29mΩ, 600V, Super Junction N-Channel Power MOSFET SRC60R029FBS

General Description

The Sanrise SRC60R029FBS 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 SRC60R029FBS break down voltage is 600V and it has a high rugged avalanche characteristics.

The SRC60R029FBS is available in TO-247 package.

Features

- Ultra Low $R_{DS(ON)}$ = 29mΩ @ V_{GS} = 10V.
- Vds@Tjmax=650v.
- Ultra Low Gate Charge, Qg=163nC typ.
- Fast switching capability
- Robust design with better EAS performance
- Optimized switching process
- Non-automotive Qualified
- Ultra-fast body diode

Application

- EV Charger
- High Performance PS

Symbol

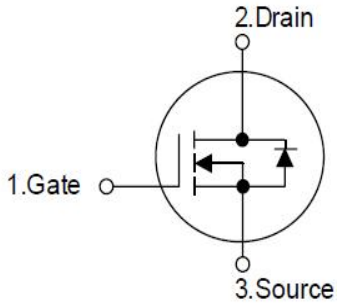
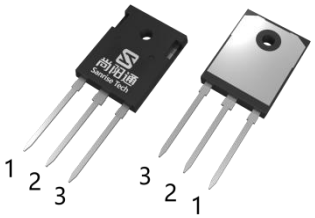


Figure 1 Symbol of SRC60R029FBS

Package Type



TO-247

Figure 2 Package Type of SRC60R029FBS

Ordering Information

SRC60R029FBS□□–□

Circuit Type

Package
T : TO-247

E: Lead Free
G: Green
Blank: Tube

Package	Part Number	Marking ID	Packing Type
TO-247	SRC60R029FBST-G	SRC60R029FBSTG	Tube

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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(T_C=25ºC,TO-247)		P_{tot}	520	W
Continuous Drain Current	T_C=25ºC	I_D	95	A
	T_C=100ºC		59	
	T_C=125ºC		42	
Pulsed Drain Current (Note 2)		I_{DM}	284	A
Avalanche Energy, Single Pulse (Note 3)		E_{AS}	413	mJ
Avalanche Energy, Single Pulse (Note 4)		E_{AS}	5529	mJ
Avalanche Energy, Repetitive (Note 2)		E_{AR}	0.4	mJ
Avalanche Current, Repetitive (Note 2)		I_{AR}	3.8	A
Continuous Diode Forward Current		I_S	95	A
Diode Pulse Current		$I_{S.PULSE}$	284	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}=3.5A, V_{DD} = 60V, R_G = 25Ω, Starting T_J = 25°C. Finish goods test condition.
3. I_{AS}=12.8A, V_{DD} = 60V, R_G = 25Ω, Starting T_J = 25°C. Typical Eas.

Thermal Resistance

Parameter (TO247-package)	Symbol	Min	Typ	Max	Unit
Thermal Resistance，Junction-to-Case	R_{thJC}	-		0.24	ºC/W
Thermal Resistance，Junction-to-Ambient	R_{thJA}	-		68	

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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=250uA	3.5	4.5	5.5	V
Static Drain-Source On-Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=34A		22	29	mΩ
Gate Resistance		R_G	f=1MHz, Open Drain		2.1		Ω
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=400V, V_{GS}=0V, f=100KHz		7.3		nF
Output Capacitance		C_{OSS}			176		pF
Effective output capacitance, energy related NOTE5		$C_{O(er)}$	V_{GS}=0V, V_{DS}=0…480V		252		pF
Effective output capacitance, time related NOTE6		$C_{O(tr)}$			1649		
Turn-on Delay Time		$t_{d(on)}$	V_{DD}=400V, I_D=34A R_G=3Ω, V_{GS}=12V		71		ns
Rise Time		t_r			18		
Turn-off Delay Time		$t_{d(off)}$			117		
Fall Time		t_f			12		
Gate Charge Characteristics							
Gate to Source Charge		Q_{gs}	V_{DD}=400V, I_D=34A V_{GS}=0 to 10V		57		nC
Gate to Drain Charge		Q_{gd}			74		
Gate Charge Total		Q_g			163		
Gate Plateau Voltage		$V_{plateau}$			7.6		V
Reverse Diode Characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_{SD}=34A		0.9	1.1	V
Reverse Recovery Time		t_{rr}	V_R=400V, I_F=34A dI$_F$/dt=100A/us		244		ns
Reverse Recovery Charge		Q_{rr}			2.42		uC
Peak Reverse Recovery Current		I_{rrm}			15.8		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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