145mΩ, 600V, Super Junction N-Channel Power MOSFET SRC60R145B

General Description

The Sanrise SRC60R145B 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 SRC60R145B break down voltage is 600V and it has a high rugged avalanche characteristic.

The SRC60R145B is available in PDFN8*8-4 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

- BMP
- Sever / Telecom

Symbol

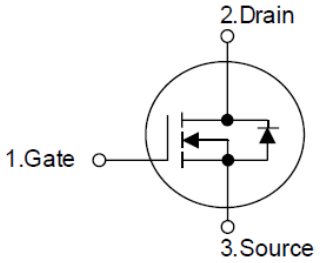
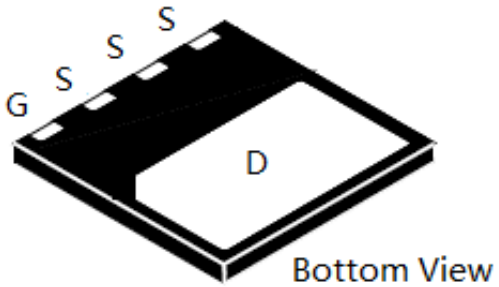


Figure 1 Symbol of SRC60R145B

Package Type



PDFN8*8-4

Figure 2 Package Type of SRC60R145B

Ordering Information

SRC60R145B□□–□

Circuit Type

Package

D88: PDFN8*8-4

E: Lead Free

G: Green

Blank: Tube

TR: Tape & Reel

Package	Part Number	Marking ID	Packing Type
	Green	Green	
PDFN8*8-4	SRC60R145BD88TR-G	SRC60R145BD88G	Tape & Reel

145mΩ, 600V, Super Junction N-Channel Power MOSFET SRC60R145B

Absolute Maximum Ratings

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	600	V
Gate-Source Voltage		V_{GSS}	±20	V
Gate-Source Voltage		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	PDFN8*8-4	R_{thJC}			0.69	ºC /W
Thermal resistance, Junction-to-Ambient	PDFN8*8-4	R_{thJA}			62	ºC /W

145mΩ, 600V, Super Junction N-Channel Power MOSFET SRC60R145B

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		121	145	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

Typical Performance Characteristics

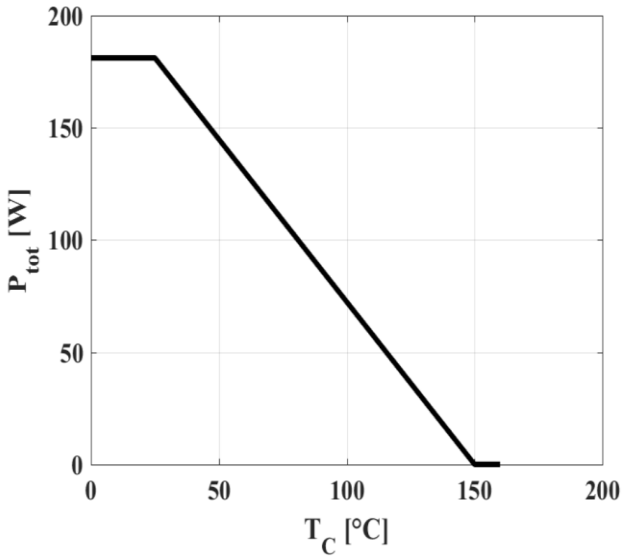
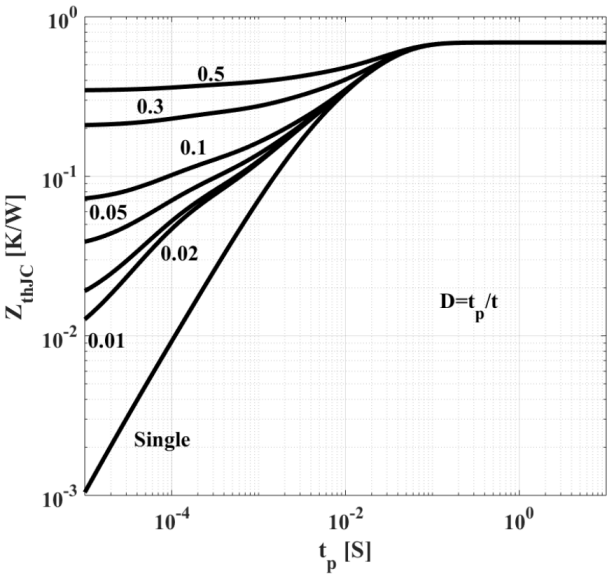
Figure 3: Power Dissipation	Figure 4: Max. Transient Thermal Impedance
	
