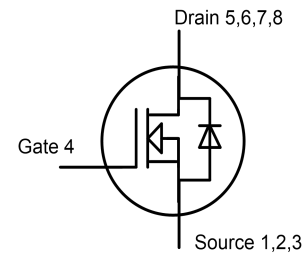


2.5mΩ, 45V, N-Channel Power MOSFET
SRT045N025H
General Description

The Sanrise SRT045N025H is a low voltage power MOSFET, fabricated using advanced split gate trench 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 synchronous rectification.

The SRT045N025H break down voltage is 45V and it has a high rugged avalanche characteristics. The SRT045N025H is available in PDFN5*6 package.

Symbol


PDFN5*6

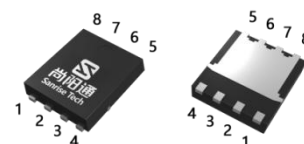
Figure 1 Symbol of SRT045N025H

Features

- Ultra Low $R_{DS(ON_TYP)} = 2.15m\Omega @ V_{GS} = 10V$.
- Ultra Low Gate Charge, $Q_g=32nC$ typ.
- Fast switching capability
- Robust design with better EAS performance
- EMI Improved
- Non-automotive Qualified

Application

- Server/Telecom
- High Power Supply
- E-Tools
- Motor Driver
- BMS

Package Type


PDFN5*6

Figure 2 Package Type of SRT045N025H

Ordering Information

SRT045N025H□□-□		
Circuit Type		E: Lead Free
Package		G: Green
D56: PDFN5*6		Blank: Tube
		TR: Tape & Reel

Package	Part Number	Marking ID	Packing Type
PDFN5*6	SRT045N025HD56TR-G	SRT045N025HD56G	Tape & Reel

Absolute Maximum Ratings

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	45	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current, Silicon	$T_C=25^{\circ}\text{C}$	I_D	129	A
	$T_C=100^{\circ}\text{C}$		81.5	
Pulsed Drain Current (Note 2)		I_{DM}	516	A
Power Dissipation ($T_C = 25^{\circ}\text{C}$)		P_D	78	W
Avalanche Destructive Energy, Single Pulse (Note 5)		E_{AS_Limit}	225	mJ
Avalanche Energy, Single Pulse (Note 4)		E_{AS}	36	mJ
Avalanche Energy, Repetitive (Note 2)		E_{AR}	0.2	mJ
Avalanche Current, Repetitive (Note 2)		I_{AR}	20.0	A
Continuous Diode Forward Current		I_S	80	A
Diode Pulse Current		$I_{S,PULSE}$	240	A
Operating Junction Temperature		T_J	150	$^{\circ}\text{C}$
Storage Temperature		T_{STG}	-55 to 150	$^{\circ}\text{C}$
Lead Temperature (Soldering, 10 sec)		T_{LEAD}	260	$^{\circ}\text{C}$

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
4. $I_{AS}=12\text{A}$, $V_{DD}=20\text{V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$
5. $I_{AS_Limit}=30.0\text{A}$, $V_{DD}=20\text{V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$

Thermal Resistance

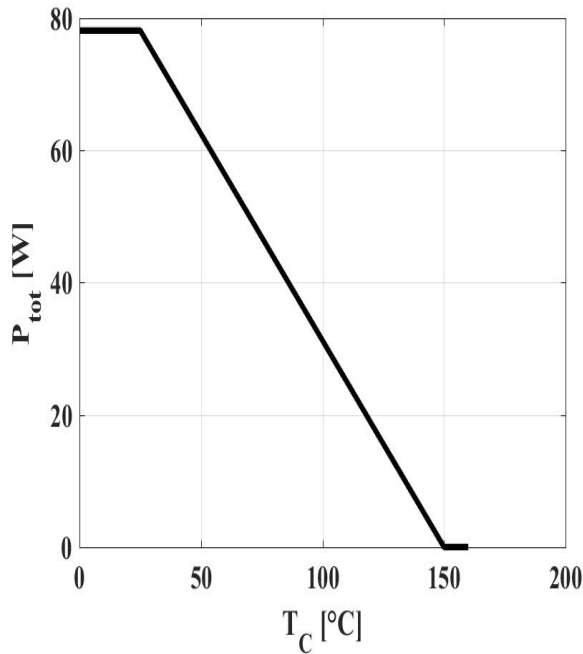
Parameter		Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Case	PDFN5*6	R_{thJC}			1.6	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient	PDFN5*6	R_{thJA}			50	

