125mΩ, 600V, Super Junction N-Channel Power MOSFET SRC60R125B

General Description

The Sanrise SRC60R125B 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 SRC60R125B break down voltage is 600V and it has a high rugged avalanche characteristics. The SRC60R125B is available in TO-247 package.

Features

- Ultra Low $R_{DS(ON)}$ = 125mΩ @ V_{GS} = 10V.
- Ultra Low Gate Charge, Qg=57.3nC typ.
- Intrinsic Fast-Recovery Body Diode
- Fast switching capability
- Robust design with better EAS performance

Application

- EV Charger
- Sever / Telecom

Symbol

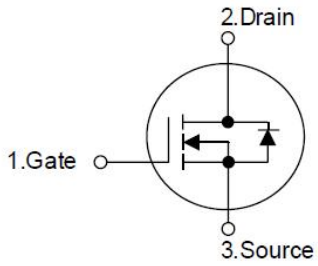
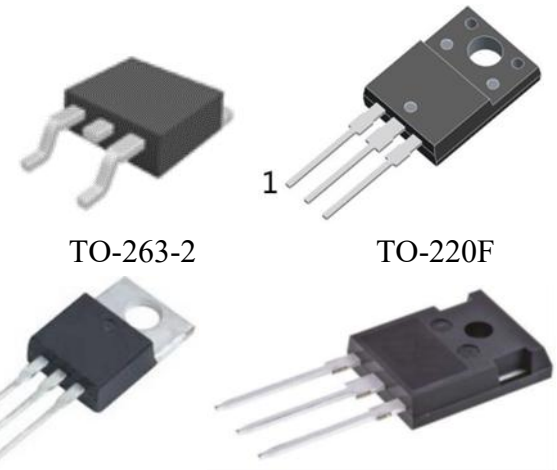


Figure 1 Symbol of SRC60R125B

Package Type



TO-263-2 TO-220F

TO-220C TO-247

Figure 2 Package Type of SRC60R125B

Ordering Information

SRC60R125B□□–□

Circuit Type

Package

T: TO-247

S2:TO-263-2

TF: TO-220F

TC: TO-220C

E: Lead Free

G: Green

Blank: Tube

TR: Tape & Reel

Package	Part Number	Marking ID	Packing Type
TO-247	SRC60R125BT-G	SRC60R125BTG	Tube
TO-263-2	SRC60R125BS2TR-G	SRC60R125BS2G	Tape & Reel
TO-220F	SRC60R125BTF-G	SRC60R125BTFG	Tube
TO-220C	SRC60R125BTC-G	SRC60R125BTCG	Tube

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Absolute Maximum Ratings

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
Continuous Drain Current	T_C=25ºC	I_D	26.2	A
	T_C=125ºC		11.7	
Pulsed Drain Current (Note 2)		I_{DM}	78.6	A
Avalanche Energy, Single Pulse (Note 3)		E_{AS}	340	mJ
Avalanche Energy, Repetitive (Note 2)		E_{AR}	0.4	mJ
Avalanche Current, Repetitive (Note 2)		I_{AR}	2.5	A
Continuous Diode Forward Current		I_S	26.2	A
Diode Pulse Current		$I_{S.PULSE}$	78.6	A
MOSFET dv/dt Ruggedness, V_{DS}<=480V		dv/dt	50	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} = 2.5A, V_{DD} = 60V, R_G = 25Ω, Starting T_J = 25°C

Thermal Resistance

Parameter		Symbol	Min	Typ	Max	Unit
Thermal resistance, Junction-to-Case	TO-220F	R_{thJC}			3.7	ºC /W
	TO-220C				0.69	
	TO-247				0.69	
	TO-263				0.69	
Thermal resistance, Junction-to-Ambient	TO-220F	R_{thJA}			80	ºC /W
	TO-220C				62	
	TO-247				62	
	TO-263				62	

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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			10	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	3.0	4.0	5.0	V
Static Drain-Source On-Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=13A		106	125	mΩ
Gate Resistance		R_G	f=1MHz, Open Drain		1.5		Ω
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=50V, V_{GS}=0V, f=1MHz		2.2		nF
Output Capacitance		C_{OSS}			88		pF
Reverse Transfer Capacitance		C_{RSS}			1.4		
Effective output capacitance, energy related NOTE5		$C_{O(er)}$	V_{GS}=0V, V_{DS}=0…400V		48.7		pF
Effective output capacitance, time related NOTE6		$C_{O(tr)}$			284.8		
Turn-on Delay Time		$t_{d(on)}$	V_{DD}=400V, I_D=13A R_G=5.3Ω, V_{GS}=10V		13		ns
Rise Time		t_r			11		
Turn-off Delay Time		$t_{d(off)}$			53		
Fall Time		t_f			6		
Gate Charge Characteristics							
Gate to Source Charge		Q_{gs}	V_{DD}=480V, I_D=13A V_{GS}=0 to 10V		13.6		nC
Gate to Drain Charge		Q_{gd}			28.0		
Gate Charge Total		Q_g			57.3		
Gate Plateau Voltage		$V_{plateau}$			6.1		V
Reverse Diode Characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_{SD}=13A		0.9	1.1	V
Reverse Recovery Time		t_{rr}	V_R=100V, I_F=13A dI_F/dt=100A/us		122		ns
Reverse Recovery Charge		Q_{rr}			0.59		uC
Peak Reverse Recovery Current		I_{rrm}			9.6		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

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