P-Channel Enhancement Mode Field Effect Transistor

Features

V_{DS} (V) = -20V,I_D = -4A

$R_{DS(ON)}$<55mΩ @ V_{GS}= -4.5V

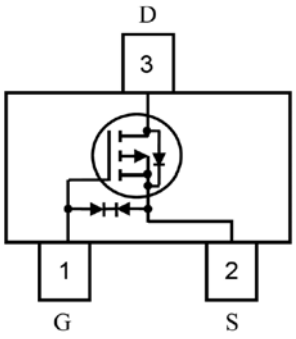
$R_{DS(ON)}$<63mΩ @ V_{GS}= -2.5V

$R_{DS(ON)}$<83mΩ @ V_{GS}= -1.8V

SOT23-3L Package

ESD Protected:3000V HBM

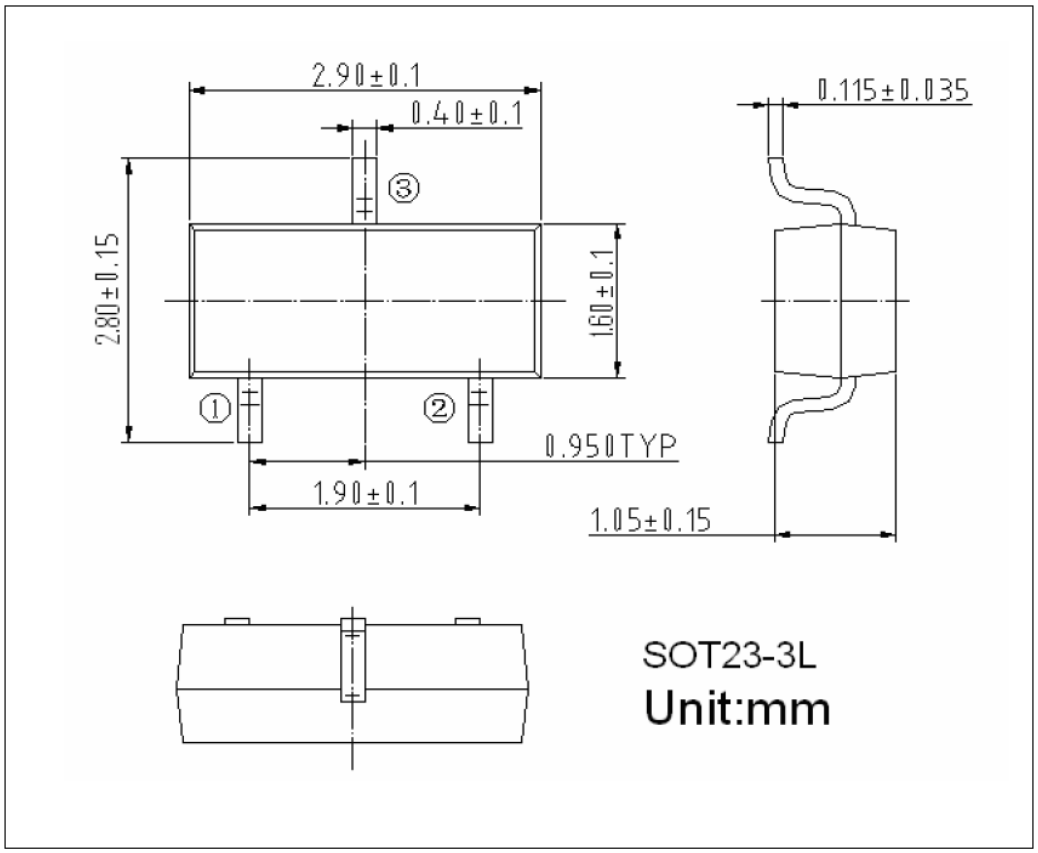
Pin Configurations



General Description

The RCR1540ESJ 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.