$P_{tot} = f(T_c)$	$Z_{(thJC)} = f(t_p)$; parameter: $D = t_p/T$

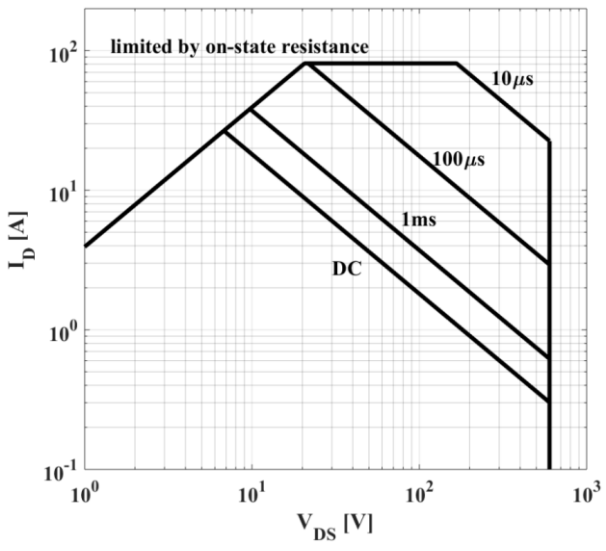
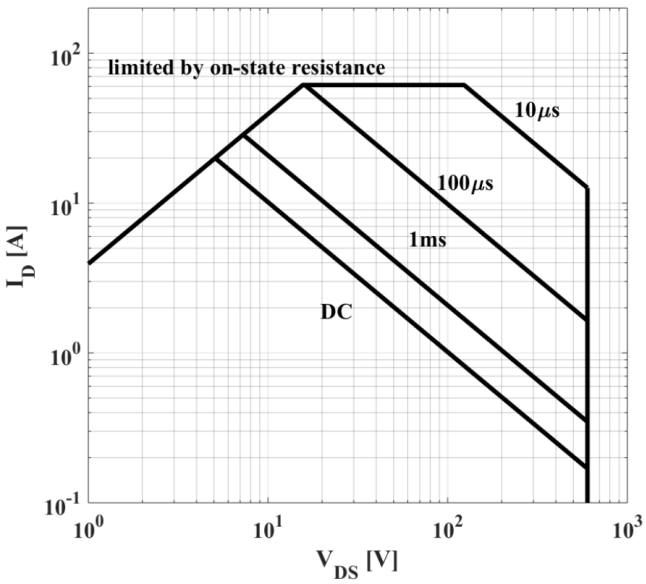
Figure 5: Safe Operating Area	Figure 6: Safe Operating Area
	
$I_D = f(V_{DS})$; T_c= 25ºC; V_{GS}>7V; parameter t_p	$I_D = f(V_{DS})$; T_c= 80ºC; V_{GS}>7V; parameter t_p

