45mΩ 600V, Super Junction N-Channel Power MOSFET SRC60R045FB

General Description

The Sanrise SRC60R045FB 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 SRC60R045FB break down voltage is 600V and it has a high rugged avalanche characteristic.

The SRC60R045FB is available in TO-247 package.

Features

- Ultra Low $R_{DS(ON)}$ = 45mΩ @ V_{GS} = 10V.
- Ultra Low Gate Charge, Qg=75.6nC typ.
- Intrinsic Fast-Recovery Body Diode
- Fast switching capability
- Robust design with better EAS performance
- Non-automotive Qualified

Application

- EV Charger
- Sever / Telecom

Symbol

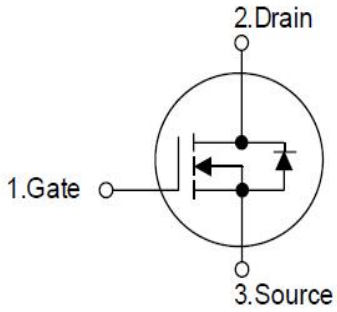

Figure 1 Symbol of SRC60R045FB

Package Type

TO-247

Figure 2 Package Type of SRC60R045FB

Ordering Information

SRC60R045FB□□–□

Circuit Type

Package
T: TO-247

E: Lead Free
G: Green

Blank: Tube
TR: Tape & Reel

Package	Part Number	Marking ID	Packing Type
TO-247	SRC60R045FBT-G	SRC60R045FBTG	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
Power Dissipation(T_C=25ºC,TO-247)		P_{tot}	403	W
Continuous Drain Current	T_C=25ºC	I_D	68.3	A
	T_C=100ºC		43.1	
	T_C=125ºC		30.5	
Pulsed Drain Current (Note 2)		I_{DM}	204.9	A
Avalanche Energy, Single Pulse (Note 3)		E_{AS}	200	mJ
Avalanche Energy, Repetitive (Note 2)		E_{AR}	0.2	mJ
Avalanche Current, Repetitive (Note 2)		I_{AR}	6.4	A
Continuous Diode Forward Current		I_S	68.3	A
Diode Pulse Current		$I_{S.PULSE}$	204.9	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} =6.4A, V_{DD} = 60V, R_G = 25Ω, Starting T_J = 25°C

Thermal Resistance

Parameter (TO247-package)	Symbol	Min	Typ	Max	Unit
Thermal Resistance， Junction-to-Case	R_{thJC}	-		0.31	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	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=1.6mA	3.2	4.0	4.8	V
Static Drain-Source On-Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=38A		36	45	mΩ
Gate Resistance		R_G	f=1MHz, Open Drain		1.3		Ω
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=50V, V_{GS}=0V, f=1MHz		5.1		nF
Output Capacitance		C_{OSS}			239		pF
Reverse Transfer Capacitance		C_{RSS}			1.7		
Effective output capacitance, energy related NOTE5		$C_{O(er)}$	V_{GS}=0V, V_{DS}=0…400V		135.1		pF
Effective output capacitance, time related NOTE6		$C_{O(tr)}$			822.4		
Turn-on Delay Time		$t_{d(on)}$	V_{DD}=400V, I_D=34A R_G=3.3Ω, V_{GS}=10V		15		ns
Rise Time		t_r			6.0		
Turn-off Delay Time		$t_{d(off)}$			62		
Fall Time		t_f			4.2		
Gate Charge Characteristics							
Gate to Source Charge		Q_{gs}	V_{DD}=480V, I_D=34A V_{GS}=0 to 10V		35.4		nC
Gate to Drain Charge		Q_{gd}			20.5		
Gate Charge Total		Q_g			75.6		
Gate Plateau Voltage		$V_{plateau}$			6.5		V
Reverse Diode Characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_{SD}=34A		0.92	1.1	V
Reverse Recovery Time		t_{rr}	V_R=100V, I_F=34A dI_F/dt=100A/us		149		ns
Reverse Recovery Charge		Q_{rr}			0.96		uC
Peak Reverse Recovery Current		I_{rrm}			12.9		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

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