2.5m Ω , 45V, N-Channel Power MOSFET
SRT045N025H
Electrical Characteristics
 $T_J = 25^\circ\text{C}$, unless otherwise specified.

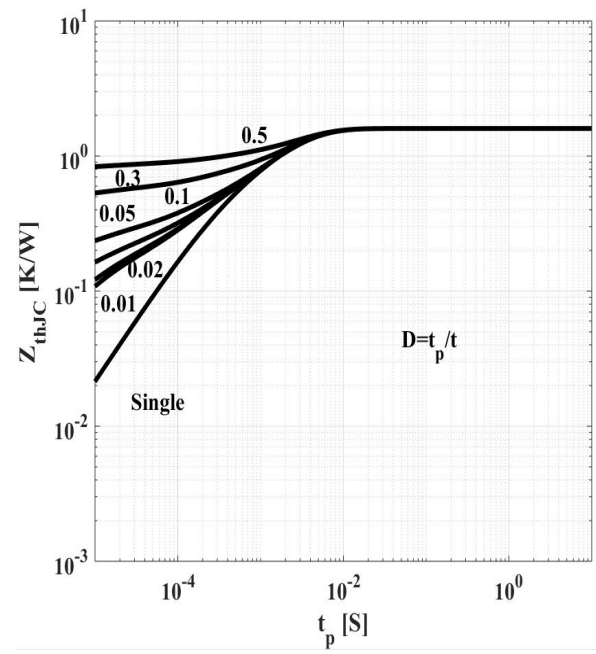
Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Statistic Characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250uA	45			V
Zero Gate Voltage Drain Current		I _{DSS}	V _{DS} =45V, V _{GS} =0V			1	uA
Gate-Body Leakage Current	Forward	I _{GSSF}	V _{GS} =20V, V _{DS} =0V			200	nA
	Reverse	I _{GSSR}	V _{GS} =-20V, V _{DS} =0V			-200	
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =0.25mA	2.0	3.0	4.0	V
Static Drain-Source On-Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =35A		2.15	2.5	mΩ
Gate Resistance		R _G	f=1MHz, Open Drain		1.2		Ω
Dynamic Characteristics							
Input Capacitance		C _{ISS}	V _{DS} =20V, V _{GS} =0V, f=1MHz		2.3		nF
Output Capacitance		C _{OSS}			762		pF
Reverse Transfer Capacitance		C _{RSS}			48		pF
Effective output capacitance, energy related ^{NOTE5}		C _{O(er)}	V _{GS} =0V, V _{DS} =0...20V		1.2		nF
Effective output capacitance, time related ^{NOTE6}		C _{O(tr)}			1.5		
Turn-on Delay Time		t _{d(on)}	V _{DD} =20V, I _D =35A R _G =1.6Ω, V _{GS} =10V		8		ns
Rise Time		t _r			29		
Turn-off Delay Time		t _{d(off)}			31		
Fall Time		t _f			7		
Gate Charge Characteristics							
Gate to Source Charge		Q _{gs}	V _{DD} =20V, I _D =35A V _{GS} =0 to 10V		10.2		nC
Gate to Drain Charge		Q _{gd}			5.2		
Gate Charge Total		Q _g			32		
Gate Plateau Voltage		V _{plateau}			5.0		V
Gate Charge Total, sync FET		Q _g	V _{DD} =0.1V, V _{GS} =0 to 10V		29		nC
Reverse Diode Characteristics							
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} =0V, I _{SD} =35A		0.84	1.0	V
Reverse Recovery Time		t _{rr}	V _R =20V, I _F =35A dI _F /dt=100A/us		52		ns
Reverse Recovery Charge		Q _{rr}			91		nC
Peak Reverse Recovery Current		I _{rrm}			3.5		A

