

## N-Channel Enhancement Mode Field Effect Transistor

- Features**

20V/5.1A

$R_{DS(ON)} = 28m\Omega @ V_{GS} = 4.5V$

$R_{DS(ON)} = 38m\Omega @ V_{GS} = 2.5V$

$R_{DS(ON)} = 60m\Omega @ V_{GS} = 1.8V$

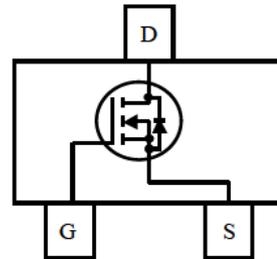
SOT23 Package

- General Description**

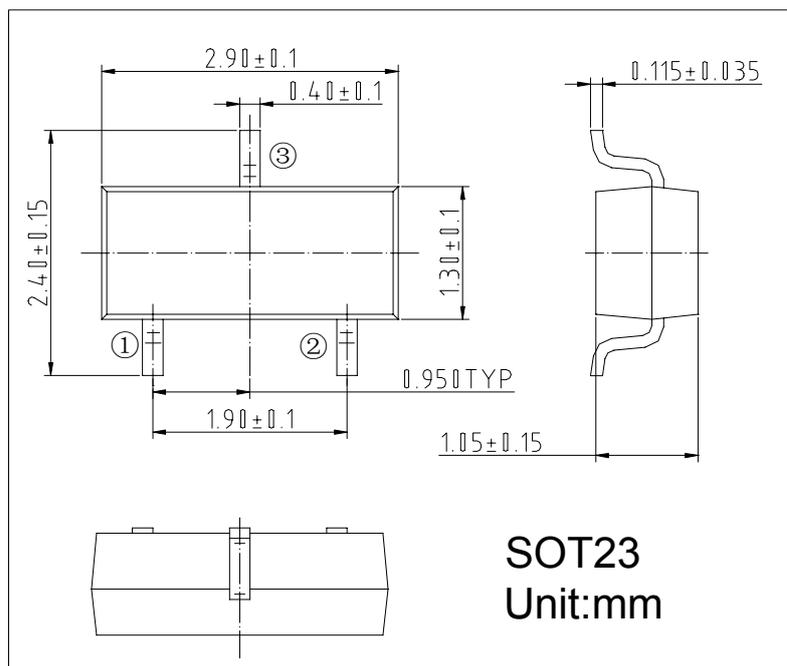
The RCR1515SI uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications.

- Pin Configurations**

See Diagram below (top view)



- Package Information**



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

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DSS}$	20	V
Gate-Source Voltage	$V_{GSS}$	$\pm 12$	V
Drain Current (Continuous)	$I_D$	$T_A=25^\circ C$	5.1
		$T_A=70^\circ C$	4



# RCR1515SI

Drain Current (Pulse)		$I_{DM}$	20	A
Power Dissipation	$T_A=25^{\circ}C$	$P_D$	1	W
Operating Temperature/ Storage Temperature		$T_{J}/T_{STG}$	-55~150	$^{\circ}C$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D=250\mu A$	20	24	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 20V, V_{GS} = 0V$	--	--	1	$\mu A$
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_{DS}=250\mu A$	0.6	0.84	1	V
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 12V, V_{DS}=0V$	--	--	100	nA
Drain-Source On-state Resistance	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 3A$	--	23	28	m $\Omega$
		$V_{GS} = 2.5V, I_D = 2A$	--	31	38	m $\Omega$
		$V_{GS} = 1.8V, I_D = 2A$	--	55	60	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=10V, I_D=6A$	--	5	--	S
Diode Forward Voltage	$V_{SD}$	$I_{SD}=1.7A, V_{GS}=0V$	--	0.9	--	V
Maximum Body-Diode Continuous Current	$I_S$		--	--	1.7	A
<b>Switching</b>						
Total Gate Charge	$Q_g$	$V_{GS}=4.5V, V_{DS}=10V, I_D=6A$	--	6.3	8.1	nC
Gate-Source Charge	$Q_{gs}$		--	1.7	2.2	nC
Gate-Drain Charge	$Q_{gd}$		--	1.4	1.8	nC
Turn-on Delay Time	$t_{d(on)}$	$V_{DS} = 10V, I_D = 1A,$ $V_{GS} = 4.5V, R_G = 6\Omega$	--	10.4	20.8	ns
Turn-on Rise Time	$t_r$		--	4.4	8.8	ns
Turn-off Delay Time	$t_{d(off)}$		--	27.4	54.8	ns
Turn-off Fall Time	$t_f$		--	4.2	8.4	ns
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 8V, V_{GS} = 0V, f = 1.0MHz$	--	522.3	--	pF
Output Capacitance	$C_{oss}$		--	98.5	--	pF
Reverse Transfer Capacitance	$C_{rss}$		--	74.7	--	pF