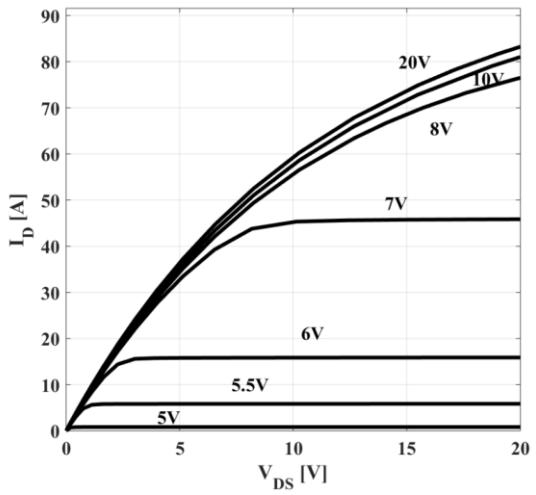
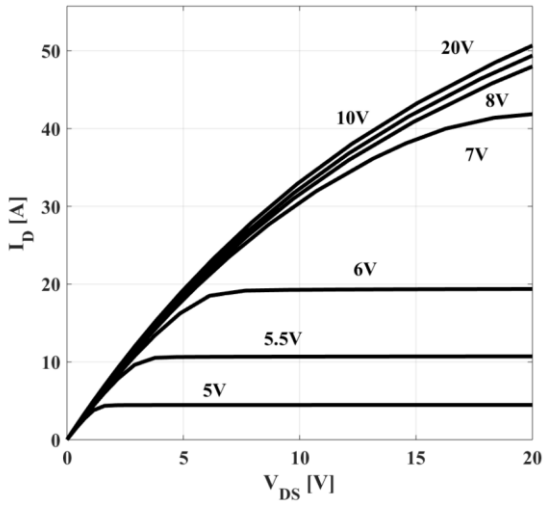
Figure 7: Typ. Output Characteristics	Figure 8: Typ. Output Characteristics
	
$I_D = f(V_{DS})$; Tj= 25ºC; parameter: V_{GS}	$I_D = f(V_{DS})$; T_j= 125ºC; parameter: V_{GS}

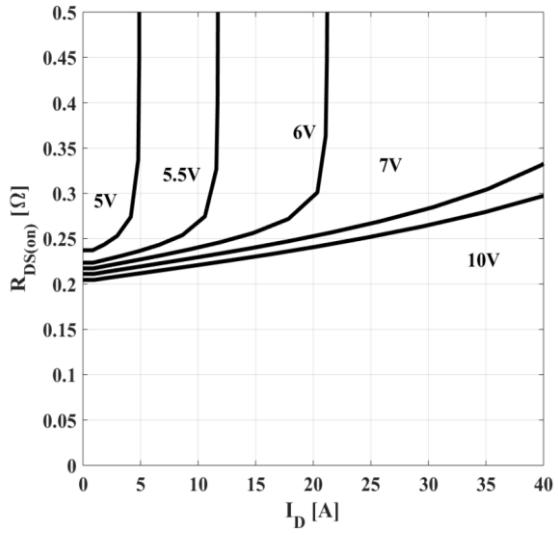
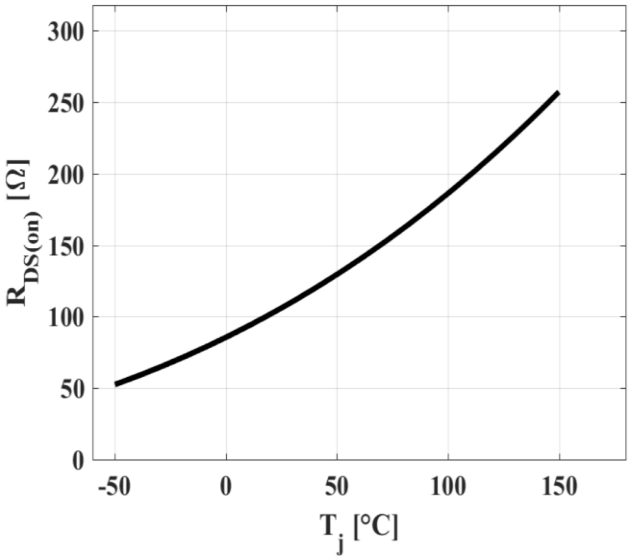
Figure 9: Typ. Drain-Source On-State Resistance	Figure 10: Typ. Drain-Source On-State Resistance
	
$R_{DS(ON)} = f(I_D)$; T_j=125ºC; parameter: V_{GS}	$R_{DS(ON)} = f(T_j)$; I_D=13A; V_{GS}=10V