Package Information



Absolute Maximum Ratings @T_A=25℃ unless otherwise noted

Parameter Sy	mbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±8	V

Drain Current (Continuous)	T_A=25°C	I_D	-4	A
	T_A=70°C		-3.2	
Drain Current (Pulse)		I_{DM}	-30	A
Power Dissipation	T_A=25°C	P_D	1.4	W
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
ON/OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D= -250μA	-20	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -16 V , V_{GS} = 0V	--	--	-1	μA
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS} =V_{DS} , I_{DS}=-250μA	-0.3	-0.65	-1	V
Gate Leakage Current	I_{GSS}	V_{GS}=±8V , V_{DS}=0V	--	--	±10	μA
Drain-Source On-state Resistance	$R_{DS(on)}$	V_{GS} = -4.5V , I_D= -4A	--	50	55	mΩ
		V_{GS} = -2.5V , I_D= -4A	--	59	63	mΩ
		V_{GS} = -1.8V , I_D= -2A	--	74	83	mΩ
Forward Transconductance	g_{FS}	V_{DS}= -5V , I_D= -4A	8	16	--	S
Diode Forward Voltage	V_{SD}	I_{SD}= -1A , V_{GS}= 0V	--	-0.81	-1.0	V
Maximum Body-Diode Continuous Current	I_S		-- --		-2.2	A
Switching CHARACTERISTICS						
Total Gate Charge	Q_g	V_{DS} = -10V, I_D = -4A V_{GS} = -4.5V	--	4.59	5.97	nC
Gate-Source Charge	Q_{gs}		--	2.14	2.78	nC
Gate-Drain Charge	Q_{gd}		-- 2.51		3.26	nC
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = -10V, R_L=2.5Ω I_D = -4A, V_{GEN} = -4.5V R_G = 3Ω	--	965.2	1930.4	ns
Turn-on Rise Time	tr		--	1604	3208	ns
Turn-off Delay Time	$t_{d(off)}$		--	7716	15432	ns
Turn-off Fall Time	tf		-- 3452		6904	ns
Dynamic CHARACTERISTICS						
Input Capacitance	Ciss	V_{GS}=0V,V_{DS}= -10V f= 1.0MHz	--	36.45	--	pF
Output Capacitance	Coss		--	128.57	--	pF
Reverse Transfer Capacitance	Crss		-- 15.17		--	pF

Notes:

1. Pulse width limited by maximum junction temperature.
2. Pulse test: PW≤300μs, duty cycle≤2%.
3. For design AID only, not subject to production testing.
4. Switching time is essentially independent of operating temperature.

