

General Description

The Sanrise SRC60R030FB 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 SRC60R030FB break down voltage is 600V and it has a high rugged avalanche characteristics. The SRC60R030FB is available in TO-247 package.

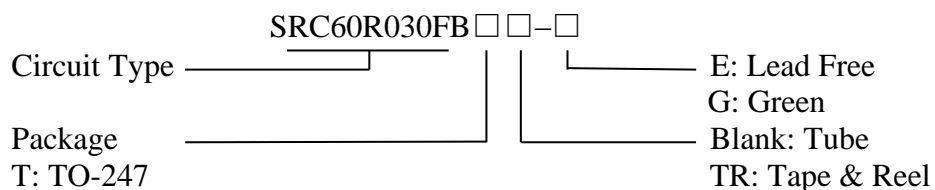
Features

- Ultra Low $R_{DS(ON)} = 30m\Omega @ V_{GS} = 10V$.
- Ultra Low Gate Charge, $Q_g = 124.1nC$ typ.
- Fast switching capability
- Robust design with better EAS performance
- Low Q_{rr}

Application

- EV Charger
- High Power Application
- High Performance Application

Ordering Information



Symbol

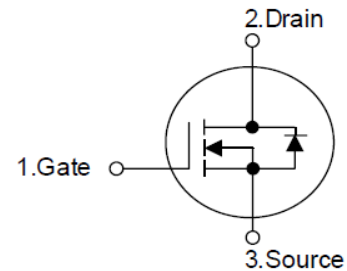


Figure 1 Symbol of SRC60R030FB

Package Type



Figure 2 Package Type of SRC60R030FB

Package	Part Number		Marking ID		Packing Type
	Lead Free	Green	Lead Free	Green	
TO-247	SRC60R030FBT-E	SRC60R030FBT-G	SRC60R030FBTE	SRC60R030FBTG	Tube

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	$T_C=25^{\circ}C$	I_D	91	A
	$T_C=125^{\circ}C$		41	
Pulsed Drain Current (Note 2)		I_{DM}	273	A
Avalanche Energy, Single Pulse (Note 3)		E_{AS}	1200	mJ
Avalanche Energy, Repetitive (Note 2)		E_{AR}	1.0	mJ
Avalanche Current, Repetitive (Note 2)		I_{AR}	7.5	A
Continuous Diode Forward Current		I_S	91	A
Diode Pulse Current		$I_{S,PULSE}$	273	A
MOSFET dv/dt Ruggedness, $V_{DS} \leq 480V$		dv/dt	80	V/ns
Reverse Diode dv/dt, $V_{DS} \leq 480V, I_{SD} \leq I_D$		dv/dt	50	V/ns
Power Dissipation		P_{tot}	595	W
Operating Junction Temperature		T_J	150	°C
Storage Temperature		T_{STG}	-55 to 150	°C
Lead Temperature (Soldering, 10 sec)		T_{LEAD}	260	°C

Note:

- 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.
- Repetitive Rating: Pulse width limited by maximum junction temperature
- $I_{AS} = 7.5A$, $V_{DD} = 60V$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}C$

Thermal characteristics

Parameter		Symbol	Min	Typ	Max	Unit
Thermal resistance, Junction-to-Case	TO-247	R_{thJC}			0.21	°C/W
Thermal resistance, Junction-to-Ambient	TO-247	R_{thJA}			54	°C/W

Electrical Characteristics
 $T_J = 25^{\circ}\text{C}$, unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Statistic Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	600			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=600V, V_{GS}=0V$			10	μA
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	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=2.2mA$	3.0	4.0	5.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=34A$		26.4	30	mΩ
Gate Resistance	R_G	f=1MHz, Open Drain		2.0		Ω
Dynamic Characteristics						
Input Capacitance	C_{ISS}	$V_{DS}=50V, V_{GS}=0V, f=1MHz$		8.3		nF
Output Capacitance	C_{OSS}			393		pF
Reverse Transfer Capacitance	C_{RSS}			2.7		pF
Effective output capacitance, energy related ^{NOTE5}	$C_{O(er)}$	$V_{GS}=0V, V_{DS}=0\dots 400V$		222.		pF
Effective output capacitance, time related ^{NOTE6}	$C_{O(tr)}$			4		
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=400V, I_D=34A, R_G=3.3\Omega, V_{GS}=10V$		21		ns
Rise Time	t_r			13		
Turn-off Delay Time	$t_{d(off)}$			71		
Fall Time	t_f			4.5		
Gate Charge Characteristics						
Gate to Source Charge	Q_{gs}	$V_{DD}=480V, I_D=34A, V_{GS}=0 \text{ to } 10V$		58.5		nC
Gate to Drain Charge	Q_{gd}			33.7		
Gate Charge Total	Q_g			124.		
Gate Plateau Voltage	$V_{plateau}$			6.5		V
Reverse Diode Characteristics						
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_{SD}=34A$		0.9	1.1	V
Reverse Recovery Time	t_{rr}	$V_R=400V, I_F=34A, dI_F/dt=100A/\mu s$		175		ns
Reverse Recovery Charge	Q_{rr}			1.28		μC
Peak Reverse Recovery Current	I_{rrm}			14.6		A