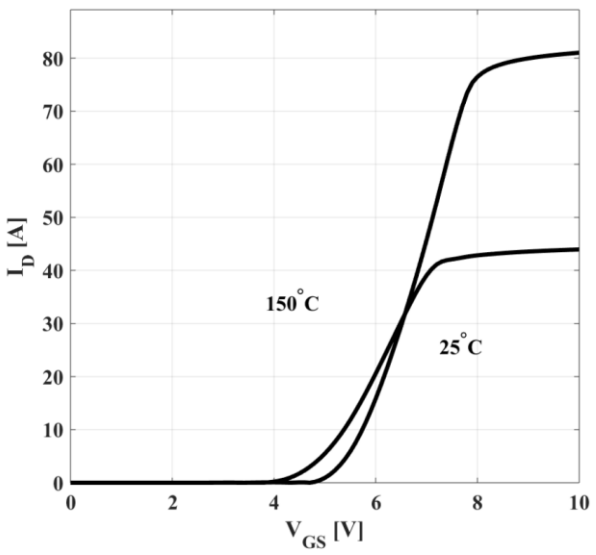
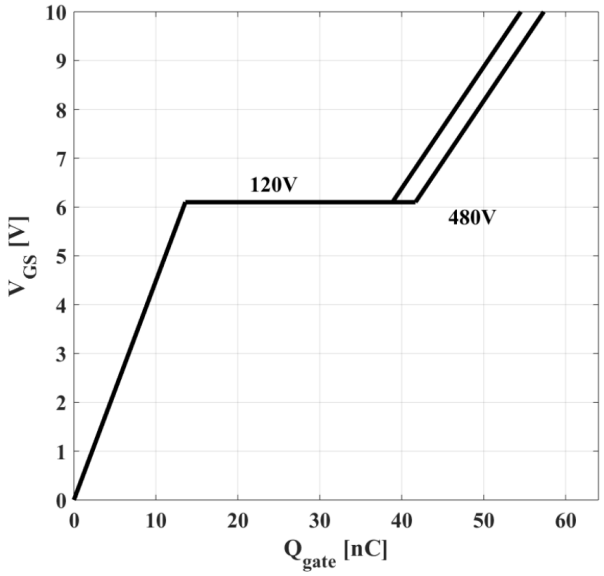
Figure 11: Typ. Transfer Characteristics	Figure 12: Typ. Gate Charge
	
