90mΩ, 600V, Super Junction N-Channel Power MOSFET SRC60R090FBS

General Description

The Sanrise SRC60R090FBS 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 SRC60R090FBS break down voltage is 600V and it has a high rugged avalanche characteristics.

The SRC60R090FBS is available in TO-263-2, TO-220F, TO-220C and TO-247 packages.

Features

- Ultra Low $R_{DS(ON)}$ = 90mΩ @ V_{GS} = 10V.
- Ultra Low Gate Charge, Qg=55nC typ.
- Fast switching capability
- Robust design with better EAS performance
- Optimized switching process
- Non-automotive Qualified
- Ultra-fast body diode

Application

- High Performance PS

Symbol

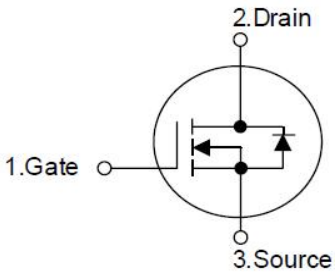
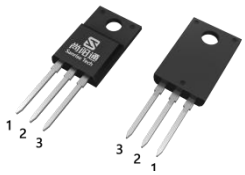
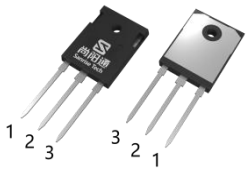


Figure 1 Symbol of SRC60R090FBS

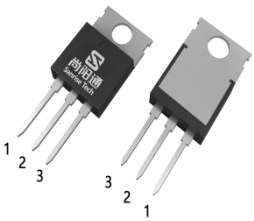
Package Type



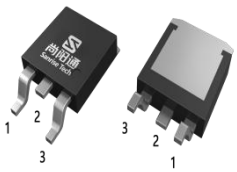
TO-220F



TO-247



TO-220C



TO-263

Figure 2 Package Types of SRC60R090FBS

Ordering Information

SRC60R090FBS□□–□

Circuit Type

Package

T : TO-247

TF: TO-220F

S2: TO-263-2

TC:TO-220C

E: Lead Free

G: Green

Blank: Tube

Package	Part Number	Marking ID	Packing Type
TO-247	SRC60R090FBST-G	SRC60R090FBSTG	Tube
TO-220F	SRC60R090FBSTF-G	SRC60R090FBSTFG	Tube
TO-220C	SRC60R090FBSTC-G	SRC60R090FBSTCG	Tube
TO-263-2	SRC60R090FBSS2TR-G	SRC60R090FBSS2G	Tape & Reel

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Absolute Maximum Ratings[Note 1]

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	600	V
Gate-Source Voltage (static)		V_{GSS}	±20	V
Gate-Source Voltage (dynamic), AC (f>1 Hz)		V_{GSS}	±30	V
Power Dissipation（Tc=25℃,TO-220F）		P_{tot}	32	W
Power Dissipation（Tc=25℃,TO-247,TO-220C,TO-263-2）		P_{tot}	255	W
Continuous Drain Current	T_C=25ºC	I_D	37	A
	T_C=100ºC		23	
	T_C=125ºC		16	
Pulsed Drain Current (Note 2)		I_{DM}	111	A
Avalanche Energy, Single Pulse (Note 3)		E_{AS}	160	mJ
Avalanche Energy, Repetitive (Note 2)		E_{AR}	0.2	mJ
Avalanche Current, Repetitive (Note 2)		I_{AR}	2.2	A
Continuous Diode Forward Current		I_S	37	A
Diode Pulse Current		$I_{S.PULSE}$	111	A
MOSFET dv/dt Ruggedness, V_{DS}<=480V		dv/dt	80	V/ns
Reverse Diode dv/dt, V_{DS}<=480V, I_{SD}<=I_D		dv/dt	50	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. Repetitive Rating: Pulse width limited by maximum junction temperature
3. I_{AS}=2.2A, V_{DD} = 60V, R_G = 25Ω, Starting T_J = 25°C

Thermal characteristics

Parameter		Symbol	Min	Typ	Max	Unit
Thermal resistance, Junction-to-Case	TO-220F	R_{thJC}			3.9	ºC /W
	TO-247				0.49	
	TO-220C				0.49	
	TO-263-2				0.49	
Thermal resistance, Junction-to-Ambient	TO-220F	R_{thJA}			78	ºC /W
	TO-247				60	
	TO-220C				60	
	TO-263-2				60	

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Electrical Characteristics

T_J = 25℃, 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			20	uA
Gate-Body Leakage Current	Forward	I_{GSSF}	V_{GS}=20V, V_{DS}=0V			100	nA
	Reverse	I_{GSSR}	V_{GS}=-20V, V_{DS}=0V			-100	
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=0.25mA	4.0	5.0	6.0	V
Static Drain-Source On-Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=20A		70	90	mΩ
Gate Resistance		R_G	f=1MHz, Open Drain		2.2		Ω
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=400V, V_{GS}=0V, f=100kHz		2.3		nF
Output Capacitance		C_{OSS}			68		pF
Effective output capacitance, energy related NOTE5		$C_{O(er)}$	V_{GS}=0V, V_{DS}=0…480V		98		pF
Effective output capacitance, time related NOTE6		$C_{O(tr)}$			600		
Turn-on Delay Time		$t_{d(on)}$	V_{DD}=400V, I_D=20A R_G=3.3Ω, V_{GS}=10V		25		ns
Rise Time		t_r			6		
Turn-off Delay Time		$t_{d(off)}$			80		
Fall Time		t_f			5		
Gate Charge Characteristics							
Gate to Source Charge		Q_{gs}	V_{DD}=480V, I_D=20A V_{GS}=0 to 10V		15.6		nC
Gate to Drain Charge		Q_{gd}			25		
Gate Charge Total		Q_g			55		
Gate Plateau Voltage		$V_{plateau}$			6.5		V
Reverse Diode Characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_{SD}=20A		0.9	1.1	V
Reverse Recovery Time		t_{rr}	V_R=400V, I_F=20A dI_F/dt=100A/us		149		ns
Reverse Recovery Charge		Q_{rr}			1.2		uC
Peak Reverse Recovery Current		I_{rrm}			15		A

Note:

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

6. $C_{O(tr)}$ 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.

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