600mΩ, 650V, Super Junction N-Channel Power MOSFET SRC65R600EC

General Description

The Sanrise SRC65R600EC 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 SRC65R600EC break down voltage is 650V and it has a high rugged avalanche characteristics.

The SRC65R600EC is available in TO-252, TO-263-2， PDFN5*6， TO-262， TO-220F and TO-251 packages.

Features

- Ultra Low $R_{DS(ON)}$ = 600mΩ @ V_{GS} = 10V.
- Ultra Low Gate Charge, Qg=18.4nC typ.
- Fast switching capability
- Robust design with better EAS performance
- EMI Improved Design ***(SnowMOS^{TM} Gen.2)***
- Non-automotive Qualified

Application

- TV Power
- High Performance Charger / Adapter
- LED Lighting Power

Symbol

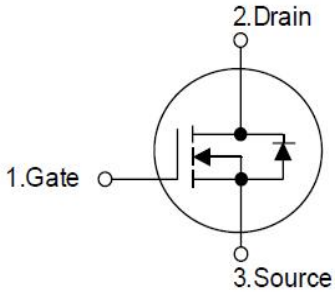

Figure 1 Symbol of SRC65R600EC

Package Type

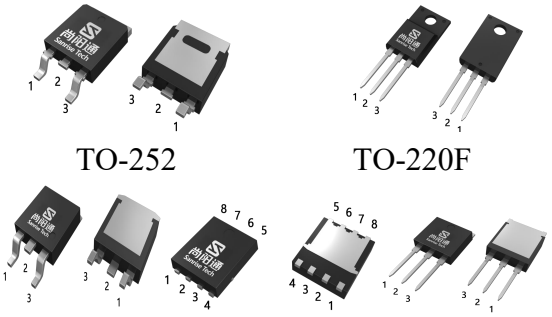

Figure 2 Package Types of SRC65R600EC

Ordering Information

SRC65R600EC□□–□

Circuit Type

Package

D: TO-252， D56：PDFN5*6

TF: TO-220F，TS：TO-262

S2: TO-263-2， D1-G：TO-251

E: Lead Free

G: Green

Blank: Tube

TR: Tape & Reel

Package	Part Number	Marking ID	Packing Type
TO-252	SRC65R600ECDTR-G	SRC65R600ECDG	Tape & Reel
TO-220F	SRC65R600ECTF-G	SRC65R600ECTFG	Tube
TO-262	SRC65R600ECTS-G	SRC65R600ECTSG	Tube
TO-263-2	SRC65R600ECS2TR-G	SRC65R600ECS2G	Tape & Reel
PDFN5*6	SRC65R600ECD56TR-G	SRC65R600ECD56G	Tape & Reel
TO-251	SRC65R600ECD1-G	SRC65R600ECD1G	Tape & Reel

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Absolute Maximum Ratings

Parameter		Symbol	Rating	Unit
Drain-Source Voltage (Note2)		V_{DSS}	650	V
Gate-Source Voltage		V_{GSS}	±30	V
Power Dissipation(T_C=25ºC,TO-252,TO-262,TO-263-2,PDFN5*6,TO-251)		P_{tot}	58	W
Power Dissipation(T_C=25ºC,TO-220F)		P_{tot}	27	W
Continuous Drain Current	T_C=25ºC	I_D	7.3	A
	T_C=100ºC		4.6	
	T_C=125ºC		3.3	
Pulsed Drain Current (Note 4)		I_{DM}	21.9	A
Avalanche Energy, Single Pulse (Note 5)		E_{AS}	105	mJ
Avalanche Energy, Repetitive (Note 4)		E_{AR}	0.15	mJ
Avalanche Current, Repetitive (Note 4)		I_{AR}	1.3	A
Continuous Diode Forward Current		I_S	7.3	A
Diode Pulse Current		$I_{S.PULSE}$	24.0	A
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. For voltage spike during switching.
3. Repetitive Rating: Pulse width limited by maximum junction temperature
4. IAS = 1.3A, VDD = 60V, RG = 25Ω, Starting TJ = 25°C

Thermal characteristics

Parameter		Symbol	Min	Typ	Max	Unit
Thermal resistance, Junction-to-Case	TO-220F	R_{thJC}			4.5	ºC /W
	TO-252				2.13	
	TO-262				2.13	
	TO-263-2				2.13	
	PDFN5*6				2.13	
	TO-251				2.13	
Thermal resistance, Junction-to-Ambient	TO-220F	R_{thJA}			60	ºC /W
	TO-252				60	
	TO-262				60	
	PDFN5*6				60	
	TO-263-2				60	
	TO-251				60	

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			1	uA
Gate-Body Leakage Current	Forward	I_{GSSF}	V_{GS}=30V, V_{DS}=0V			100	nA
	Reverse	I_{GSSR}	V_{GS}=-30V, V_{DS}=0V			-100	
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250uA	2.7	3.6	4.5	V
Static Drain-Source On-Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=4.0A		460	600	mΩ
Gate Resistance		R_G	f=1MHz, Open Drain		8.9		Ω
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=50V, V_{GS}=0V, f=1MHz		356		pF
Output Capacitance		C_{OSS}			31.8		
Reverse Transfer Capacitance		C_{RSS}			18.7		
Effective output capacitance, energy related NOTE6		$C_{O(er)}$	V_{GS}=0V, V_{DS}=0…480V		16		pF
Effective output capacitance, time related NOTE7		$C_{O(tr)}$			72		
Turn-on Delay Time		$t_{d(on)}$	V_{DD}=400V, I_D=4.0A R_G=10Ω, V_{GS}=10V		10		ns
Rise Time		t_r			12		
Turn-off Delay Time		$t_{d(off)}$			36		
Fall Time		t_f			14		
Gate Charge Characteristics							
Gate to Source Charge		Q_{gs}	V_{DD}=480V, I_D=4.0A V_{GS}=0 to 10V		4.2		nC
Gate to Drain Charge		Q_{gd}			9.1		
Gate Charge Total		Q_g			18.4		
Gate Plateau Voltage		$V_{plateau}$			5.9		V
Reverse Diode Characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_{SD}=4.0A		0.84	1.1	V
Reverse Recovery Time		t_{rr}	V_R=400V, I_F=4.0A dI$_F$/dt=100A/us		206		ns
Reverse Recovery Charge		Q_{rr}			1.63		uC
Peak Reverse Recovery Current		I_{rrm}			15.8		A

Note:

6. $C_{O(er)}$ is a fixed capacitance that gives the same stored energy as C_{OSS} while V_{DS} is rising from 0 to 480V

7. $C_{O(tr)}$ 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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Shenzhen Sanrise Technology Co., LTD

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