Note:

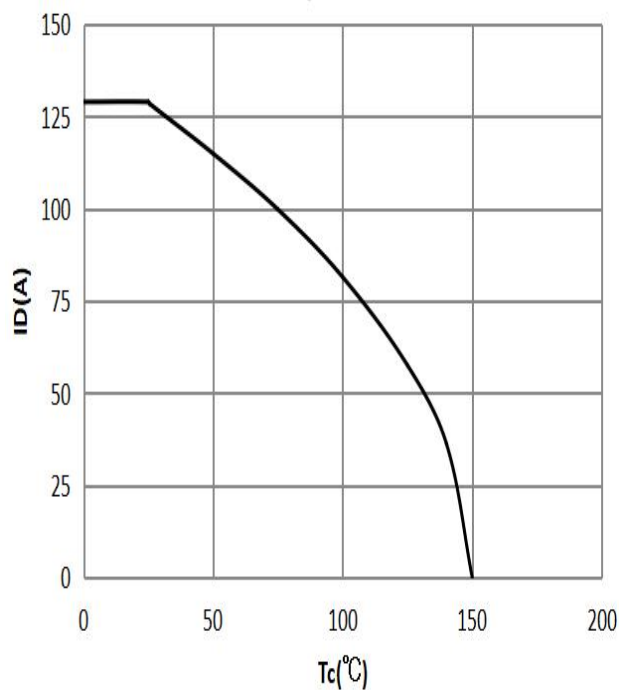
- $C_{O(er)}$ is a fixed capacitance that gives the same stored energy as C_{OSS} while V_{DS} is rising from 0 to 32V
- $C_{O(tr)}$ is a fixed capacitance that gives the same charging time as C_{OSS} while V_{DS} is rising from 0 to 32V