$I_D = f(V_{GS})$; V_{DS} = 20V	V_{GS}= f(Q_{gate}), I_D= 13A pulsed

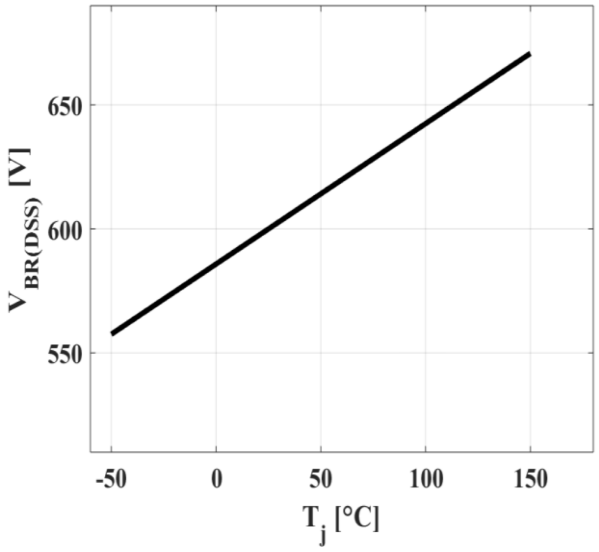
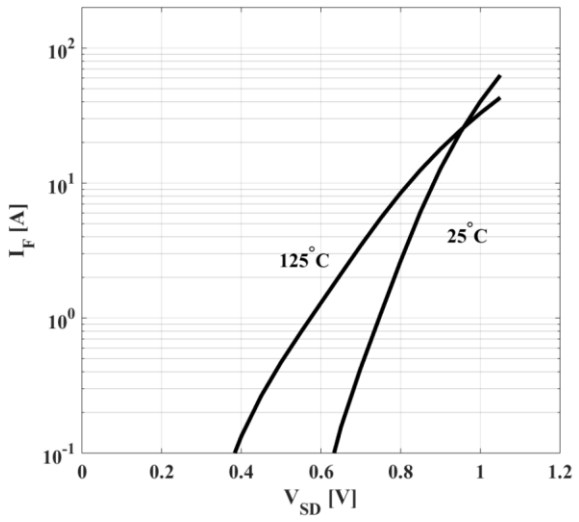
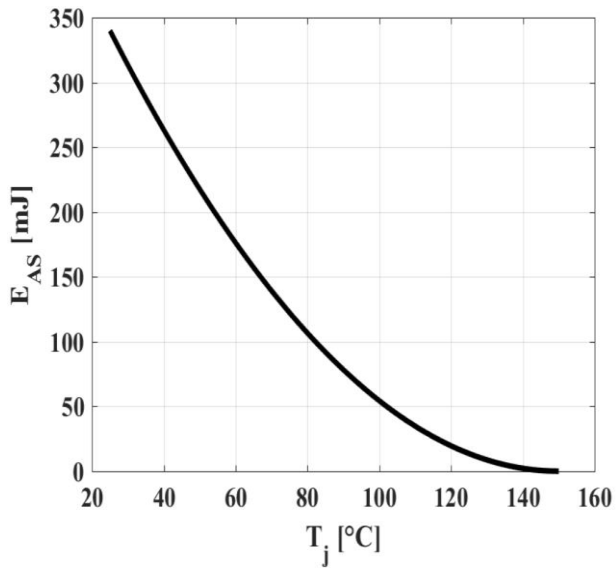
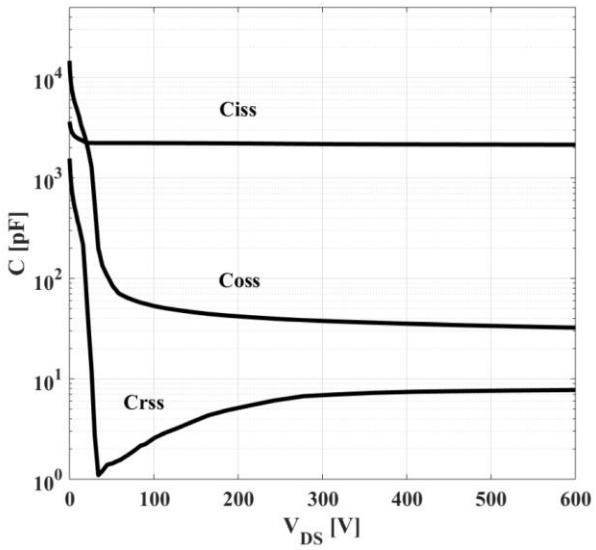
Figure 13: Drain-Source Breakdown Voltage	Figure 14: Forward Characteristics of Reverse Diode
	
$V_{BR(DSS)}$=f(T_j); I_D=1mA	I_F=f(V_{SD}); parameter: T_j

Figure 15: Avalanche Energy



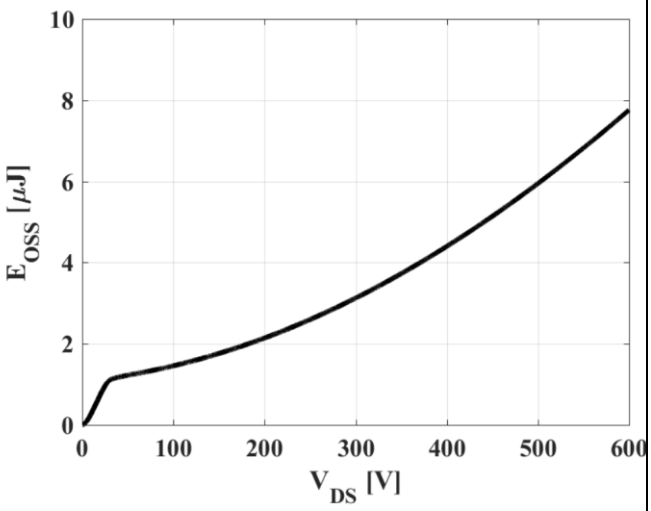
$E_{AS}=f(T_j)$; $I_D=2.5A$; $V_{DD}=60V$