Note:

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

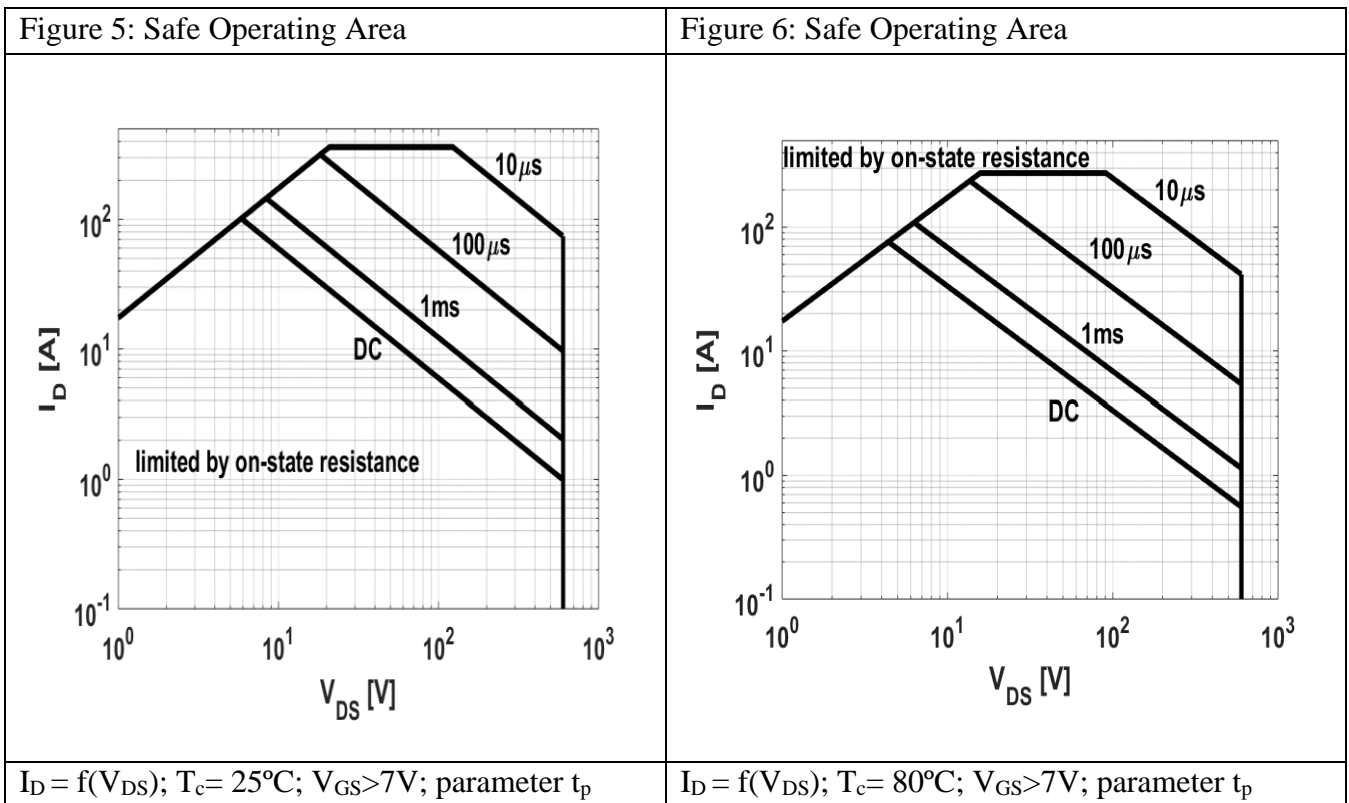
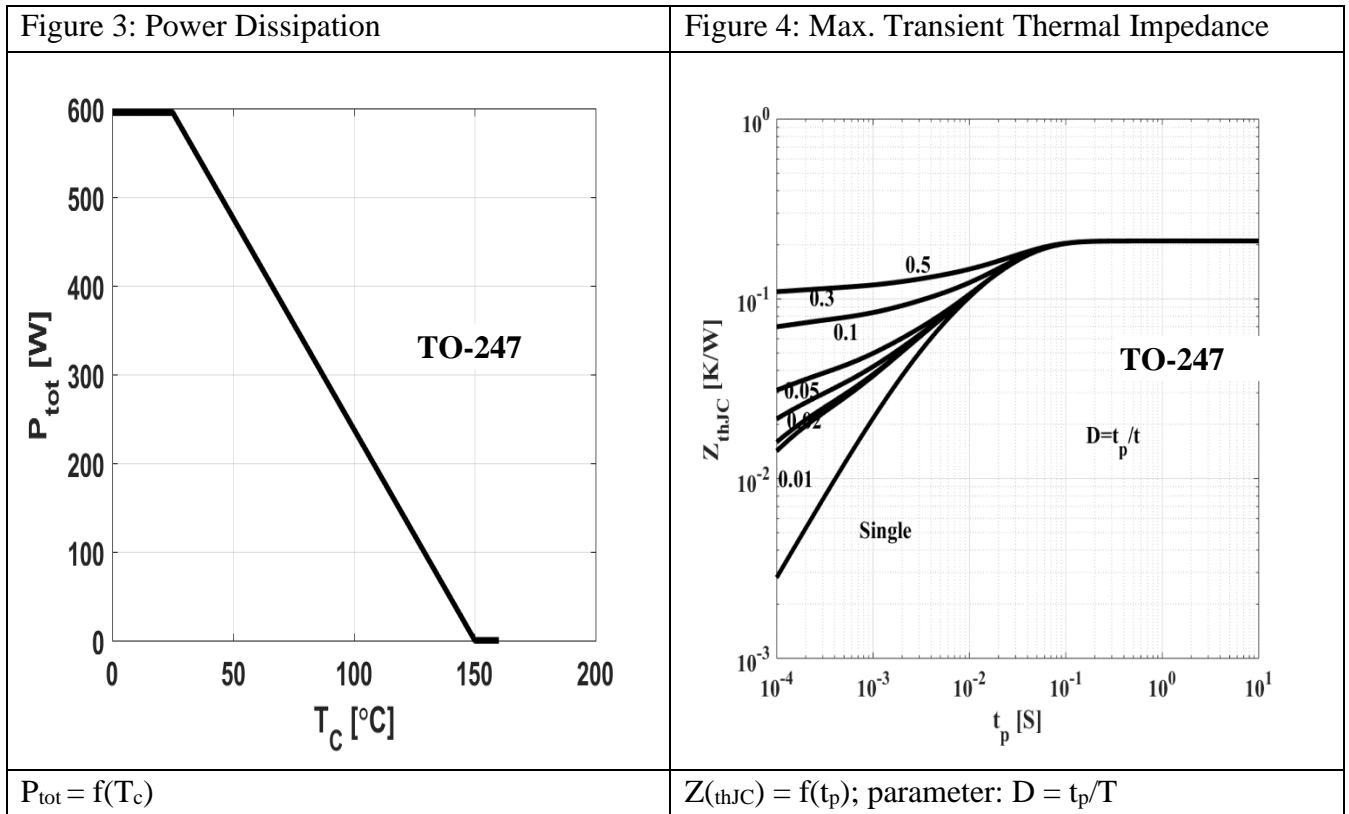
Typical Performance Characteristics


