82mΩ, 600V, Super Junction N-Channel Power MOSFET SRC60R082BT-GA

General Description

The Sanrise SRC60R082BT-GA 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 SRC60R082BT-GA break down voltage is 600V and it has a high rugged avalanche characteristics.

The SRC60R082BT-GA is available in TO-247 package.

Symbol

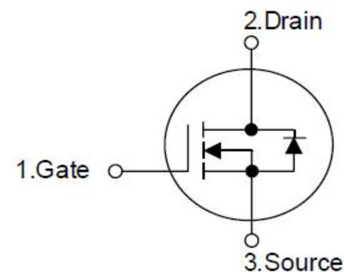


Figure 1 Symbol of SRC60R082BT-GA

Features

- Ultra Low $R_{DS(ON)}$ = 82mΩ @ V_{GS} = 10V.
- Ultra Low Gate Charge, Qg=110nC typ.
- Intrinsic Fast-Recovery Body Diode
- Fast switching capability
- Robust design with better EAS performance
- EMI Improved
- Qualified according to AEC Q101
- Green Product (RoHS compliant)

Application

- On-Board Charger
- DC/DC Converter
- Auxiliary Inverter

Package Type

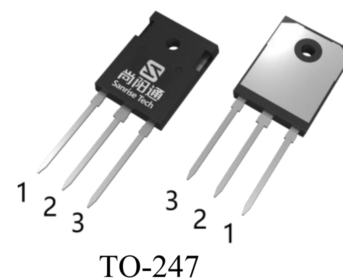
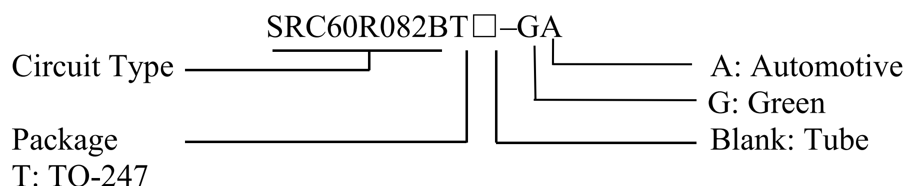


Figure 2 Package Type of SRC60R082BT-GA

Ordering Information



Package	Part Number	Marking ID	Packing Type
TO-247	SRC60R082BT-GA	SRC60R082BTGA	Tube

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>1Hz)		V_{GSS}	±30	V
Power Dissipation(T_C=25ºC,TO-247)		P_{tot}	357	W
Continuous Drain Current	T_C=25ºC	I_D	45	A
	T_C=100ºC		28	
	T_C=125ºC		20.3	
Pulsed Drain Current (Note 2)		I_{DM}	135	A
Avalanche Energy, Single Pulse (Note 3)		E_{AS}	125	mJ
Avalanche Energy, Single Pulse (Note 3)		E_{AS}	1280	mJ
Avalanche Energy, Repetitive (Note 2)		E_{AR}	0.6	mJ
Avalanche Current, Repetitive (Note 2)		I_{AR}	5.0	A
Continuous Diode Forward Current		I_S	45	A
Diode Pulse Current		$I_{S.PULSE}$	135	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} = 5A, V_{DD} = 60V, R_G = 25Ω, Starting T_J = 25°C. Finish goods test condition.
4. I_{AS} = 16A, 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-247	R_{thJC}			0.35	ºC /W
Thermal resistance, Junction-to-Ambient	TO-247	R_{thJA}			58	ºC /W

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=1.0mA	3.0	4.0	5.0	V
Static Drain-Source On-Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=24A		60	82	mΩ
Gate Resistance		R_G	f=1MHz, Open Drain		1.0		Ω
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1MHz		4.3		nF
Output Capacitance		C_{OSS}			2.0		nF
Reverse Transfer Capacitance		C_{RSS}			50		pF
Effective output capacitance, energy related [NOTE5]		$C_{O(er)}$	V_{GS}=0V, V_{DS}=0…480V		94		pF
Effective output capacitance, time related [NOTE6]		$C_{O(tr)}$			550		
Turn-on Delay Time		$t_{d(on)}$	V_{DD}=400V, I_D=24A R_G=3Ω, V_{GS}=10V		40		ns
Rise Time		t_r			18		
Turn-off Delay Time		$t_{d(off)}$			108		
Fall Time		t_f			8.0		
Gate Charge Characteristics							
Gate to Source Charge		Q_{gs}	V_{DD}=480V, I_D=24A V_{GS}=0 to 10V		28.1		nC
Gate to Drain Charge		Q_{gd}			56.0		
Gate Charge Total		Q_g			110		
Gate Plateau Voltage		$V_{plateau}$			6.5		V
Reverse Diode Characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_{SD}=24A		0.9	1.1	V
Reverse Recovery Time		t_{rr}	V_R=400V, I_F=24A dI_F/dt=100A/us		141		ns
Reverse Recovery Charge		Q_{rr}			0.83		uC
Peak Reverse Recovery Current		I_{rrm}			11.8		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

Shenzhen Sanrise Technology Co., LTD

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