Typical Performance Characteristics
Figure 3: Power Dissipation


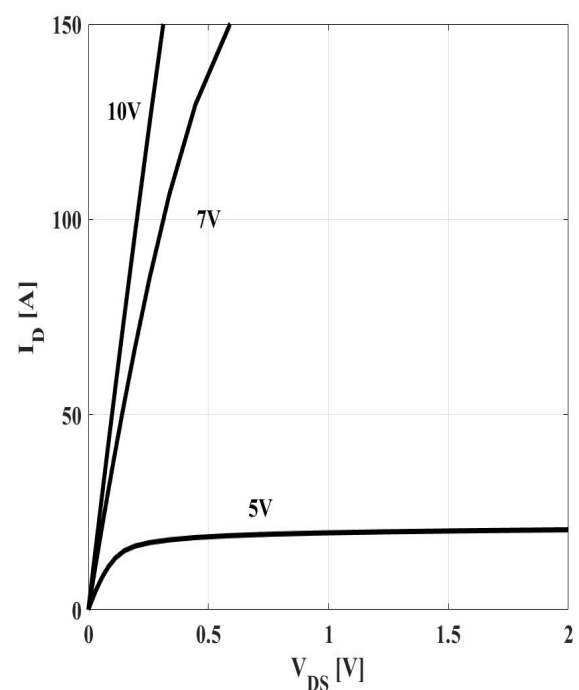
$$P_{tot}=f(T_c)$$

Figure 4: Max. Transient Thermal Impedance


$$Z_{(th)JC}=f(t_p); \text{ parameter: } D=t_p/T$$

Figure5: Drain Current


$$I_D=f(T_c); V_{GS} \geq 10V$$