Figure 16: Typ. Capacitances



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

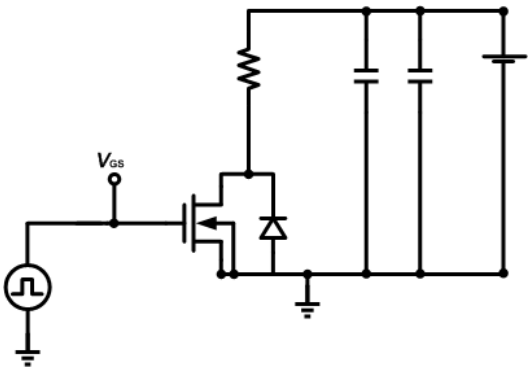
Figure 17: C_{OSS} Stored Energy

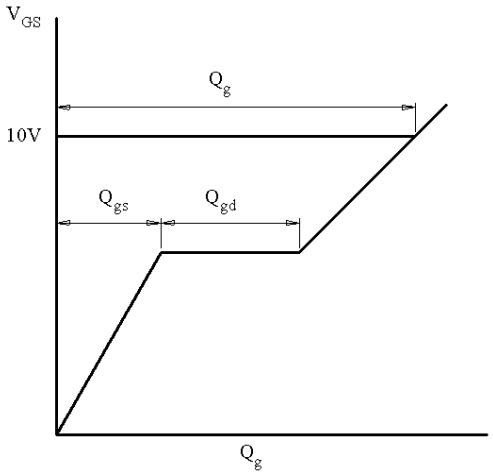


$E_{OSS}=f(V_{DS})$

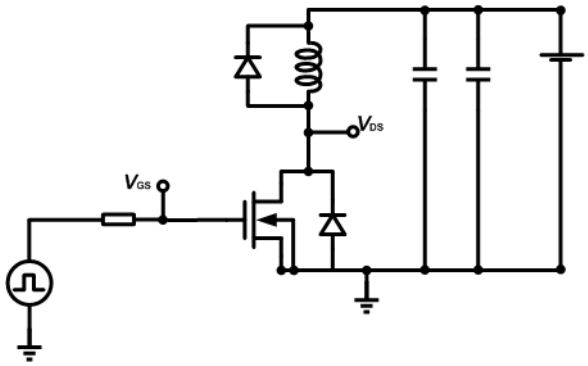
Test Circuits

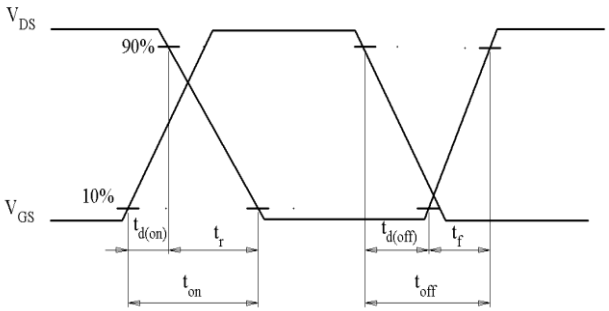