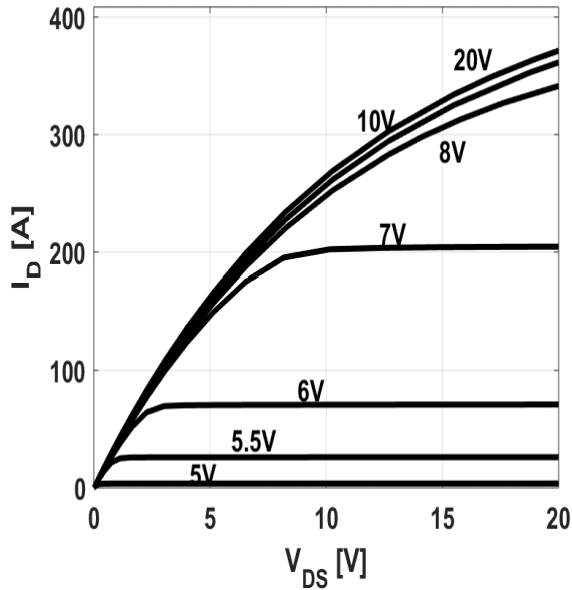
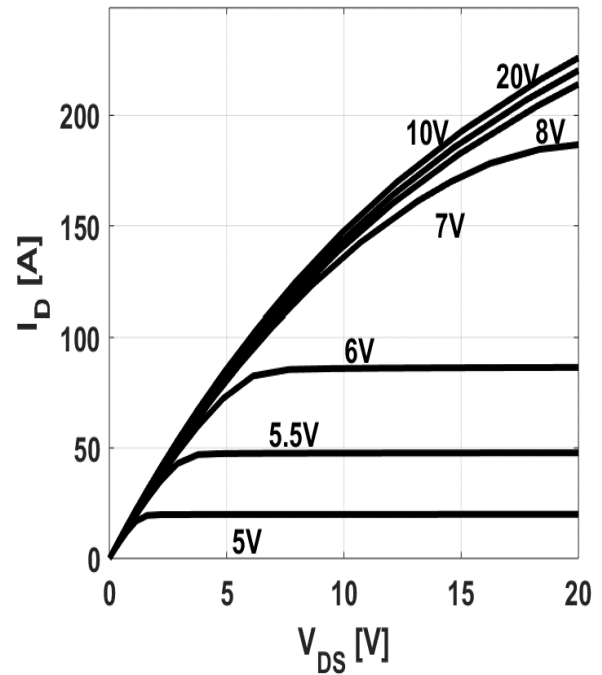
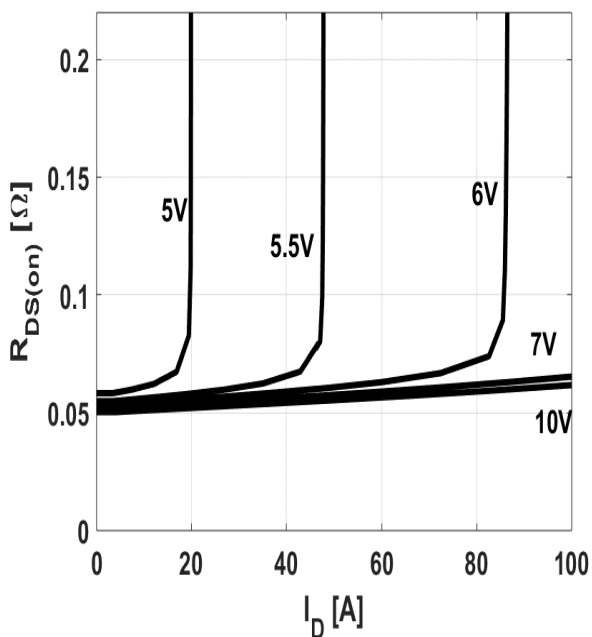
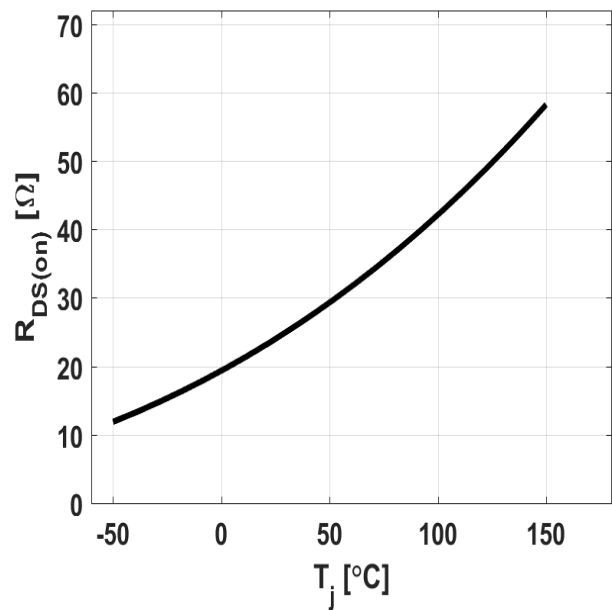
Figure 7: Typ. Output Characteristics