Figure6: Typ. Output Characteristics


$$I_D=f(V_{DS}); T_j=25^{\circ}C; \text{ parameter: } V_{GS}$$

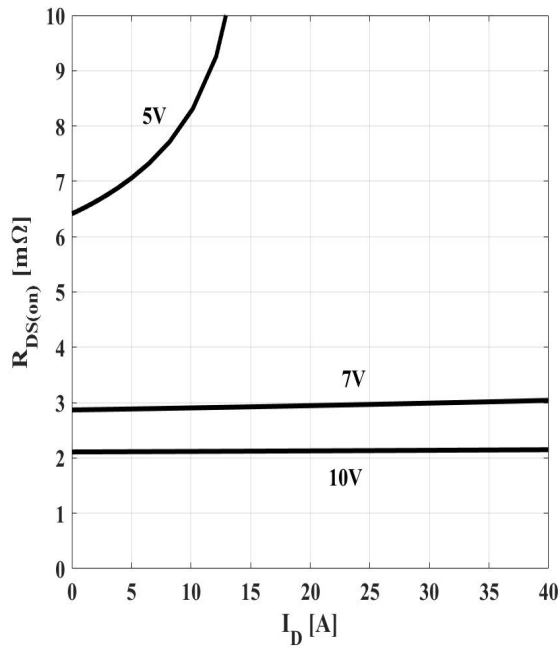
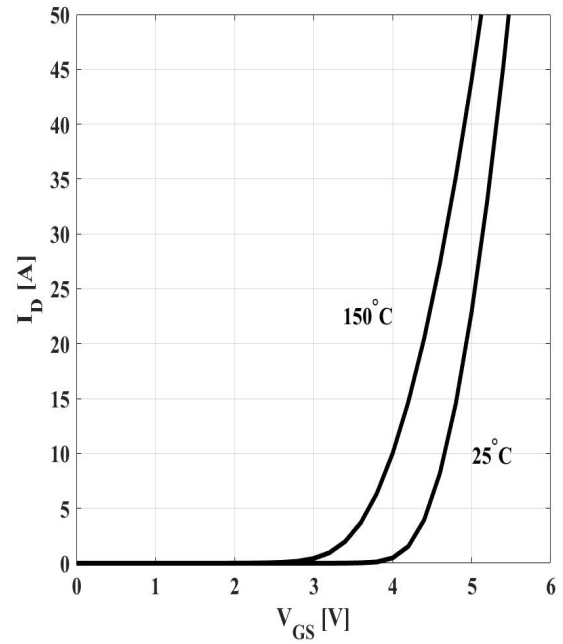
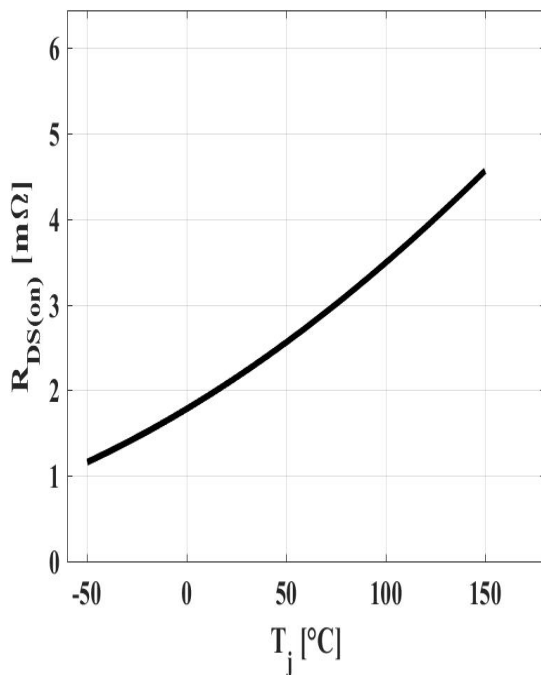
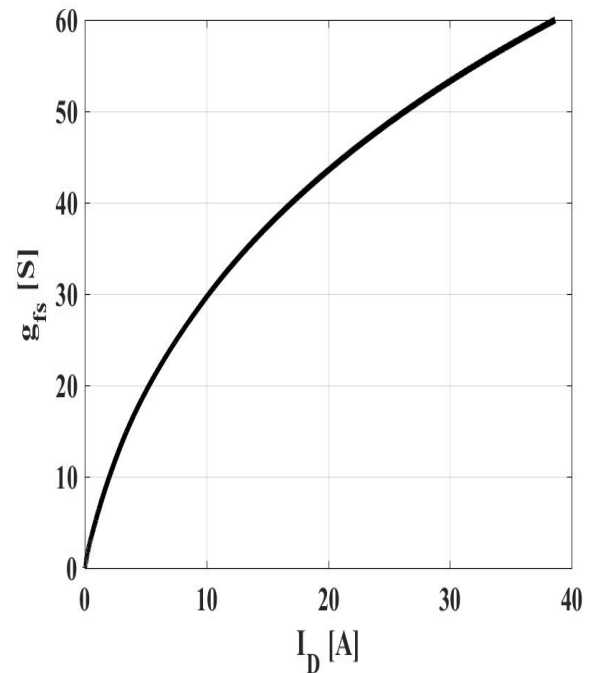
Figure7: Typ. Drain-Source On-State Resistance