1. Gate Charge Test Circuit & Waveform



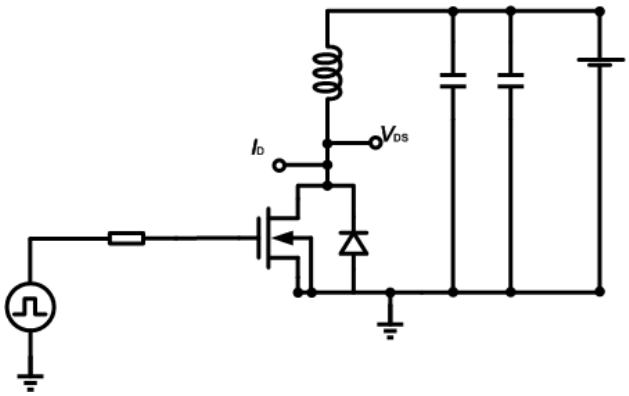


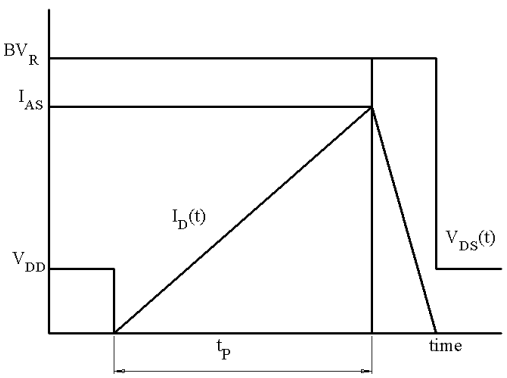
2. Switch Time Test Circuit



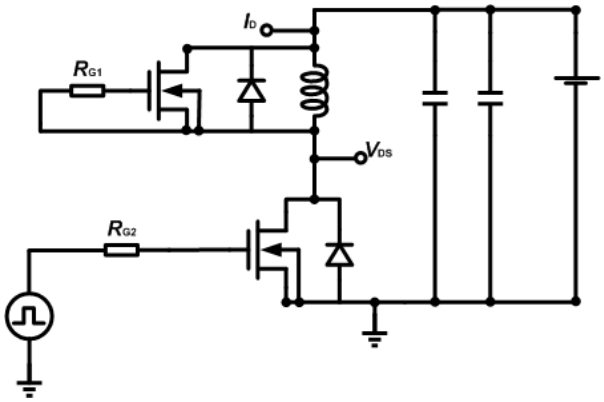


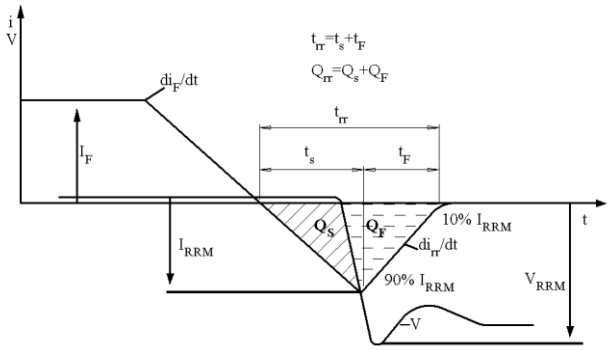
3. Unclaimed Inductive Switching Test Circuit & Waveforms