- **Typical Performance Characteristics**

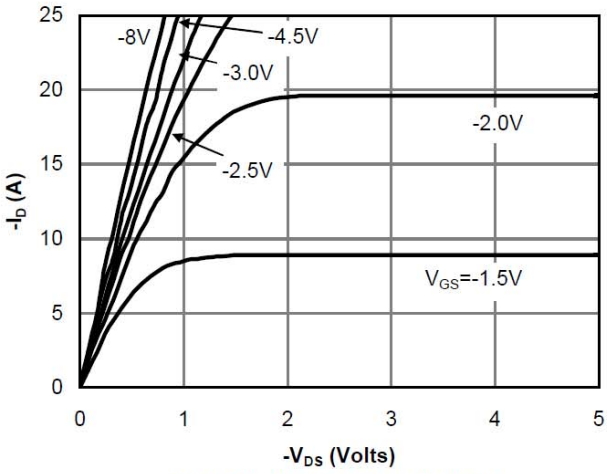


Fig 1: On-Region Characteristics

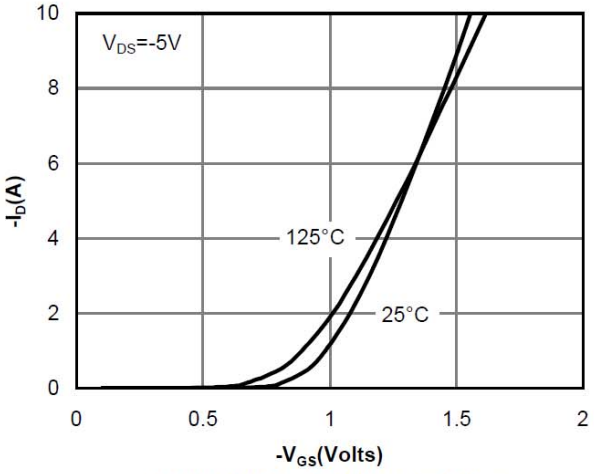


Figure 2: Transfer Characteristics

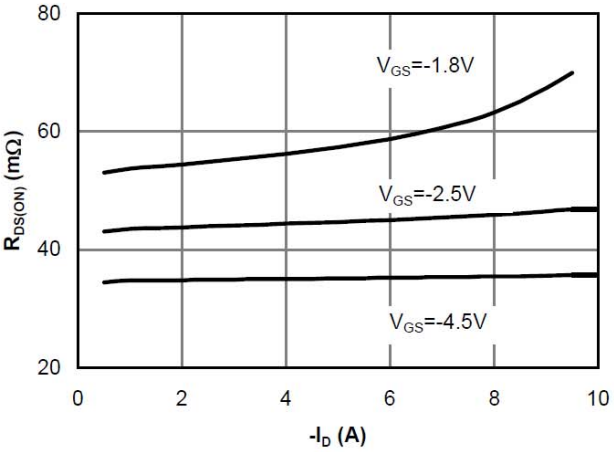


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

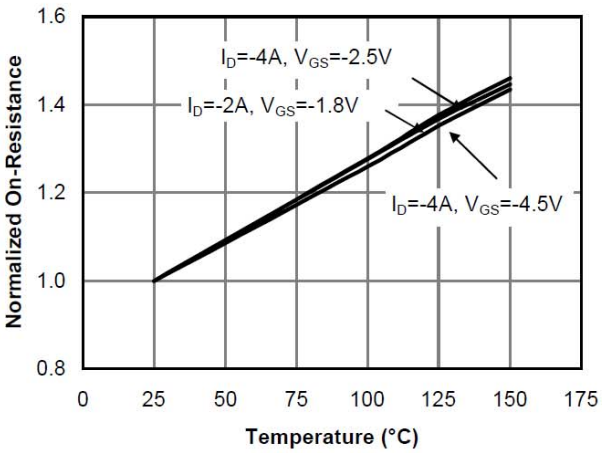


Figure 4: On-Resistance vs. Junction Temperature

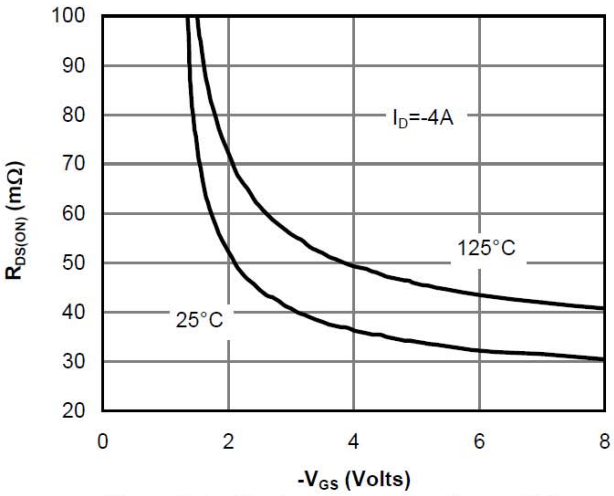


Figure 5: On-Resistance vs. Gate-Source Voltage

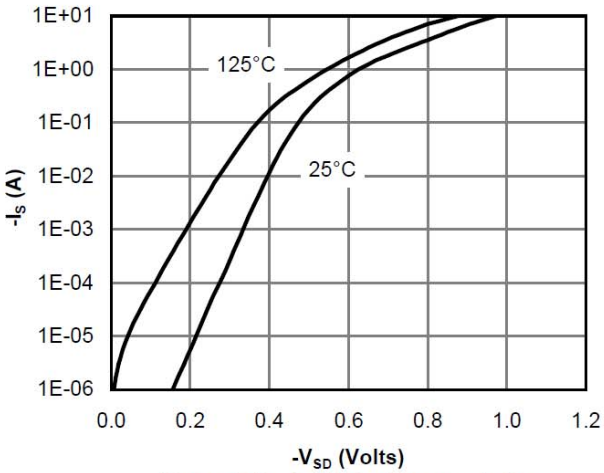


Figure 6: Body-Diode Characteristics

