75mΩ, 600V, Super Junction N-Channel Power MOSFET SRC60R075B

General Description

The Sanrise SRC60R075B 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 SRC60R075B break down voltage is 600V and it has a high rugged avalanche characteristics. The SRC60R075B is available in PDFN8*8 package.

Features

- Ultra Low $R_{DS(ON)}$ = 75mΩ @ V_{GS} = 10V.
- Ultra Low Gate Charge, Qg=110nC typ.
- Fast switching capability
- Robust design with better EAS performance
- EMI Improved

Application

- Telecom Power
- EV Charger
- High Power Application

Symbol

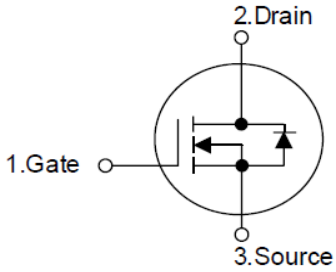
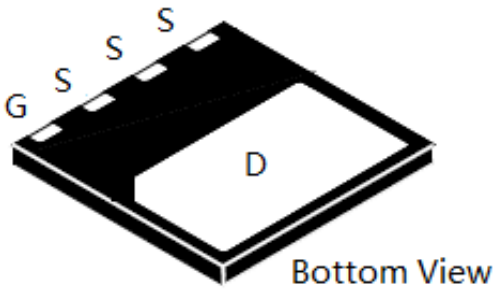


Figure 1 Symbol of SRC60R075B

Package Type



PDFN8*8-4

Figure 2 Package Type of SRC60R075B

Ordering Information

SRC60R075B□□–□

Circuit Type

Package

GD88: 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	SRC60R075BGD88TR-G	SRC60R075BGD88G	Tape & Reel

75mΩ, 600V, Super Junction N-Channel Power MOSFET SRC60R075B

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=25ºC	I_D	48	A
	T_C=125ºC		21.5	
Pulsed Drain Current (Note 2)		I_{DM}	144	A
Avalanche Energy, Single Pulse (Note 3)		E_{AS}	125	mJ
Avalanche Energy, Repetitive (Note 2)		E_{AR}	0.6	mJ
Avalanche Current, Repetitive (Note 2)		I_{AR}	4.8	A
Continuous Diode Forward Current		I_S	48	A
Diode Pulse Current		$I_{S.PULSE}$	144	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
Power Dissipation (T_C=25°C)		*P*tot	357	W
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

Thermal characteristics

Parameter		Symbol	Min	Typ	Max	Unit
Thermal resistance, Junction-to-Case	PDFN8*8-4	R_{thJC}			0.35	**ºC** /W
Thermal resistance, Junction-to-Ambient	PDFN8*8-4	R_{thJA}			58	**ºC** /W

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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}=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=5.0mA	3.7	4.3	5.3	V
Static Drain-Source On-Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=24A		65	75	mΩ
Gate Resistance		R_G	f=1MHz, Open Drain	0.11	0.55	5	Ω
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1MHz	2.6	4.32	6.6	nF
Output Capacitance		C_{OSS}		1	2.8	8	nF
Reverse Transfer Capacitance		C_{RSS}		10	33	300	pF
Effective output capacitance, energy related NOTE5		$C_{O(er)}$	V_{GS}=0V, V_{DS}=0…400V		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=3.3Ω, V_{GS}=10V		16		ns
Rise Time		t_r			6.0		
Turn-off Delay Time		$t_{d(off)}$			98		
Fall Time		t_f			4.0		
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	160	
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	200	ns
Reverse Recovery Charge		Q_{rr}			0.83	1.66	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