 $I_D = f(V_{DS}); T_j = 25^\circ\text{C}; \text{parameter: } V_{GS}$
Figure 8: Typ. Output Characteristics

 $I_D = f(V_{DS}); T_j = 125^\circ\text{C}; \text{parameter: } V_{GS}$
Figure 9: Typ. Drain-Source On-State Resistance

 $R_{DS(ON)} = f(I_D); T_j = 125^\circ\text{C}; \text{parameter: } V_{GS}$
Figure 10: Typ. Drain-Source On-State Resistance

 $R_{DS(ON)} = f(T_j); I_D = 34\text{A}; V_{GS} = 10\text{V}$

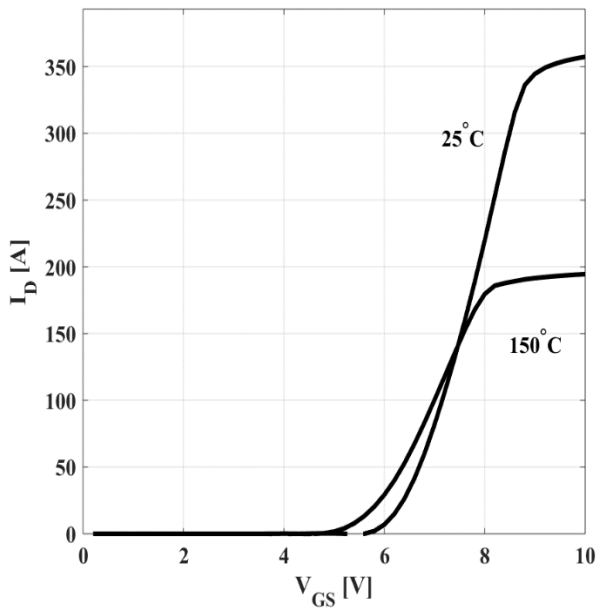
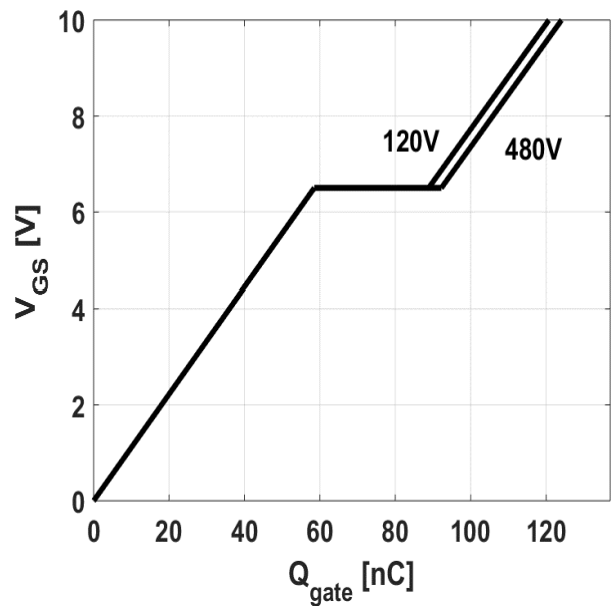
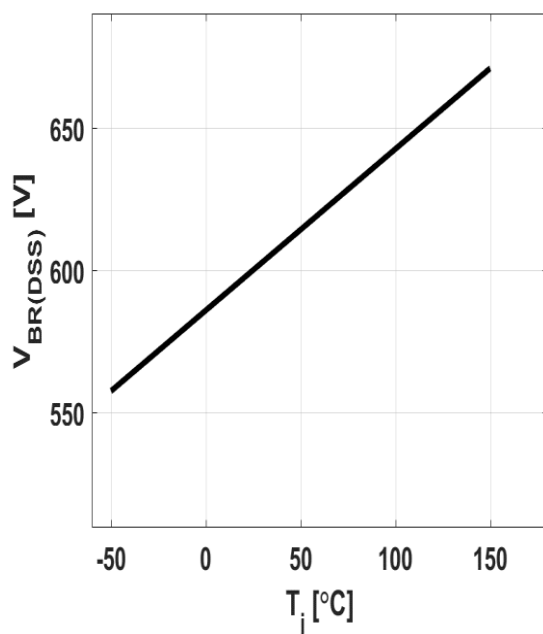
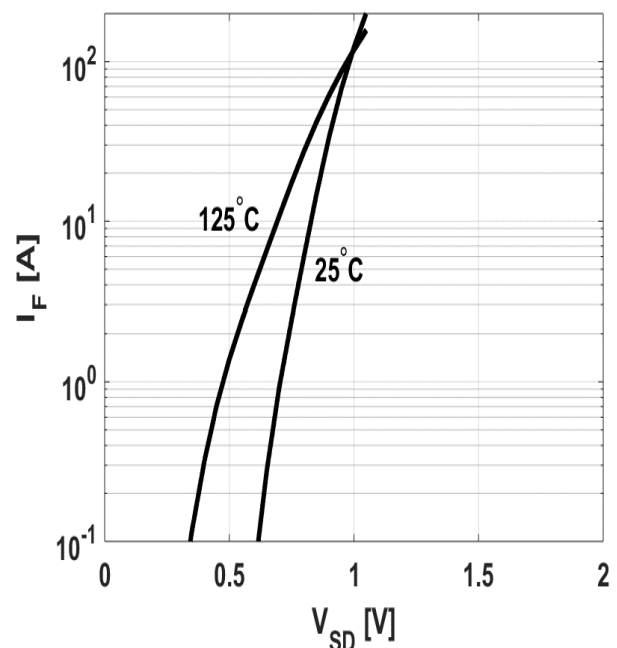
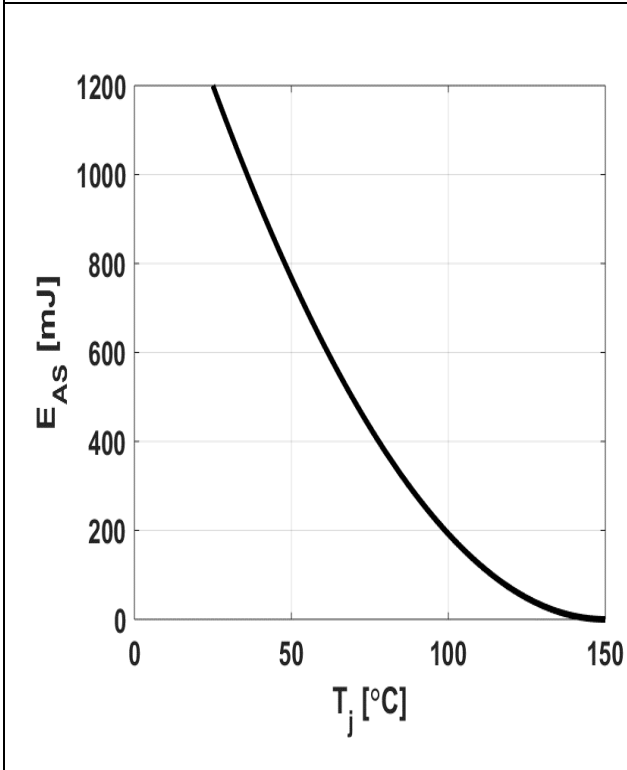
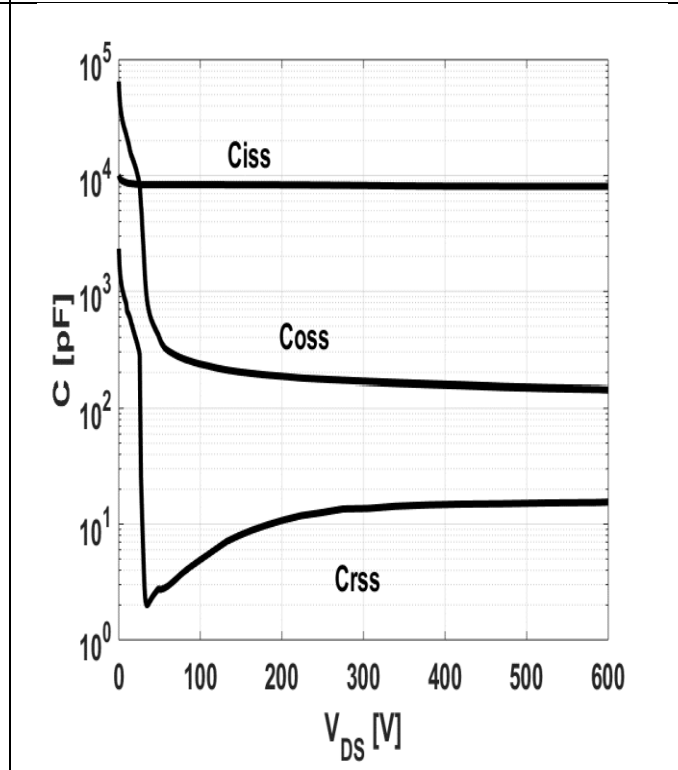
Figure 11: Typ. Transfer Characteristics

