24mΩ, 650V, Super Junction N-Channel Power MOSFET SRC65R024BS

General Description

The Sanrise SRC65R024BS 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 SRC65R024BS break down voltage is 650V and it has a high rugged avalanche characteristics.

The SRC65R024BS is available in TO-247 package.

Symbol

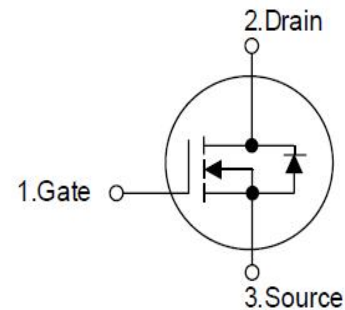


Figure 1 Symbol of SRC65R024BS

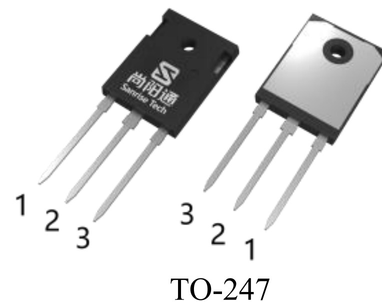
Features

- Ultra Low $R_{DS(ON)}$ = 24mΩ @ V_{GS} = 10V.
- Ultra Low Gate Charge, Qg=408nC typ.
- Vds@Tjmax=700v.
- Intrinsic Fast-Recovery Body Diode
- Fast switching capability
- Robust design with better EAS performance
- Non-automotive Qualified
- Ultra-fast body diode

Application

- EV Charger
- Server / Telecom

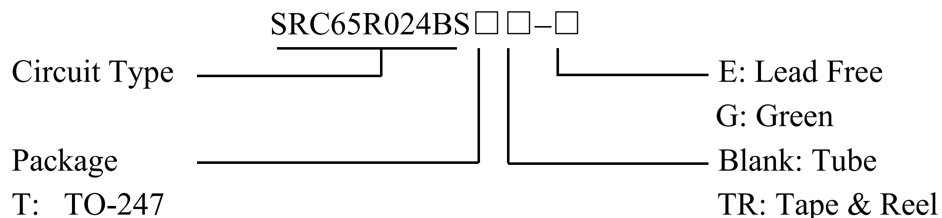
Package Type



TO-247

Figure 2 Package Type of SRC65R024BS

Ordering Information



Package	Part Number	Marking ID	Packing Type
TO-247	SRC65R024BST-G	SRC65R024BSTG	Tube

Absolute Maximum Ratings[Note 1]

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	650	V
Gate-Source Voltage (static)		V_{GSS}	±20	V
Gate-Source Voltage (dynamic), AC (f>1 Hz)		V_{GSS}	±30	V
Continuous Drain Current	T_C=25ºC	I_D	110	A
	T_C=100ºC		69	
	T_C=125ºC		49	
Power Dissipation（Tc=25℃,TO-247）		P_{tot}	595	W
Pulsed Drain Current (Note 2)		I_{DM}	330	A
Avalanche Energy, Single Pulse (Note 3)		E_{AS}	413	mJ
Avalanche Energy, Single Pulse (Note 4)		E_{AS}	6000	mJ
Avalanche Energy, Repetitive (Note 2)		E_{AR}	0.4	mJ
Avalanche Current, Repetitive (Note 2)		I_{AR}	3.5	A
Continuous Diode Forward Current		I_S	110	A
Diode Pulse Current		$I_{S.PULSE}$	330	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.
4. I_{AS} = 13.4A, V_{DD} = 60V, R_G = 25Ω, Starting T_J = 25°C. Typical Eas.

Thermal characteristics

Parameter (TO247-package)	Symbol	Min	Typ	Max	Unit
Thermal Resistance，Junction-to-Case	R_{thJC}	-		0.21	ºC/W
Thermal Resistance，Junction-to-Ambient	R_{thJA}	-		62	

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	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}=20V, V_{DS}=0V			200	nA
	Reverse	I_{GSSR}	V_{GS}=-20V, V_{DS}=0V			-200	
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=2.9mA	3.5	4.5	5.5	V
Static Drain-Source On-Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=40A		19	24	mΩ
Gate Resistance		R_G	f=1MHz, Open Drain		0.9		Ω
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=400V, V_{GS}=0V, f=100kHz		8.3		nF
Output Capacitance		C_{OSS}			208		pF
Effective output capacitance, energy related NOTE5		$C_{O(er)}$	V_{GS}=0V, V_{DS}=0…400V		316		pF
Effective output capacitance, time related NOTE6		$C_{O(tr)}$			1722		
Turn-on Delay Time		$t_{d(on)}$	V_{DD}=400V, I_D=40A R_G=3.0Ω, V_{GS}=12V		87		ns
Rise Time		t_r			30		
Turn-off Delay Time		$t_{d(off)}$			205		
Fall Time		t_f			15		
Gate Charge Characteristics							
Gate to Source Charge		Q_{gs}	V_{DD}=400V, I_D=40A V_{GS}=0 to 10V		66		nC
Gate to Drain Charge		Q_{gd}			226		
Gate Charge Total		Q_g			408		
Gate Plateau Voltage		$V_{plateau}$			7.8		V
Reverse Diode Characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_{SD}=40A		0.85	1.1	V
Reverse Recovery Time		t_{rr}	V_R=400V, I_F=40A dIF/dt=100A/us		238		ns
Reverse Recovery Charge		Q_{rr}			3.2		uC
Peak Reverse Recovery Current		I_{rrm}			22		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 400V

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 400 V

Shenzhen Sanrise Technology Co., LTD

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