A: The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^{\circ}C$ . 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  $t_s \leq 10s$  junction to ambient thermal resistance rating.

● **Typical Performance Characteristics**

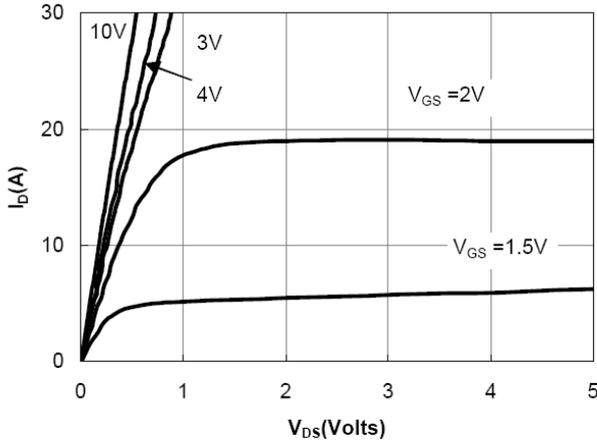


Figure 1: On-Regions Characteristics

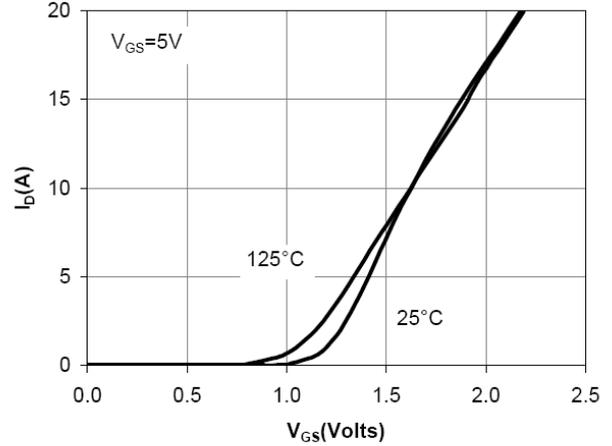


Figure 2: Transfer Characteristics

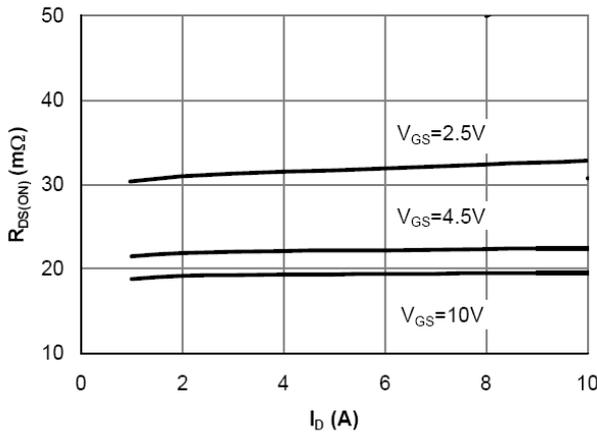