 $I_D = f(V_{GS}); V_{DS} = 20\text{V}$
Figure 12: Typ. Gate Charge

 $V_{GS} = f(Q_{gate}), I_D = 34\text{A pulsed}$
Figure 13: Drain-Source Breakdown Voltage

 $V_{BR(DSS)} = f(T_j); I_D = 10\text{mA}$
Figure 14: Forward Characteristics of Reverse Diode

 $I_F = f(V_{SD}); \text{parameter: } T_j$

Figure 15: Avalanche Energy



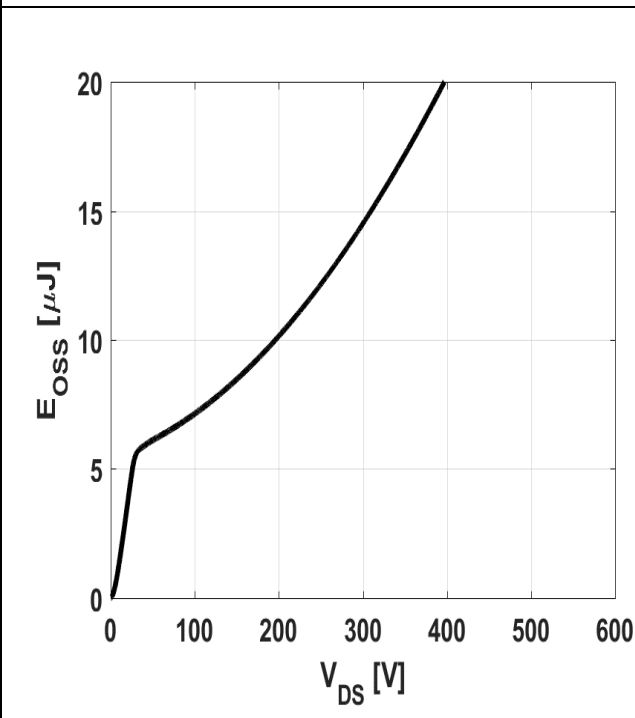
$E_{AS}=f(T_j)$; $I_D=7.5A$; $V_{DD}=60V$

Figure 16: Typ. Capacitances



$C=f(V_{DS})$; $V_{GS}=0$; $f=1MHz$

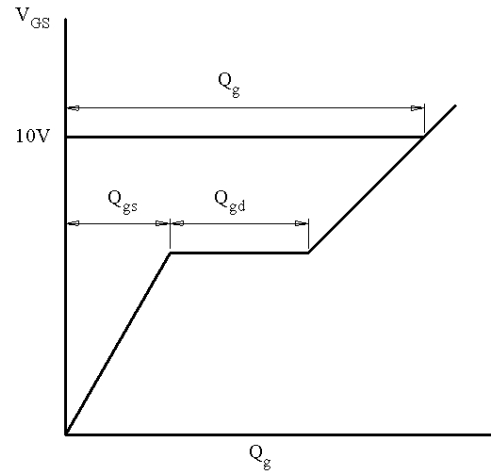
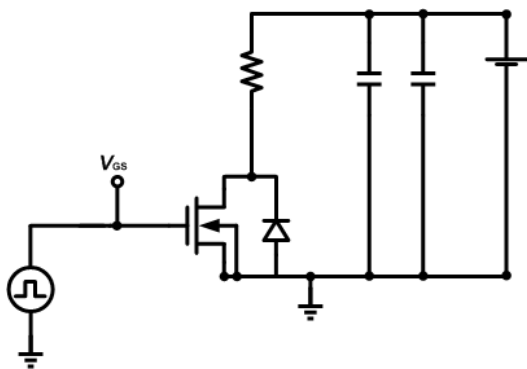
Figure 17: Coss Stored Energy



