

General Description

The Sanrise SRC60R138BS is a high voltage power MOSFET, fabricated using advanced super junction technology. The resulting device has extremely low on resistance, low gate charge and fast switching time, making it especially suitable for applications which require superior power density and outstanding efficiency.

The SRC60R138BS break down voltage is 600V and it has a high rugged avalanche characteristics. The SRC60R138BS is available in TO-220F, TO-220C, TO-263-2 and TO-247 packages.

Features

- Ultra Low $R_{DS(ON)} = 138m\Omega @ V_{GS} = 10V$.
- Ultra Low Gate Charge, $Q_g = 71nC$ typ.
- Intrinsic Fast-Recovery Body Diode
- Fast switching capability
- Robust design with better EAS performance
- Non-automotive Qualified
- Ultra-fast body diode

Application

- AC/DC Power Supply
- PC Power
- Server / Telecom
- Solar Inverter

Ordering Information

Circuit Type		SRC60R138BS□□-□	
Package		E: Lead Free	
TF: TO-220F		G: Green	
TC: TO-220C		Blank: Tube	
S2: TO-263-2		TR: Tape & Reel	
T: TO-247			

Symbol

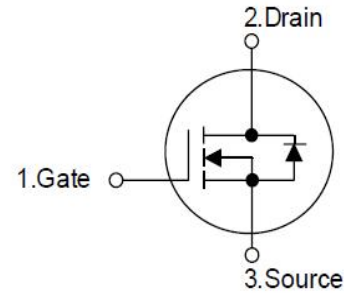


Figure 1 Symbol of SRC60R138BS

Package Type

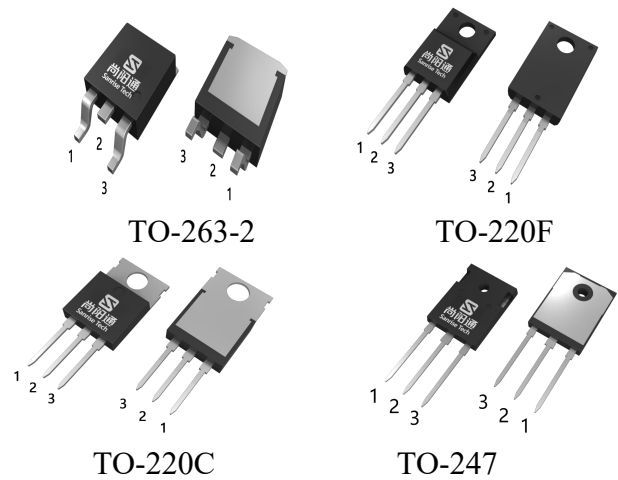


Figure 2 Package Types of SRC60R138BS

Package	Part Number	Marking ID	Packing Type
TO-220F	SRC60R138BSTF-G	SRC60R138BSTFG	Tube
TO-220C	SRC60R138BSTC-G	SRC60R138BSTCG	Tube
TO-263-2	SRC60R138BSS2TR-G	SRC60R138BSS2G	Tape & Reel
TO-247	SRC60R138BST-G	SRC60R138BSTG	Tube

Absolute Maximum Ratings^{Note 1}

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	600	V
Gate-Source Voltage(static)		V_{GS}	±30	V
Gate-Source Voltage(dynamic),AC($f>1\text{Hz}$)		V_{GS}	±30	
Continuous Drain Current	$T_C=25^\circ\text{C}$	I_D	23	A
	$T_C=100^\circ\text{C}$		14.5	
	$T_C=125^\circ\text{C}$		10.2	
Power Dissipation ($T_C=25^\circ\text{C}, \text{TO-220C}, \text{TO-247}, \text{TO-263-2}$)		P_{tot}	178	W
Power Dissipation ($T_C=25^\circ\text{C}, \text{TO-220F}$)		P_{tot}	34.7	W
Pulsed Drain Current (Note 2)		I_{DM}	69	A
Avalanche Energy, Single Pulse (Note 3)		E_{AS}	210	mJ
Avalanche Energy, Single Pulse (Note 4)		E_{AS}	984	mJ
Avalanche Energy, Repetitive (Note 2)		E_{AR}	0.2	mJ
Avalanche Current, Repetitive (Note 2)		I_{AR}	2.5	A
Continuous Diode Forward Current		I_S	23	A
Diode Pulse Current		$I_{S,PULSE}$	69	A
MOSFET dv/dt Ruggedness, $V_{DS}\leq 480\text{V}$		dv/dt	80	V/ns
Reverse Diode dv/dt , $V_{DS}\leq 480\text{V}$, $I_{SD}\leq I_D$		dv/dt	50	V/ns
Operating Junction Temperature		T_J	150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55 to 150	$^\circ\text{C}$
Lead Temperature (Soldering, 10 sec)		T_{LEAD}	260	$^\circ\text{C}$

Note:

1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. $I_{AS} = 2.5\text{A}$, $V_{DD} = 60\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$. Finish goods test condition.
4. $I_{AS} = 5.4\text{A}$, $V_{DD} = 60\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$. Typical Eas.