Typical Performance Characteristics

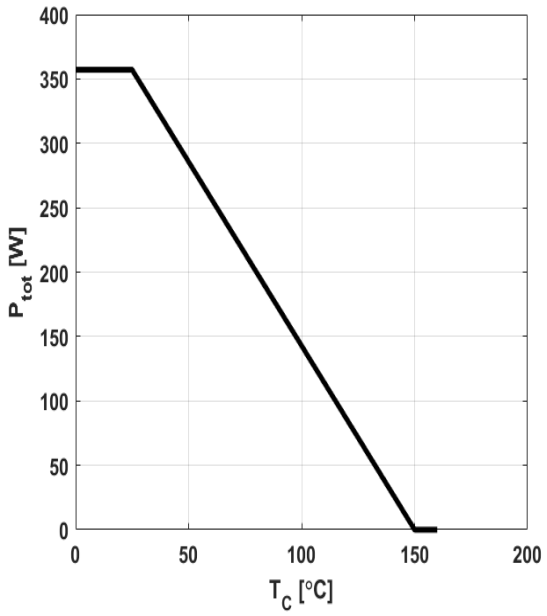
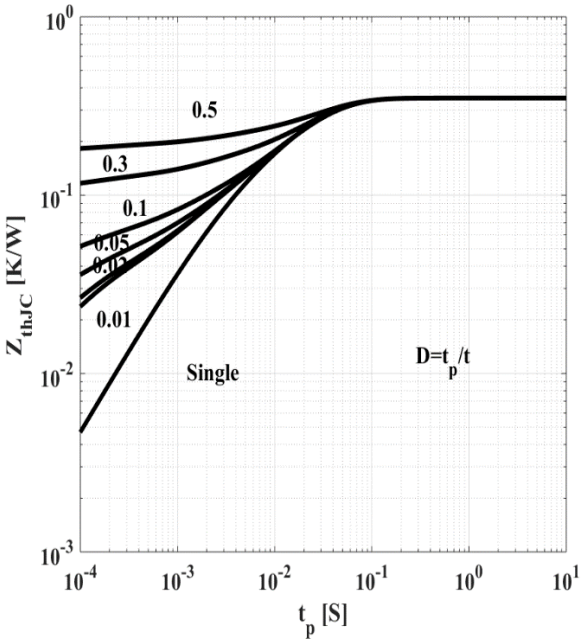
Figure 3: Power Dissipation	Figure 4: Max. Transient Thermal Impedance
	
P_{tot} = f(T_c); TO-247	$Z_{(thJC)}$ = f(t_p); parameter: D = t_p/T;TO-247

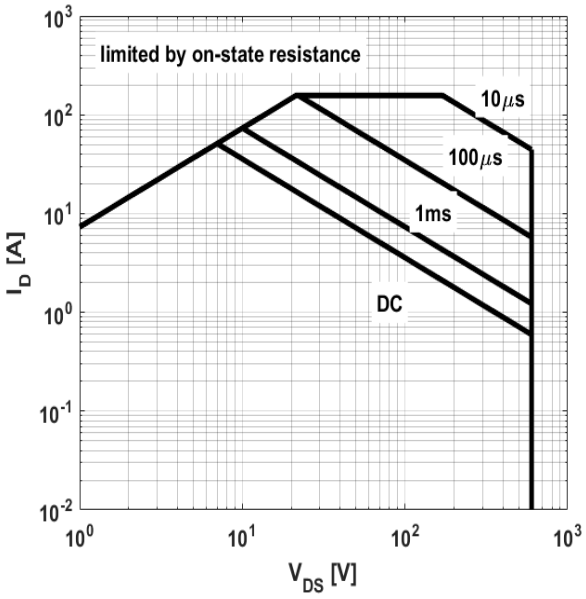
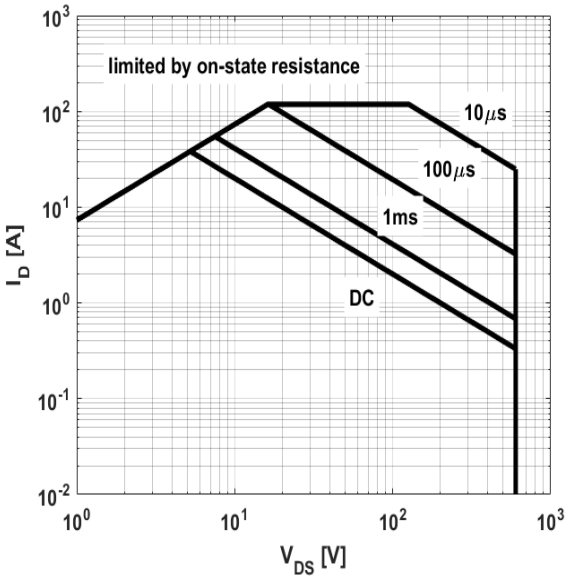
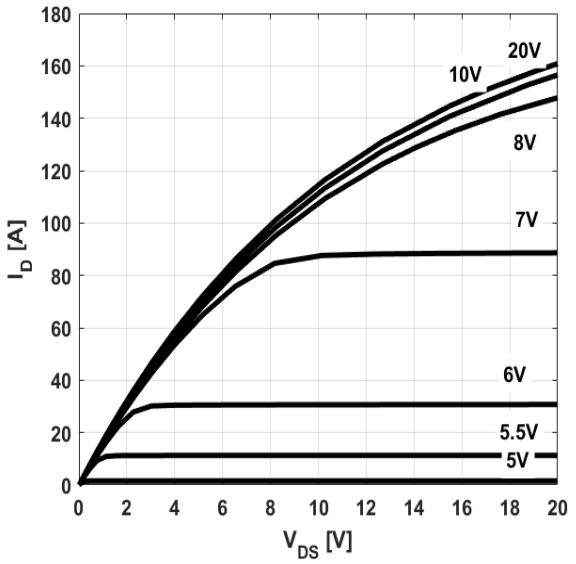
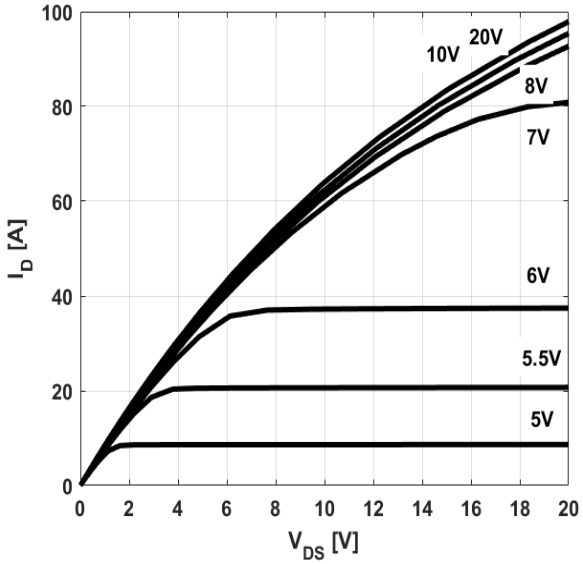
Figure 5: Safe Operating Area	Figure 6: Safe Operating Area
	
