N-Channel Enhancement Mode Field Effect Transistor

- **Features**

20V/5A

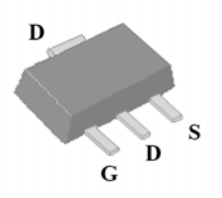
$R_{DS(ON)}$ = 28mΩ @ V_{GS} = 4.5V

$R_{DS(ON)}$ = 38mΩ @ V_{GS} = 2.5V

Low $V_{GS(TH)}$

SOT89 Package

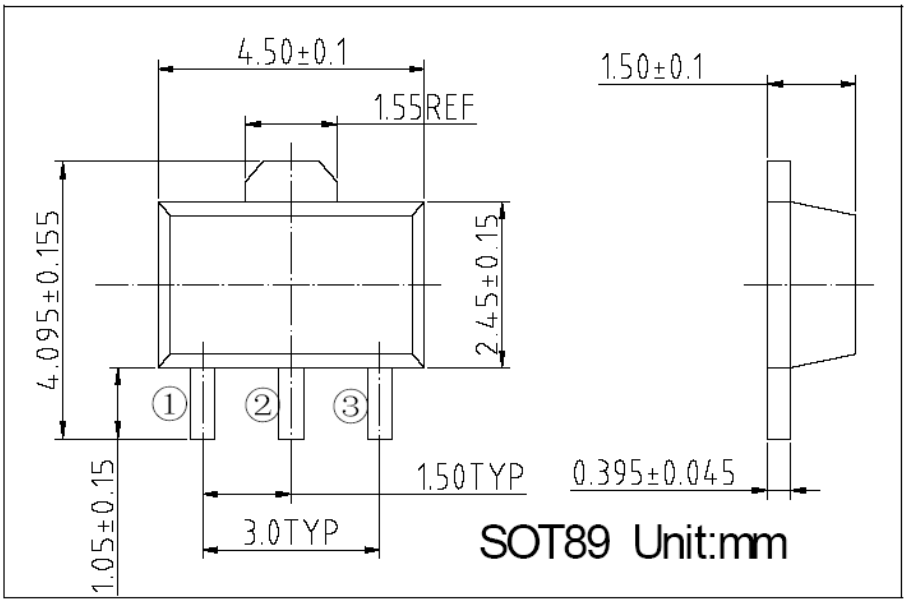
- **Pin Configurations**



- **General Description**

The RCR1515SM uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch or in PWM applications.RCR1515SM are electrically identical.-RoHS Compliant

- **Package Information**



- **Absolute Maximum Ratings** @T_A=25℃ unless otherwise noted

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	±12	V
Drain Current (Continuous)	T_A=25°C	I_D	5	A
	T_A=70°C		4	
Drain Current (Pulse)		I_{DM}	20	A
Power Dissipation	T_A=25°C	P_D	1	W
	T_A=70°C		0.7	

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	20	25	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20 V , V_{GS} = 0V	--	--	1	μA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS} , I_{DS}=250μA	0.6	0.84	1	V
Gate Leakage Current	I_{GSS}	V_{GS}=±12V , V_{DS}=0V	--	--	100	nA
Drain-Source On-state Resistance	$R_{DS(on)}$	V_{GS} = 4.5V , I_D = 3A	--	23	28	mΩ
		V_{GS} =2.5V , I_D = 2A	--	31	38	mΩ
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=6A	--	5	--	S
Diode Forward Voltage	V_{SD}	I_{SD}=1A , V_{GS}=0V	--	0.71	1.0	V
Maximum Body-Diode Continuous Current	I_S		--	--	1.7	A
Pulsed Body-Diode Current	I_{SM}		--	--	20	A
Switching						
Total Gate Charge	Qg	V_{GS}=4.5V, V_{DS}=10V, I_D=6A	--	6.3	8.1	nC
Gate-Source Charge	Q_{gs}		--	1.7	2.2	nC
Gate-Drain Charge	Qgd		--	1.4	1.8	nC
Turn-on Delay Time	$t_{d(on)}$	V_{DS} = 10V, I_D = 1A, V_{GS} = 4.5V, R_G = 6Ω	--	10.4	20.8	ns
Turn-on Rise Time	tr		--	4.4	8.8	ns
Turn-off Delay Time	$t_{d(off)}$		--	27.4	54.8	ns
Turn-off Fall Time	tf		--	4.2	8.4	ns
Dynamic						
Input Capacitance	Ciss	V_{DS} = 8V, V_{GS} = 0V,F = 1.0MHz	--	522.3	--	pF
Output Capacitance	Coss		--	98.5	--	pF
Reverse Transfer Capacitance	Crss		--	74.7	--	pF