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

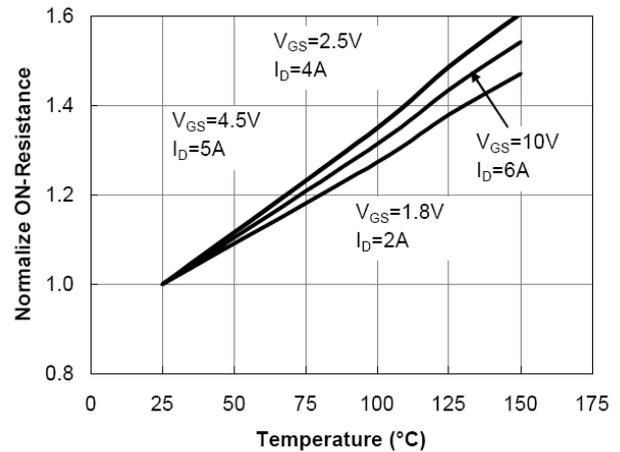


Figure 4: On-Resistance vs. Junction Temperature

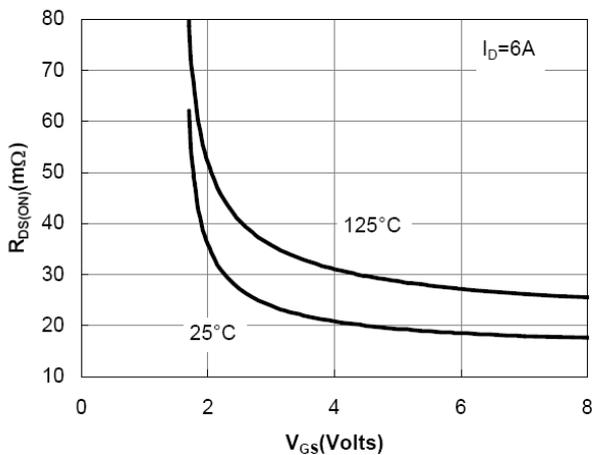


Figure 5: On-Resistance vs. Gate-Source Voltage

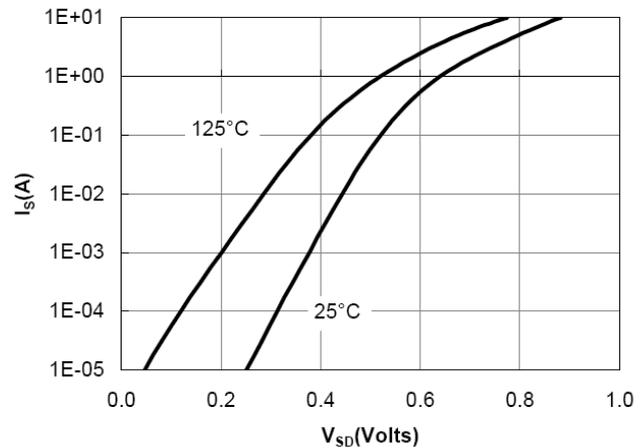


Figure 6: Body-Diode Characteristics

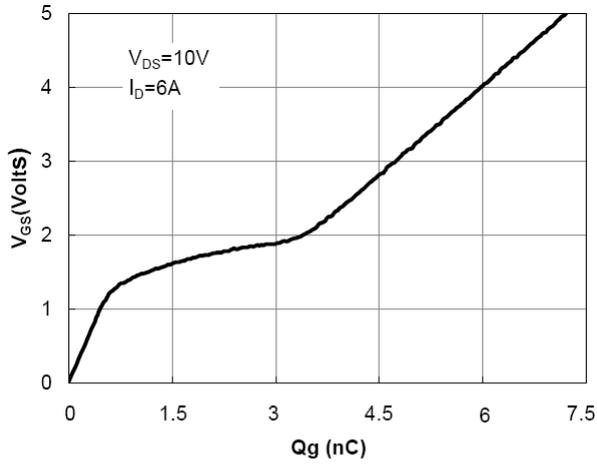


Figure 7: Gate-Charge Characteristics