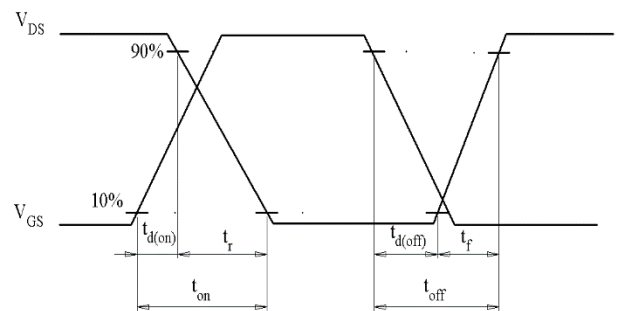
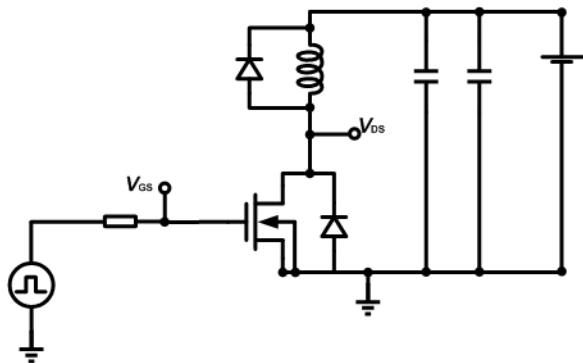
$E_{OSS}=f(V_{DS})$

Test Circuits

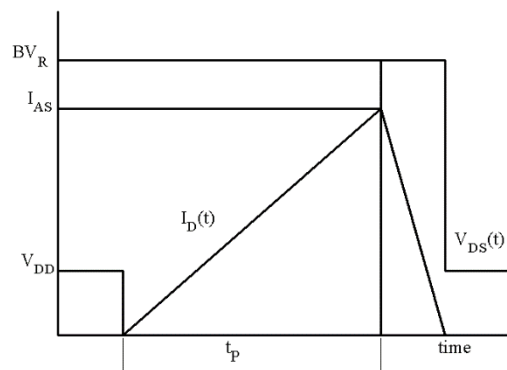
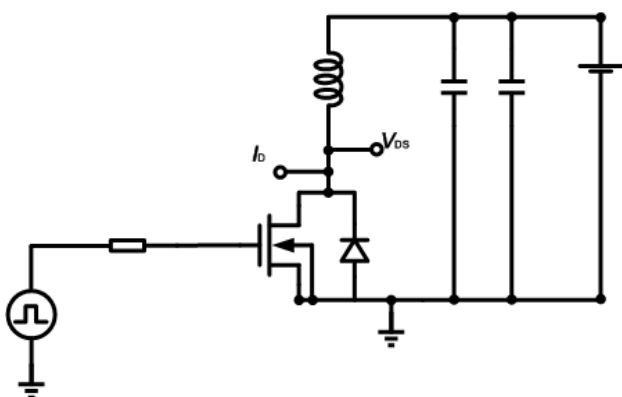
1. Gate Charge Test Circuit & Waveform



2. Switch Time Test Circuit

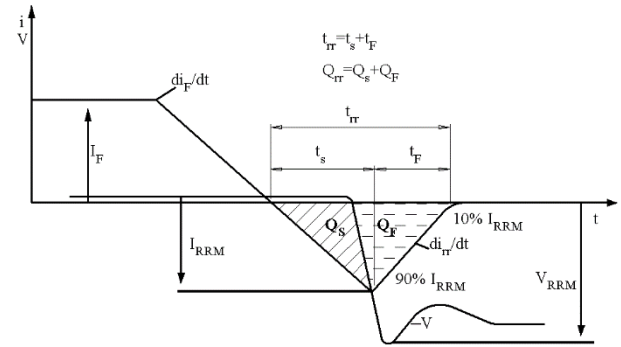
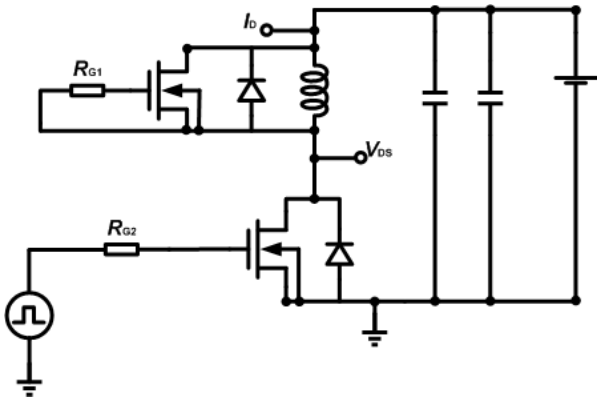