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The current rating is based on the t≤ 10s junction to ambient thermal resistance rating.

- **Typical Performance Characteristics**

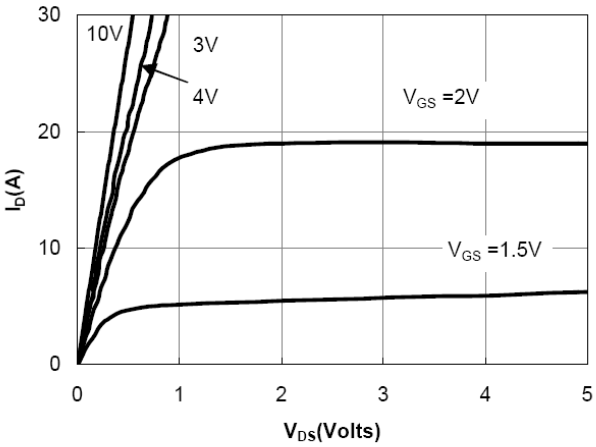


Figure 1: On-Regions Characteristics

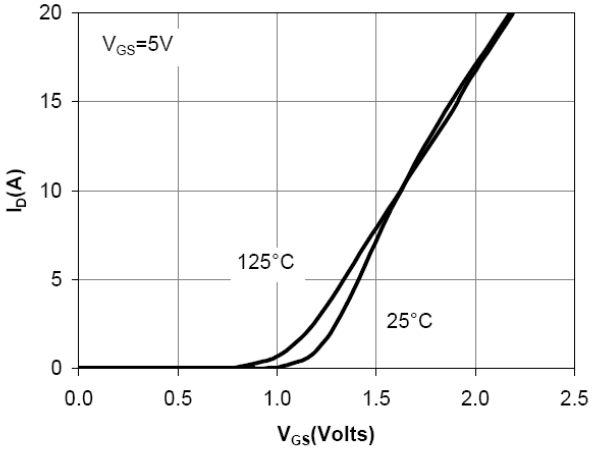


Figure 2: Transfer Characteristics

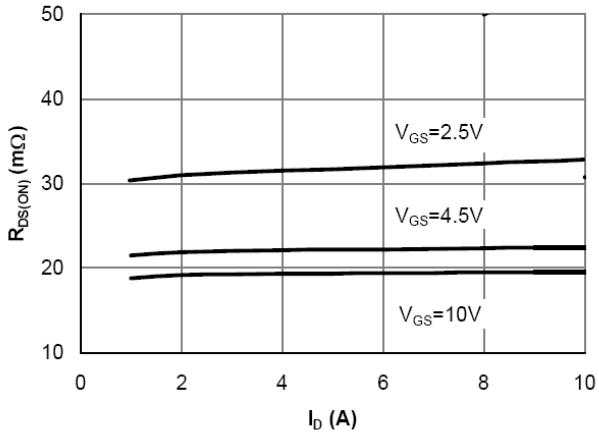