I_D = f(V_{DS}); T_c= 25ºC; V_{GS}>7V; parameter t_p	I_D = f(V_{DS}); T_c= 80ºC; V_{GS}>7V; parameter t_p

Figure 7: Typ. Output Characteristics



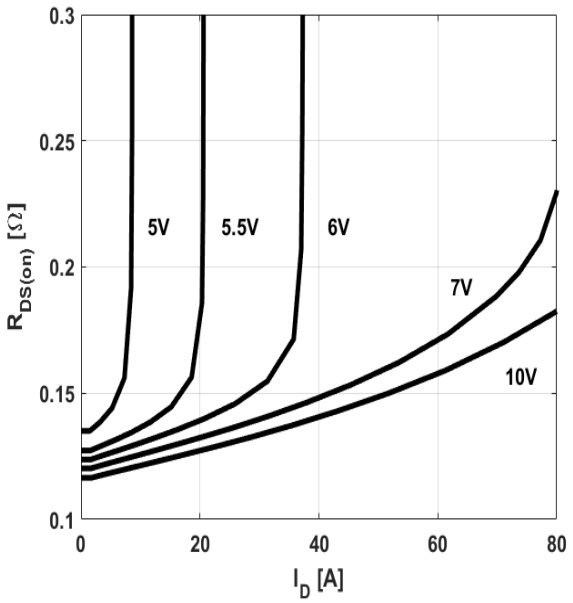
$I_D = f(V_{DS})$; Tj= 25ºC; parameter: V_{GS}