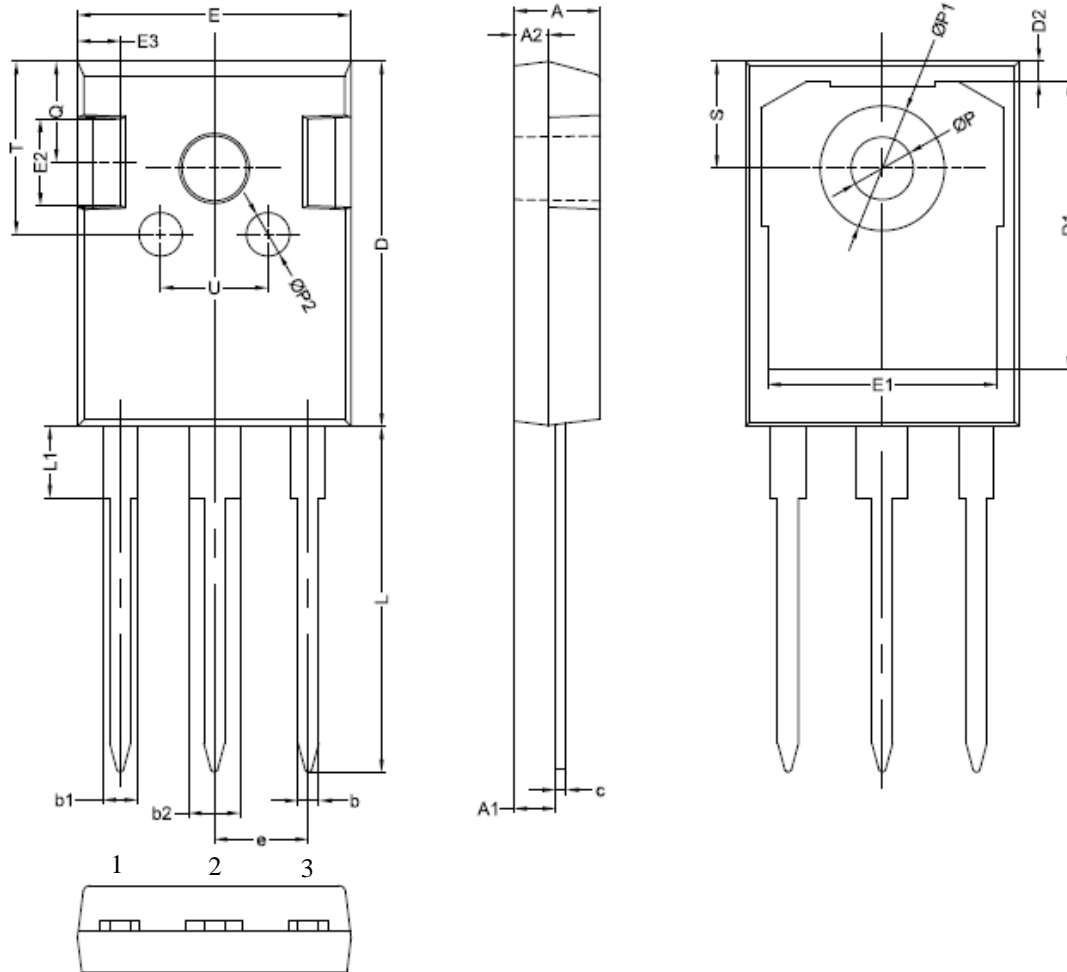
3. Unclaimed Inductive Switching Test Circuit & Waveforms



30mΩ, 600V, Super Junction N-Channel Power MOSFET SRC60R030FB

4. Test Circuit and Waveform for Diode Characteristics



Mechanical Dimensions
TO-247
Unit: mm


Symbol	Dimensions(mm)			Symbol	Dimensions(mm)		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	4.80	5.00	5.20	E2	-	5.00	-
A1	2.21	2.41	2.61	E3	-	2.50	-
A2	1.90	2.00	2.10	e	5.44(BSC)		
b	1.10	1.20	1.35	L	19.42	19.92	20.42
b1	-	2.00	-	L1	-	4.13	-
b2	-	3.00	-	P	3.50	3.60	3.70
c	0.55	0.60	0.75	P1	-	-	7.40
D	20.80	21.00	21.20	P2	-	2.50	-
D1	-	16.55	-	Q	-	5.80	-
D2	-	1.20	-	S	6.05	6.15	6.25
E	15.60	15.80	16.00	T	-	10.00	-
E1	-	13.30	-	U	-	6.20	-



Shenzhen Sanrise Technology Co., LTD

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