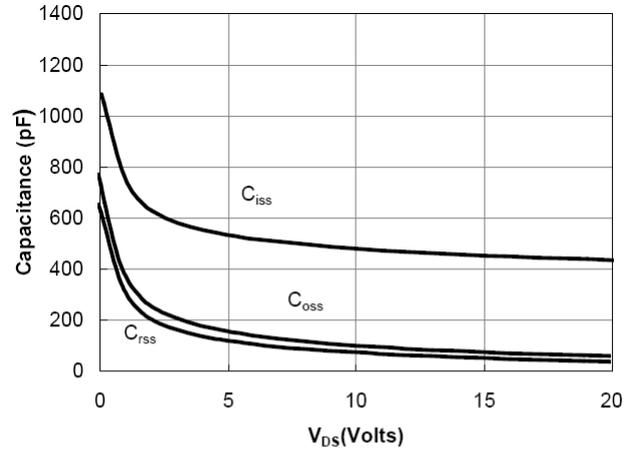


Figure 8: Capacitance Characteristics

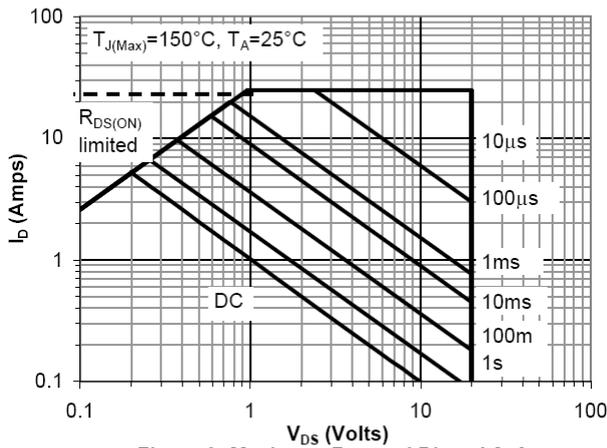


Figure 9: Maximum Forward Biased Safe Operating Area

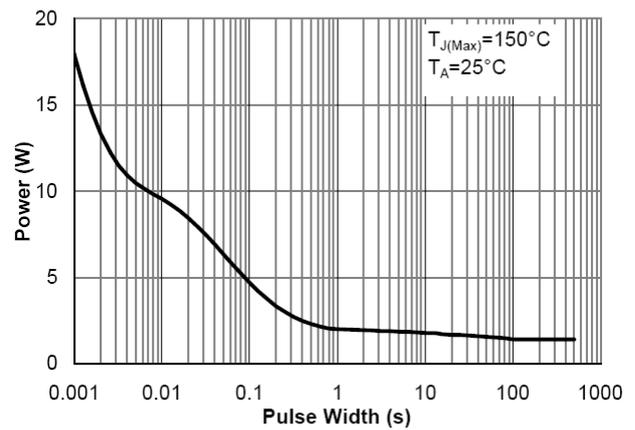


Figure 10: Single Pulse Power Rating Junction-to-Ambient

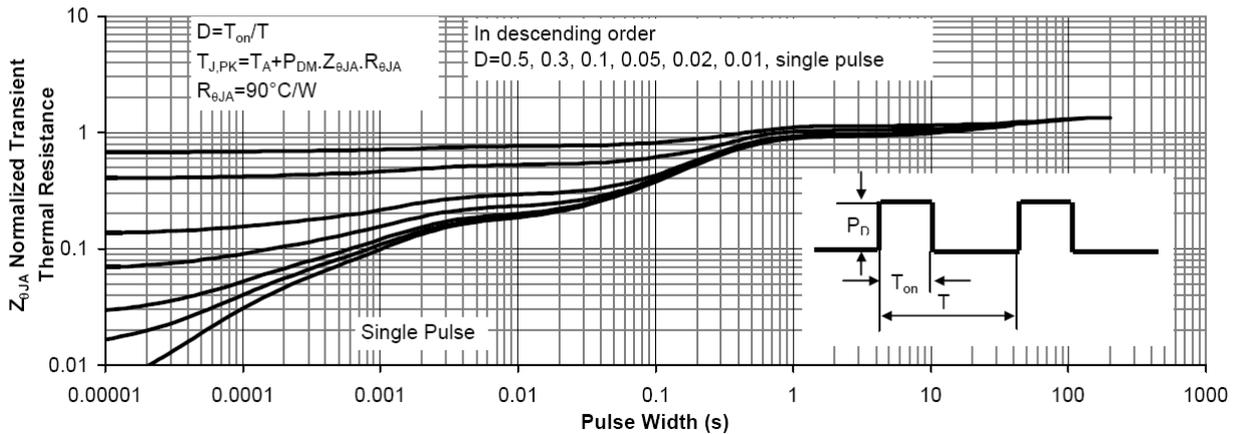


Figure 11: Normalized Maximum Transient Thermal Impedance



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