Figure 8: Typ. Output Characteristics



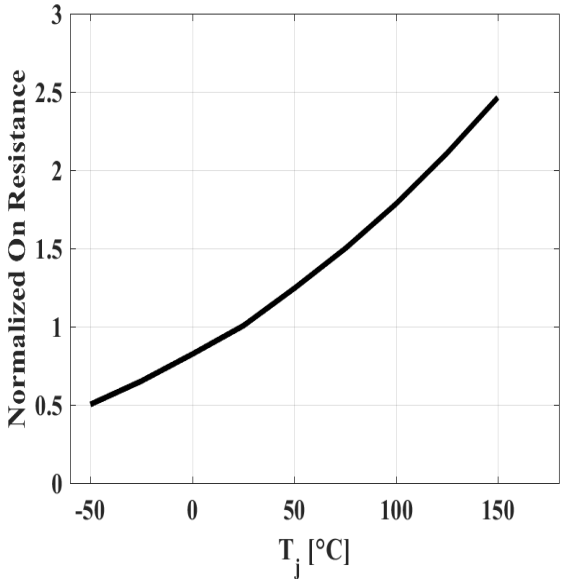
$I_D = f(V_{DS})$; T_j= 125ºC; parameter: V_{GS}

Figure 9: Typ. Drain-Source On-State Resistance



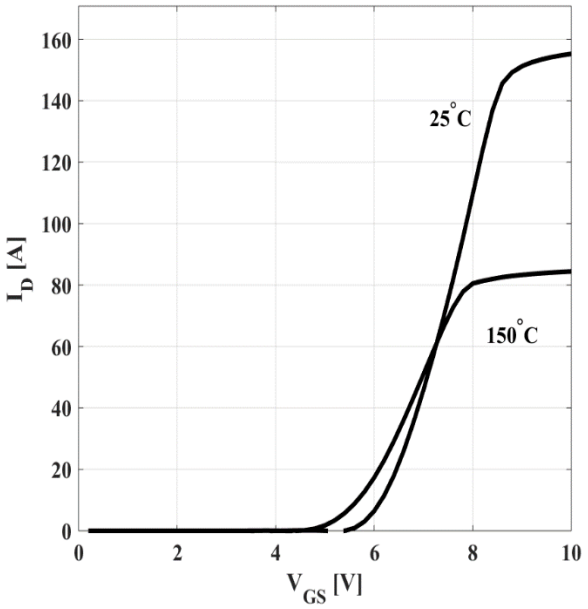
$R_{DS(ON)} = f(I_D)$; T_j=125ºC; parameter: V_{GS}

Figure 10: Typ. Drain-Source On-State Resistance



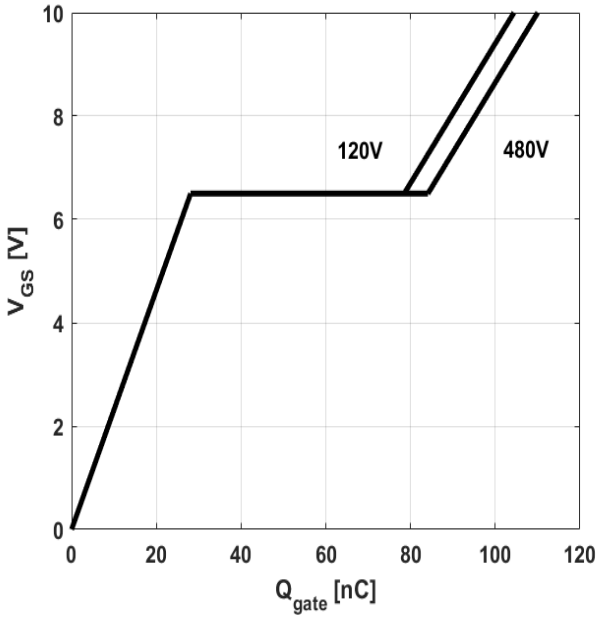
$R_{DS(ON)} = f(T_j)$; I_D=24A; V_{GS}=10V

