220mΩ, 650V, Super Junction N-Channel Power MOSFET SRC65R220BS

General Description

The Sanrise SRC65R220BS 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 SRC65R220BS break down voltage is 650V and it has a high rugged avalanche characteristics. The SRC65R220BS is available in TO-220F , TO-220C, TO-247and TO-263-2 packages.

Symbol

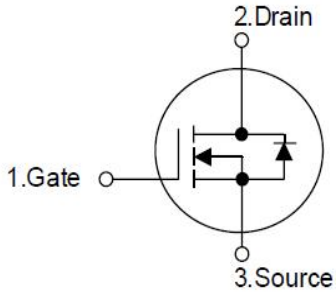


Figure 1 Symbol of SRC65R220BS

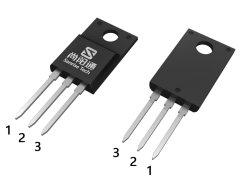
Features

- Ultra Low $R_{DS(ON)}$ = 220mΩ @ V_{GS} = 10V.
- Vds@Tjmax=700v.
- Ultra Low Gate Charge, Qg=38.4nC typ.
- Intrinsic Fast-Recovery Body Diode
- Fast switching capability
- Robust design with better EAS performance
- Non-automotive Qualified
- Ultra-fast body diode

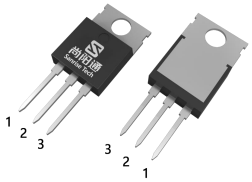
Application

- UPS, Inverter, etc
- Solar
- High Power AC/DC Power Supply

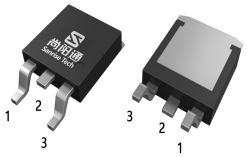
Package Type



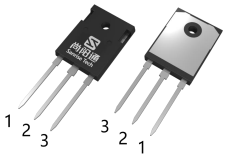
TO-220F



TO-220C



TO-263-2



TO-247

Figure 2 Package Types of SRC65R220BS

Ordering Information

SRC65R220BS□□–□

Circuit Type

Package

TF: TO-220F

TC: TO-220C

S2: TO-263-2

T:TO-247

E: Lead Free

G: Green

Blank: Tube

TR: Tape & Reel

Package	Part Number	Marking ID	Packing Type
TO-220F	SRC65R220BSTF-G	SRC65R220BSTFG	Tube
TO-220C	SRC65R220BSTC-G	SRC65R220BSTCG	Tube
TO-263-2	SRC65R220BSS2TR-G	SRC65R220BSS2G	Tape & Reel
TO-247	SRC65R220BST-G	SRC65R220BSTG	Tube

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Absolute Maximum Ratings

Parameter		Symbol	Rating	Unit
Drain-Source Voltage (Note2)		V_{DSS}	650	V
Gate-Source Voltage		V_{GSS}	±30	V
Gate-Source Voltage(dynamic),AC(f>1Hz)		V_{GSS}	±30	V
Power Dissipation(T_C=25ºC,TO-220C,TO-263-2,TO-247)		P_{tot}	179	W
Power Dissipation(T_C=25ºC,TO-220F)		P_{tot}	34	W
Continuous Drain Current	T_C=25ºC	I_D	21.2	A
	T_C=100ºC		13.4	
	T_C=125ºC		9.5	
Pulsed Drain Current (Note 3)		I_{DM}	63	A
Avalanche Energy, Single Pulse (Note 4)		E_{AS}	210	mJ
Avalanche Energy, Single Pulse (Note 5)		E_{AS}	810	mJ
Avalanche Energy, Repetitive (Note 3)		E_{AR}	0.7	mJ
Avalanche Current, Repetitive (Note 3)		I_{AR}	2.5	A
Continuous Diode Forward Current		I_S	21.2	A
Diode Pulse Current		$I_{S.PULSE}$	64	A
MOSFET dv/dt Ruggedness, V_{DS}<=480V		dv/dt	120	V/ns
Operating Junction Temperature		T_J	150	ºC
Storage Temperature		T_{STG}	-55 to 150	ºC
Lead Temperature (Soldering, 10 sec)		T_{LEAD}	260	ºC

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. For voltage spike during switching.
3. Repetitive Rating: Pulse width limited by maximum junction temperature
4. I_{AS} = 2.5A, V_{DD} = 60V, R_G = 25Ω, Starting T_J = 25°C. Finish goods test condition.
5. I_{AS} = 4.9A, V_{DD} = 60V, R_G = 25Ω, Starting T_J = 25°C. Typical Eas.

Thermal characteristics

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

Electrical Characteristics

T_J = 25 ºC, unless otherwise specified.

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250uA	650			V
Zero Gate Voltage Drain Current		I_{DSS}	V_{DS}=650V, 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			-1.0	uA
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250uA	2.3	3.3	4.3	V
Static Drain-Source On-Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=10.0A		170	220	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		1706		pF
Output Capacitance		C_{OSS}			45		
Effective output capacitance, energy related NOTE6		$C_{O(er)}$	V_{GS}=0V, V_{DS}=0…480V		71		pF
Effective output capacitance, time related NOTE7		$C_{O(tr)}$			301		
Turn-on Delay Time		$t_{d(on)}$	V_{DD}=400V, I_D=10.0A R_G=5Ω, V_{GS}=12V		26		ns
Rise Time		t_r			5		
Turn-off Delay Time		$t_{d(off)}$			43		
Fall Time		t_f			5		
Gate Charge Characteristics							
Gate to Source Charge		Q_{gs}	V_{DD}=480V, I_D=10.0A V_{GS}=0 to 10V		10.8		nC
Gate to Drain Charge		Q_{gd}			12.3		
Gate Charge Total		Q_g			38.4		
Gate Plateau Voltage		$V_{plateau}$			5.4		V
Reverse Diode Characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_{SD}=10.0A		0.87	1.1	V
Reverse Recovery Time		t_{rr}	V_R=400V, I_F=10.0A dI$_F$/dt=100.0A/us		122		ns
Reverse Recovery Charge		Q_{rr}			0.78		uC
Peak Reverse Recovery Current		I_{rrm}			10.6		A

Note:

6. $C_{O(er)}$ is a fixed capacitance that gives the same stored energy as C_{OSS} while V_{DS} is rising from 0 to 480V

7. $C_{O(tr)}$ is a fixed capacitance that gives the same charging time as C_{OSS} while V_{DS} is rising from 0 to 480 V

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Shenzhen Sanrise Technology Co., LTD.

http://www.sanrise-tech.com

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