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

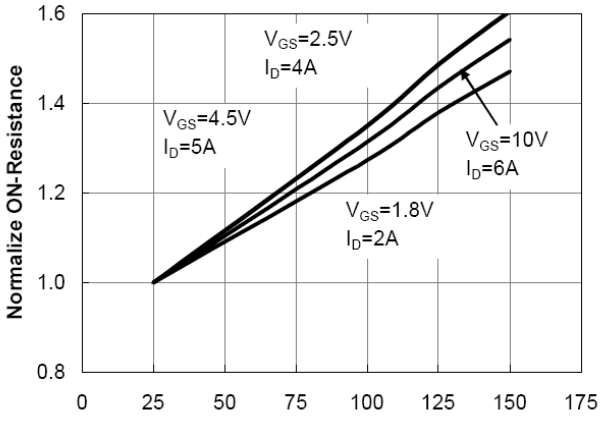


Figure 4: On-Resistance vs. Junction Temperature

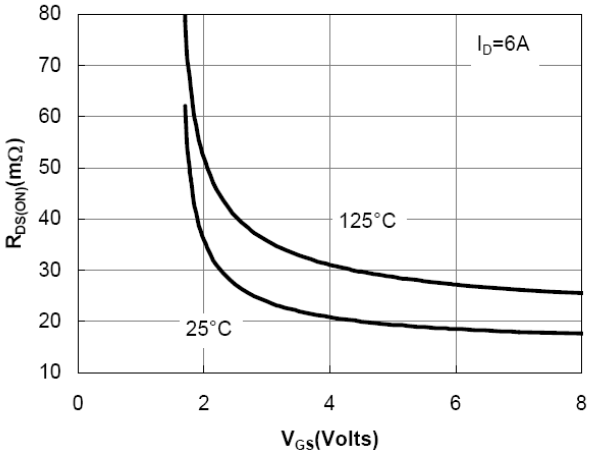


Figure 5: On-Resistance vs. Gate-Source Voltage

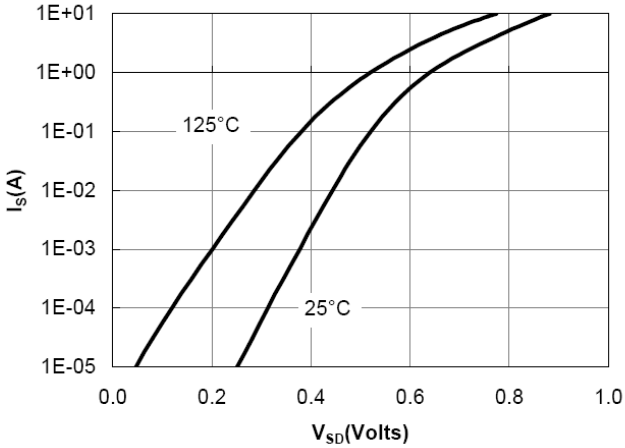


Figure 6: Body-Diode Characteristics

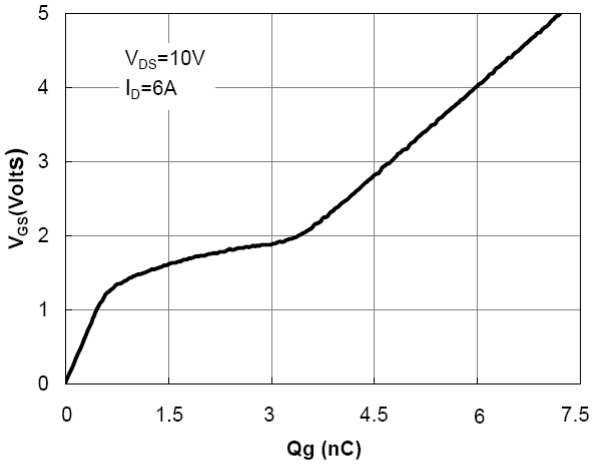


Figure 7: Gate-Charge Characteristics

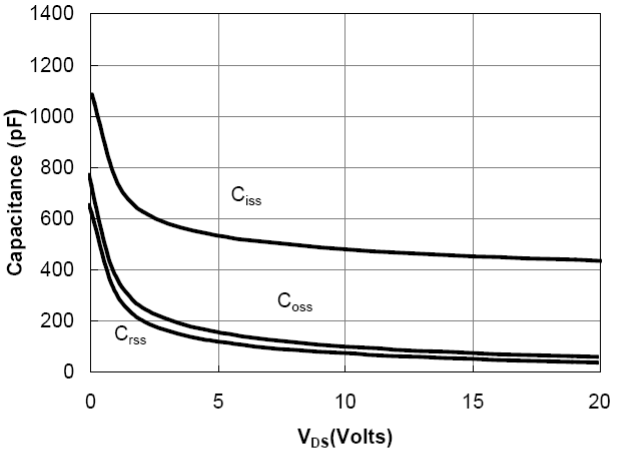


