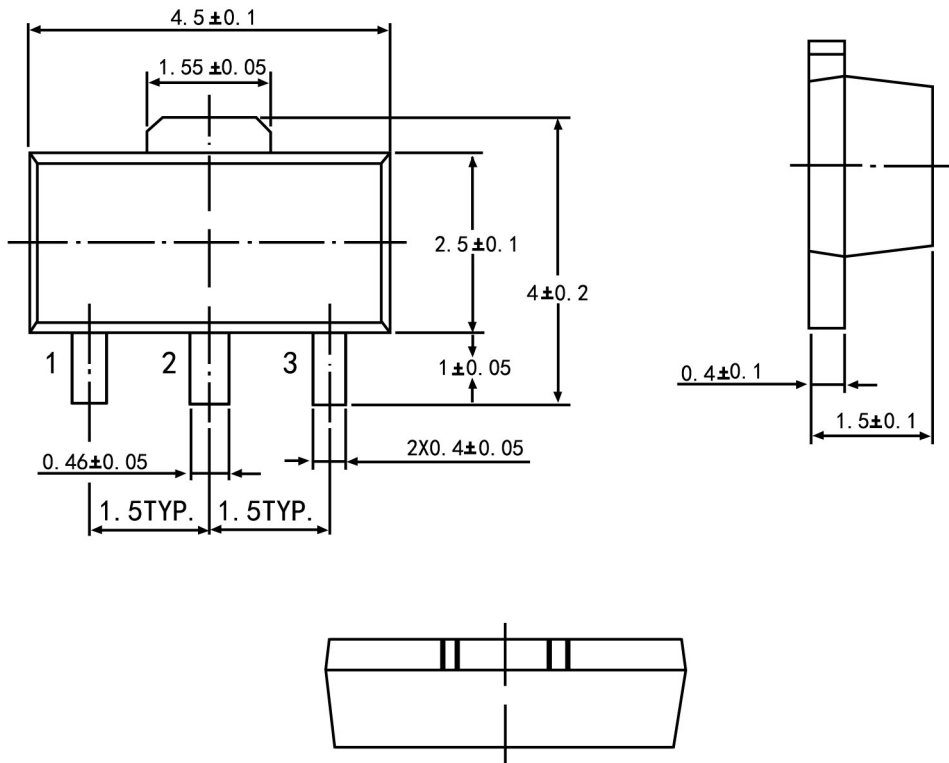


Fig.11 Gate Charge Waveform



## SOT-89 PACKAGE OUTLINE



Symbol	Dimension in Millimeters	
	Min	Max
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.44
D	4.40	4.60
D1	1.62	1.83
E	2.29	2.60
e	1.50 Typ	
H	3.94	4.25
H1	2.63	2.93
L	0.89	1.20
All Dimensions In mm		