Figure 11: Typ. Transfer Characteristics



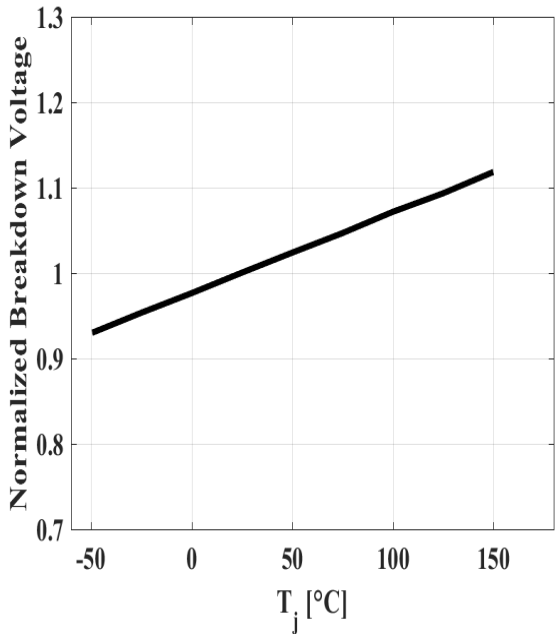
$I_D = f(V_{GS})$; $V_{DS} = 20V$

Figure 12: Typ. Gate Charge



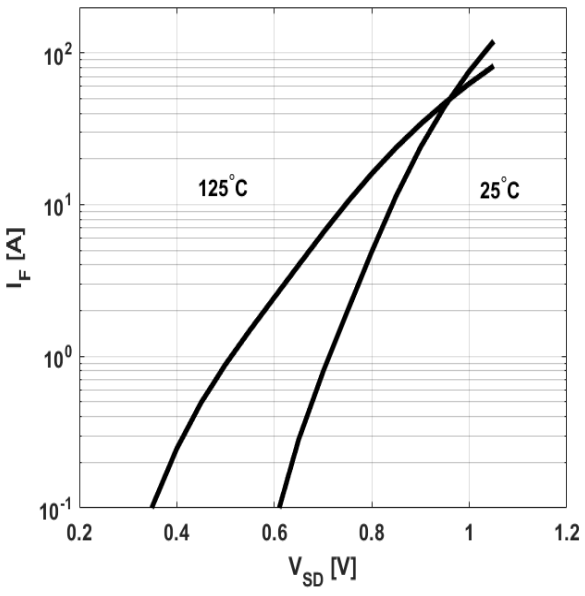
$V_{GS}= f(Q_{gate})$, $I_D= 24A$ pulsed