Thermal characteristics

Parameter		Symbol	Min	Typ	Max	Unit
Thermal resistance, Junction-to-Case	TO-220F	R_{thJC}			3.6	$^\circ\text{C} / \text{W}$
	TO-247				0.7	
	TO-220C				0.7	
	TO-263-2				0.7	
Thermal resistance, Junction-to-Ambient	TO-220F	R_{thJA}			80	$^\circ\text{C} / \text{W}$
	TO-247				62	
	TO-220C				62	
	TO-263-2				62	

Electrical Characteristics

$T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise specified.

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Statistic Characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250uA	600			V
Zero Gate Voltage Drain Current		I _{DSS}	V _{DS} =600V, V _{GS} =0V			10	uA
Gate-Body Leakage Current	Forward	I _{GSSF}	V _{GS} =30V, V _{DS} =0V			100	nA
	Reverse	I _{GSSR}	V _{GS} =-30V, V _{DS} =0V			-100	nA
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =500uA	3.5	4.5	5.5	V
Static Drain-Source On-Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =10A		103	138	mΩ
Gate Resistance		R _G	f=1MHz, Open Drain		1.7		Ω
Dynamic Characteristics							
Input Capacitance		C _{ISS}	V _{DS} =400V, V _{GS} =0V, f=100KHz		1472		pF
Output Capacitance		C _{OSS}			47		
Effective output capacitance, energy related ^{NOTE5}		C _{O(er)}	V _{GS} =0V, V _{DS} =0...400V		74		pF
Effective output capacitance, time related ^{NOTE6}		C _{O(tr)}			380		
Turn-on Delay Time		t _{d(on)}	V _{DD} =400V, I _D =13.0A R _G =3Ω, V _{GS} =12V		12		ns
Rise Time		t _r			15		
Turn-off Delay Time		t _{d(off)}			48		
Fall Time		t _f			6.4		
Gate Charge Characteristics							
Gate to Source Charge		Q _{gs}	V _{DD} =400V, I _D =13.0A V _{GS} =0 to 10V		14		nC
Gate to Drain Charge		Q _{gd}			38		
Gate Charge Total		Q _g			71		
Gate Plateau Voltage		V _{plateau}			7.5		V
Reverse Diode Characteristics							
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} =0V, I _{SD} =10A		0.86	1.1	V
Reverse Recovery Time		t _{rr}	V _R =400V, I _F =13.0A dI _F /dt=100.0A/us		162		ns
Reverse Recovery Charge		Q _{rr}			1.7		uC
Peak Reverse Recovery Current		I _{rrm}			20		A

Note:

- $C_{O(er)}$ is a fixed capacitance that gives the same stored energy as C_{OSS} while V_{DS} is rising from 0 to 400V
- $C_{O(tr)}$ is a fixed capacitance that gives the same charging time as C_{OSS} while V_{DS} is rising from 0 to 400 V



Shenzhen Sanrise Technology Co., LTD

<http://www.sanrise-tech.com>

IMPORTANT NOTICE

Shenzhen Sanrise Technology Co., LTD. reserves the right to make changes without further notice to any products or specifications herein. Shenzhen Sanrise Technology Co., LTD. does not assume any responsibility for use of any its products for any particular purpose, nor does Shenzhen Sanrise Technology Co., LTD. assume any liability arising out of the application or use of any its products or circuits. Shenzhen Sanrise Technology Co., LTD. does not convey any license under its patent rights or other rights nor the rights of others.

Main Site:

- Headquarter

Shenzhen Sanrise Technology Co., LTD.
A1206, Skyworth building, No. 008, gaoxinnan 1st Road,
Gaoxin District, Yuehai street,, Nanshan District, ShenZhen,
P.R.China

Tel: +86-755-22953335

Fax: +86-755-22916878

- Shanghai Office

Shenzhen Sanrise Technology Co., LTD
Rm.401, Building B, No. 666, Zhangheng Road,
Zhangjiang Hi-Tech Park, Shanghai, P.R.China

Tel: +86-21-68825918