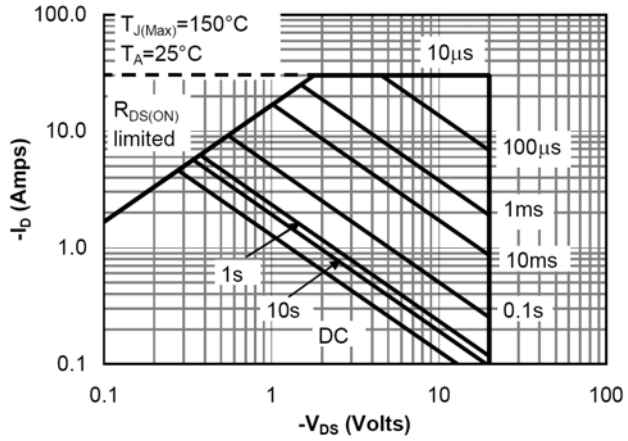


Figure 7: Maximum Forward Biased Safe Operating Area

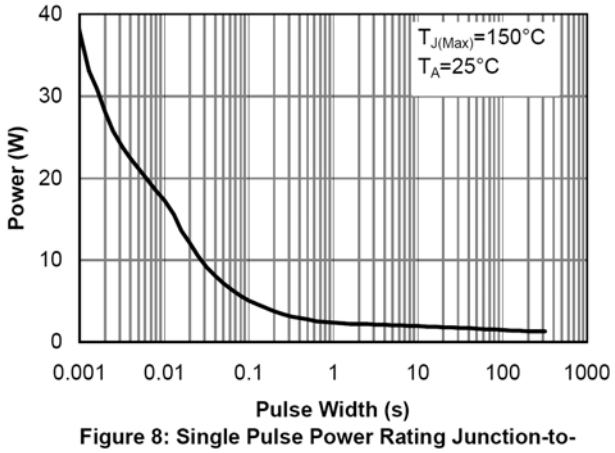


Figure 8: Single Pulse Power Rating Junction-to-Ambient

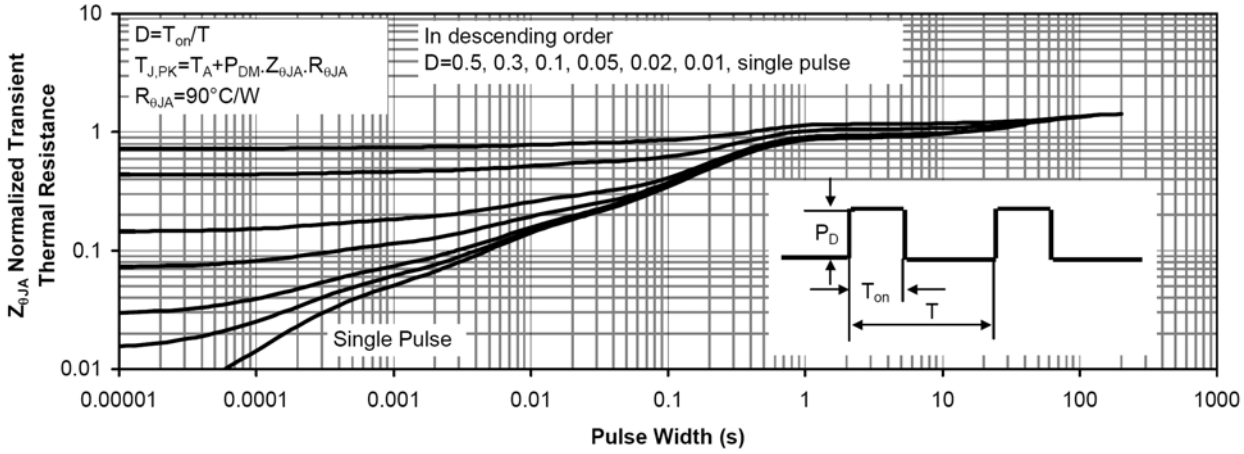


Figure 9: Normalized Maximum Transient Thermal Impedance

DISCLAIMER

YUKUN SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. YUKUN DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DE SCRIBED H EREIN; NE ITHER DOES IT CONV EY ANY LI CENCE U NDER ITS P ATENT RIGHTS, NOR THE RIGHTS OF OTHERS.