Figure 13: Drain-Source Breakdown Voltage



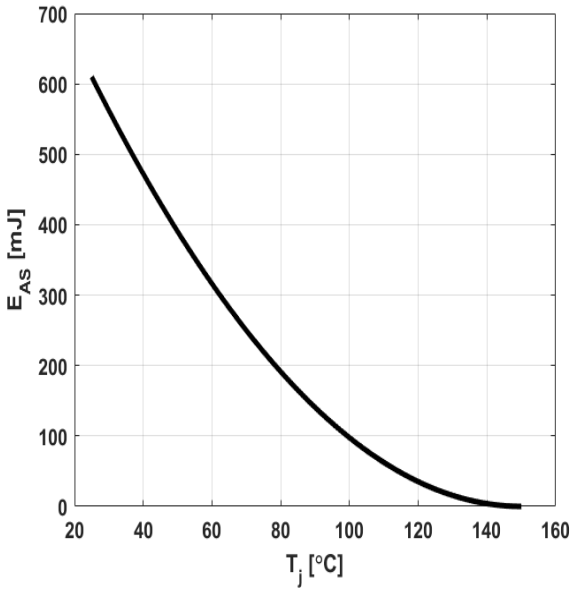
$V_{BR(DSS)}=f(T_j)$; $I_D=1mA$

Figure 14: Forward Characteristics of Reverse Diode



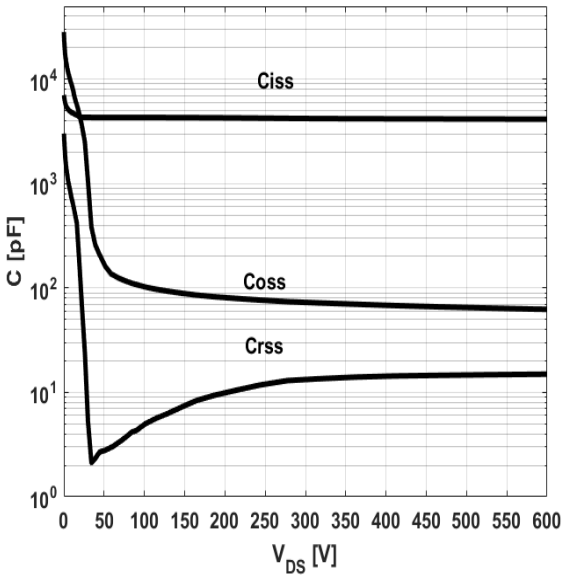
$I_F=f(V_{SD})$; parameter: T_j

Figure 15: Avalanche Energy



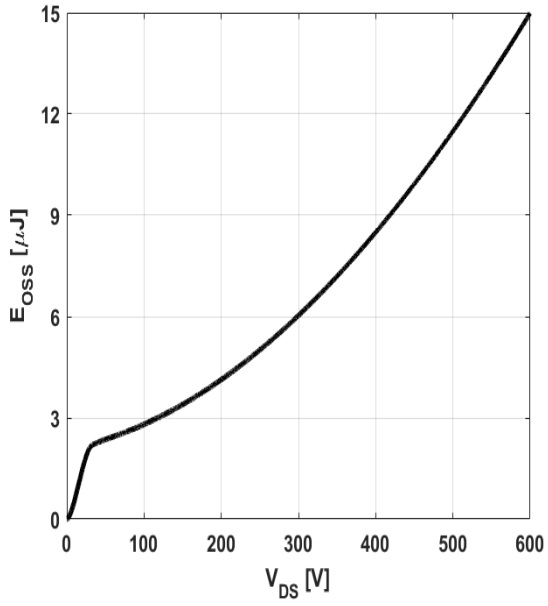
$E_{AS}=f(T_j)$; I_D=4.8A; V_{DD}=60V

Figure 16: Typ. Capacitances



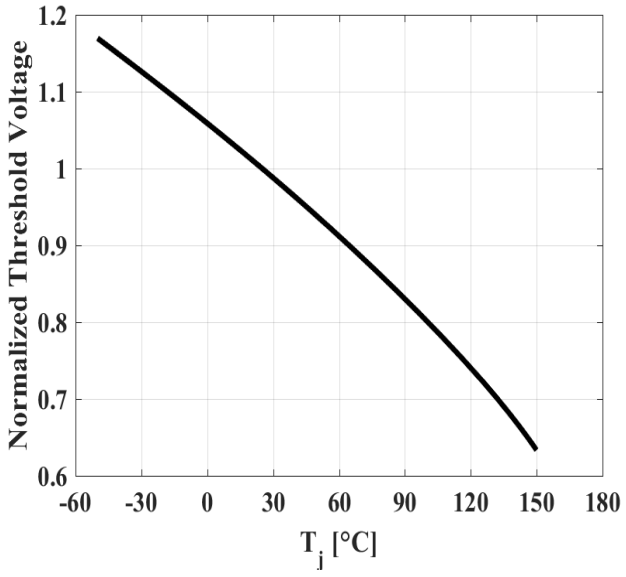
$C=f(V_{DS})$; V_{GS}=0; f=1MHz

Figure 17: C_{OSS} Stored Energy



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