4. Test Circuit and Waveform for Diode Characteristics

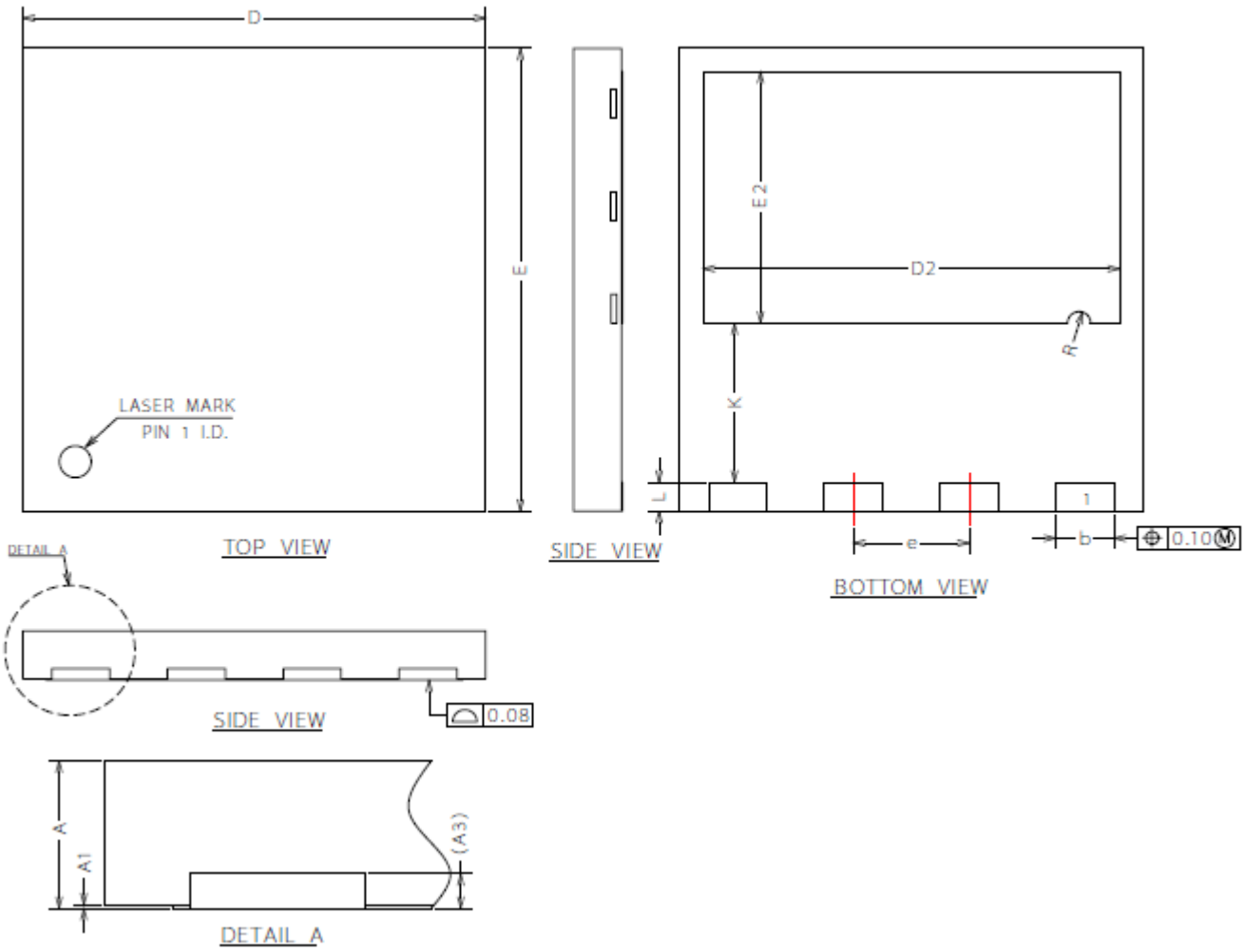




145mΩ, 600V, Super Junction N-Channel Power MOSFET SRC60R145B

Mechanical Dimensions

PDFN8*8-4 **Unit: mm**



Symbol	Dimensions(mm)		
	Min.	Typ.	Max.
A	0.80	0.85	0.90
A1	0.00	0.02	0.05
A3		0.20REF	
b	0.90	1.00	1.10
D	7.90	8.00	8.10
D2	7.10	7.20	7.30
E	7.90	8.00	8.10
E2	4.25	4.35	4.45
e		2.00(BSC)	
K	2.65	2.75	2.85
L	0.40	0.50	0.60
R		0.20REF	

145mΩ, 600V, Super Junction N-Channel Power MOSFET SRC60R145B

Shenzhen Sanrise Technology Co., LTD

http://www.sanrise-tech.com

IMPORTANT NOTICE

Shenzhen Sanrise Technology Co., LTD reserves the right to make changes without further notice to any products or specifications herein. Shenzhen Sanrise Technology Co., LTD does not assume any responsibility for use of any its products for any particular purpose, nor does Shenzhen Sanrise Technology Co., LTD assume any liability arising out of the application or use of any its products or circuits. Shenzhen Sanrise Technology Co., LTD does not convey any license under its patent rights or other rights nor the rights of others.

Main Site:

- Headquarter

Shenzhen Sanrise Technology Co., LTD.

A1206, Skyworth building, No. 008, gaoxinnan 1st Road, Gaoxin District, Yuehai street,, Nanshan District, ShenZhen, P.R.China

Tel: +86-755-22953335

Fax: +86-755-22916878

- Shanghai Office

Shenzhen Sanrise Technology Co., LTD.

Rm.702, Building A, No. 666, Zhangheng Road, Zhangjiang Hi-Tech Park, Shanghai, P.R.China

Tel: +86-21-68825918