Figure 8: Capacitance Characteristics

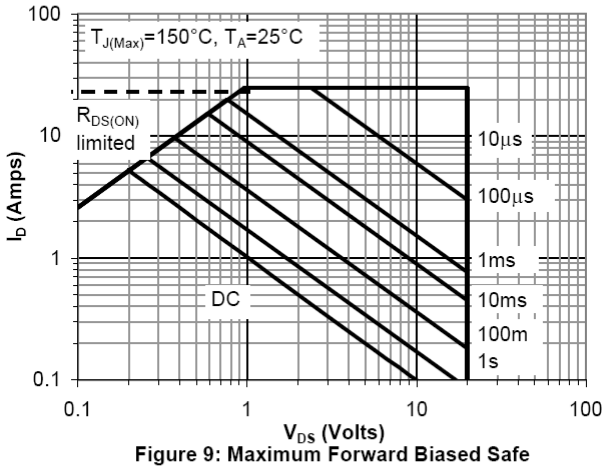


Figure 9: Maximum Forward Biased Safe Operating Area

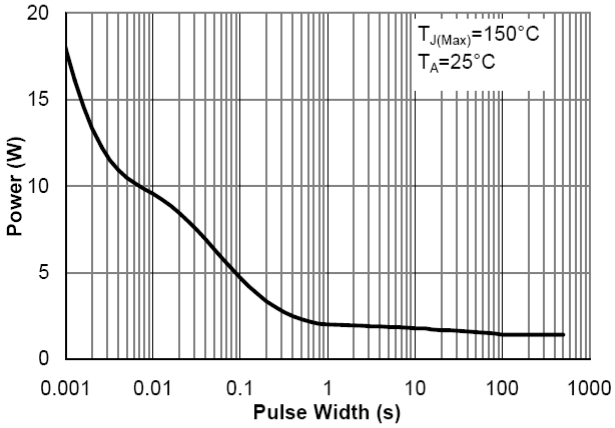


Figure 10: Single Pulse Power Rating Junction-to-Ambient

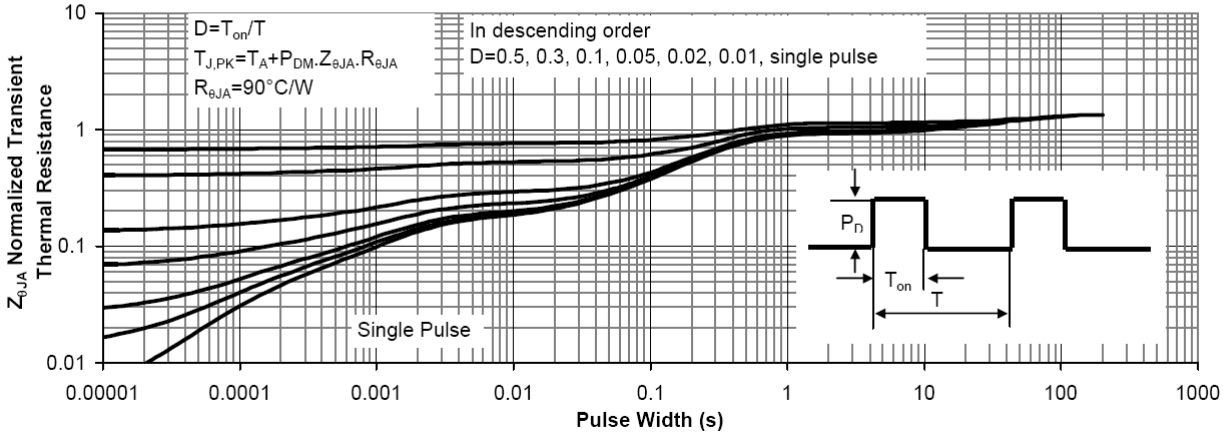


Figure 11: Normalized Maximum Transient Thermal Impedance

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