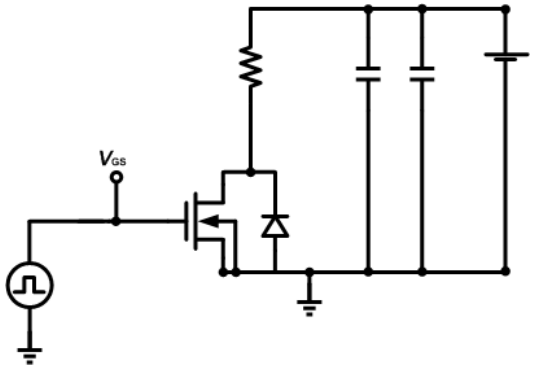
Figure 18: Threshold Voltage

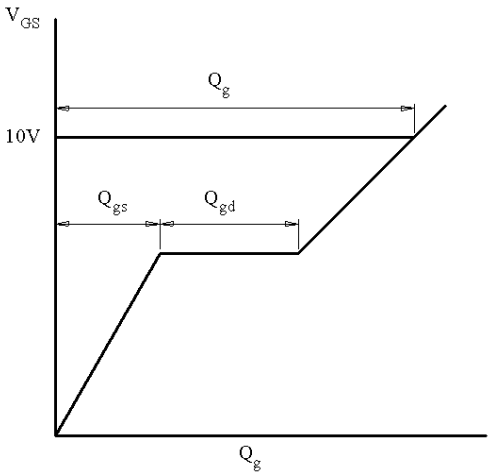


$Vth=f(T_j)$

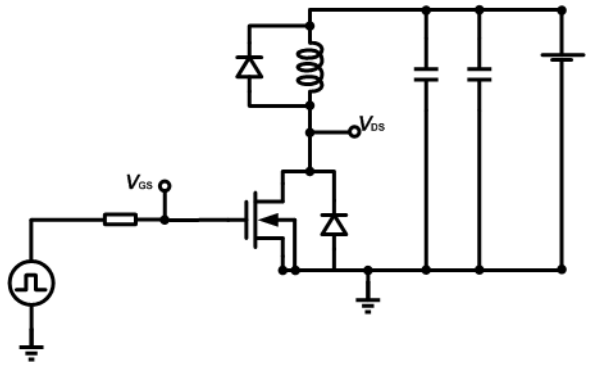
Test Circuits

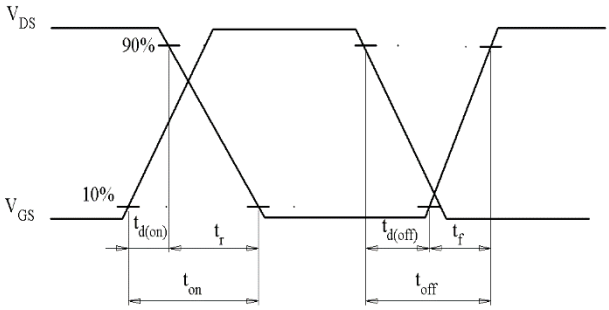
1. Gate Charge Test Circuit & Waveform



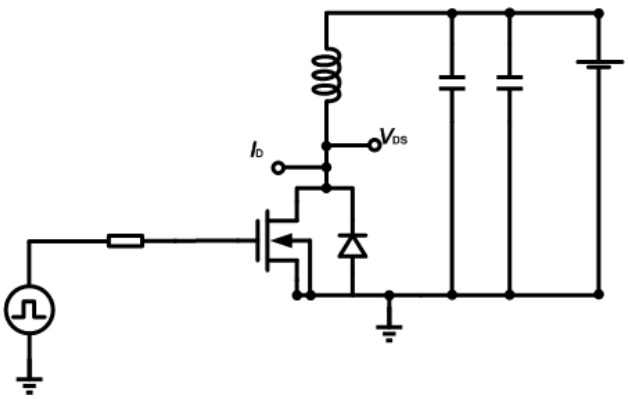


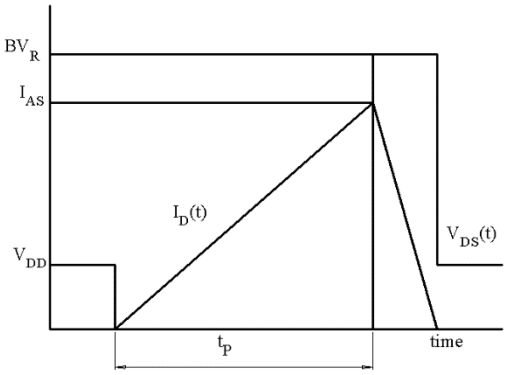
2. Switch Time Test Circuit



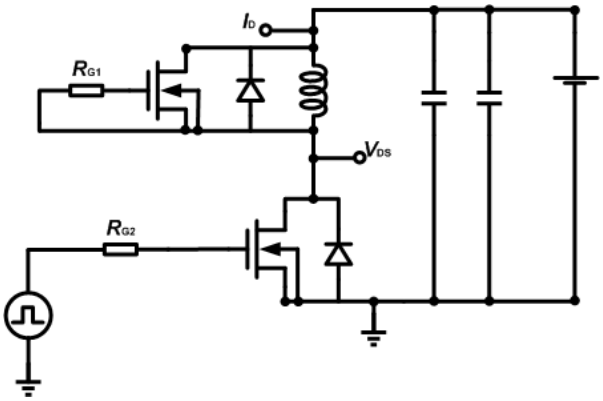


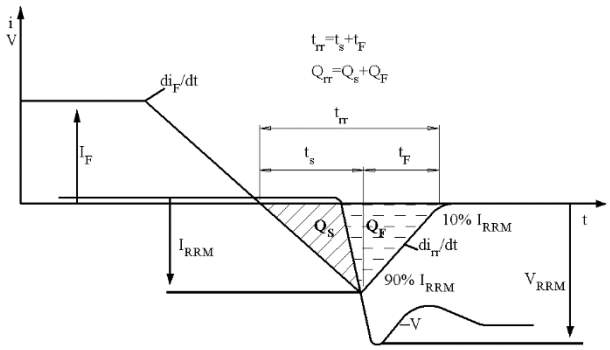
3. Unclaimed Inductive Switching Test Circuit & Waveforms





4. Test Circuit and Waveform for Diode Characteristics





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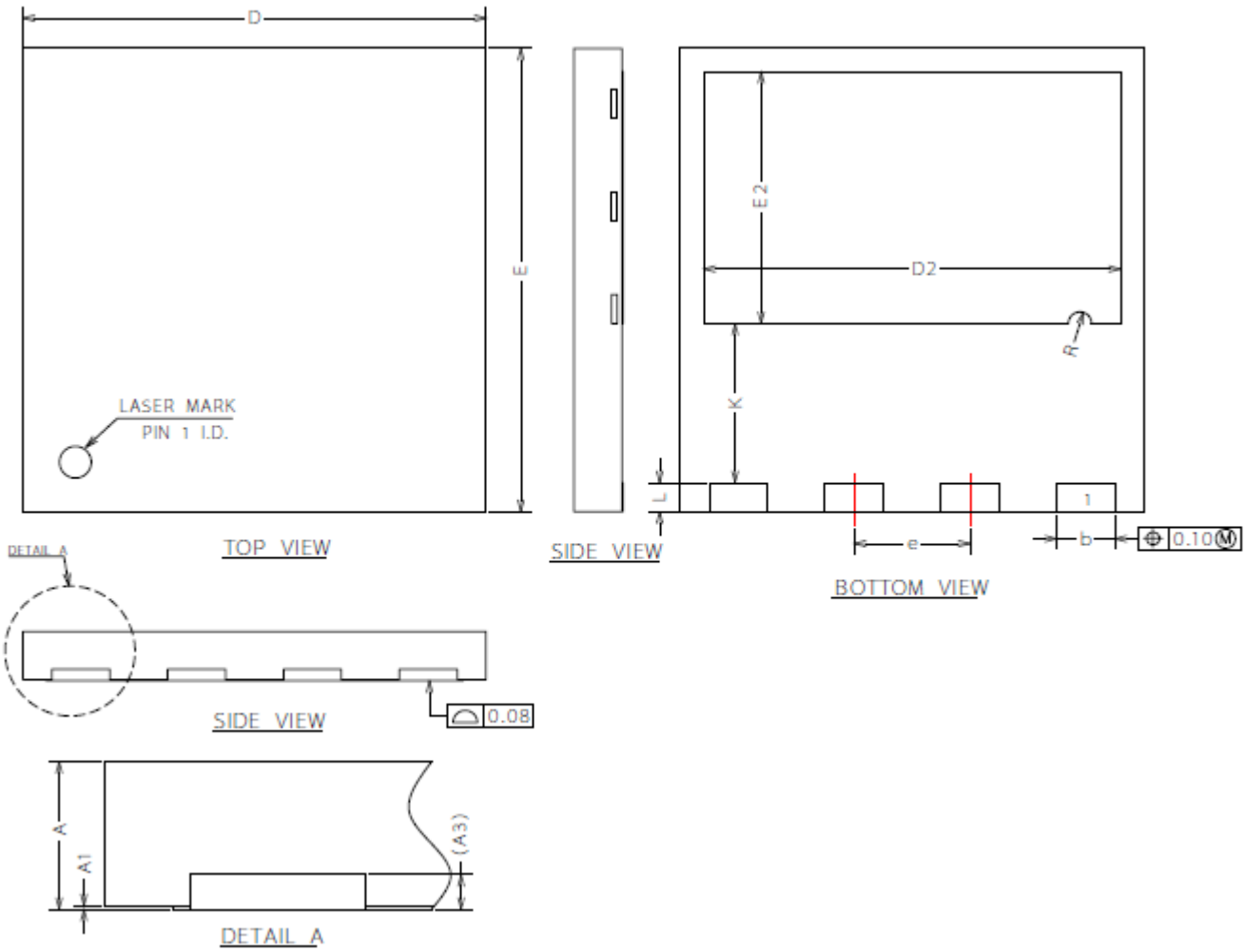
Mechanical Dimensions

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	

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Shenzhen Sanrise Technology Co., LTD

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