 $R_{DS(ON)}=f(I_D); T_j=25^{\circ}\text{C}; \text{parameter: } V_{GS}$
Figure8: Typ. Transfer Characteristics

 $I_D=f(V_{GS}); |V_{DS}|>2|I_D|R_{DS(on)max}; \text{parameter: } T_j$
Figure9: Typ. Drain-Source On-State Resistance

 $R_{DS(ON)}=f(T_j); I_D=35\text{A}; V_{GS}=10\text{V}$
Figure10: Typ. Forward Transconductance

 $g_{fs}=f(I_D); T_j=25^{\circ}\text{C}$

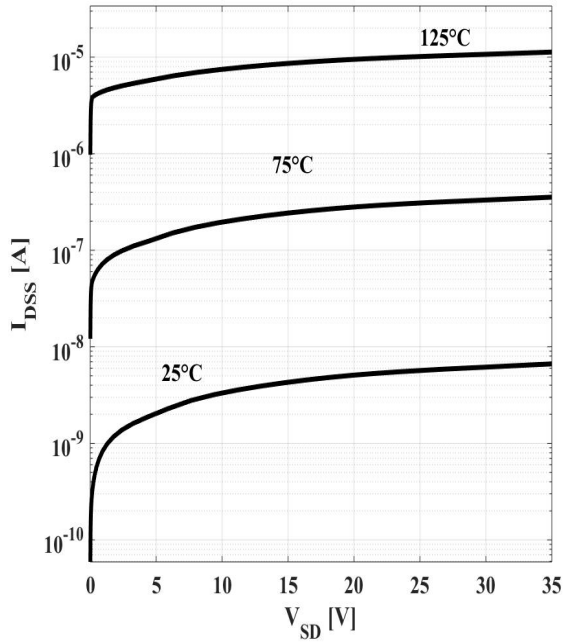
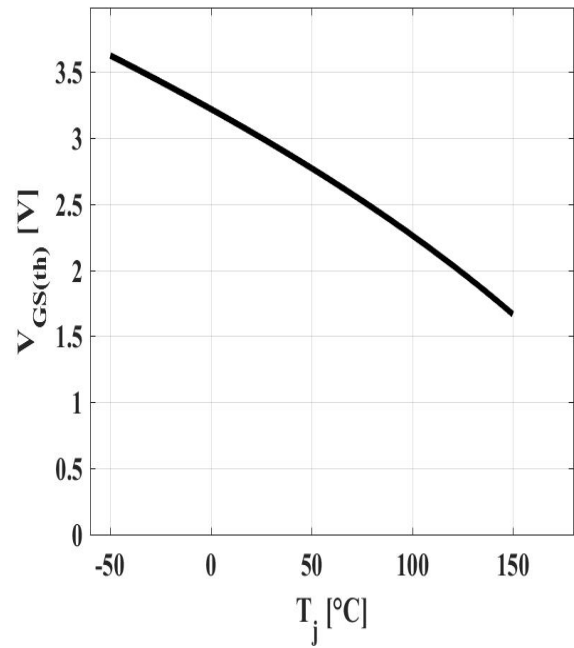
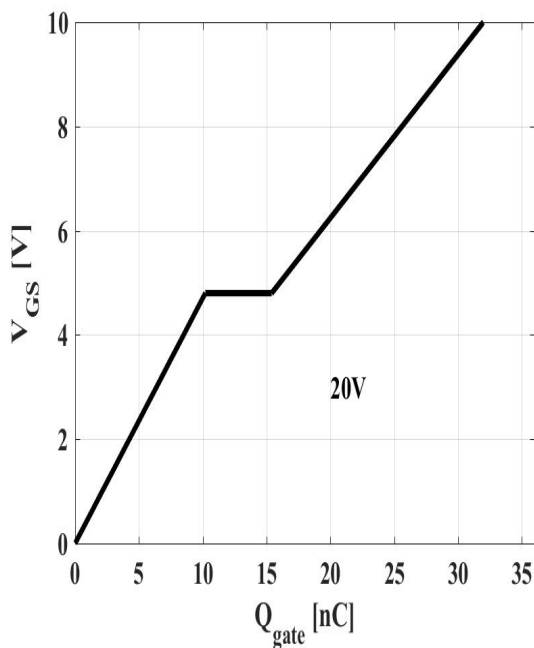
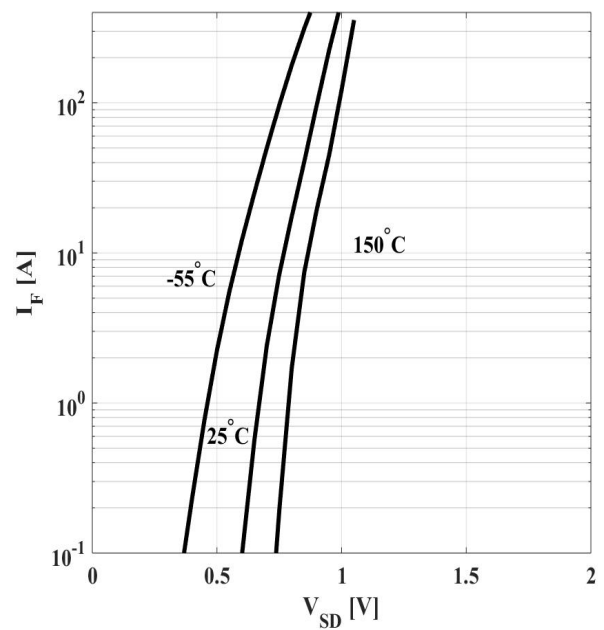
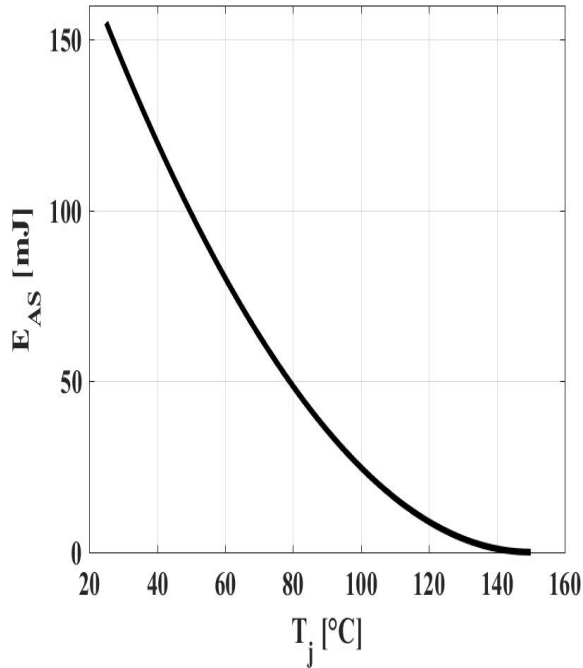
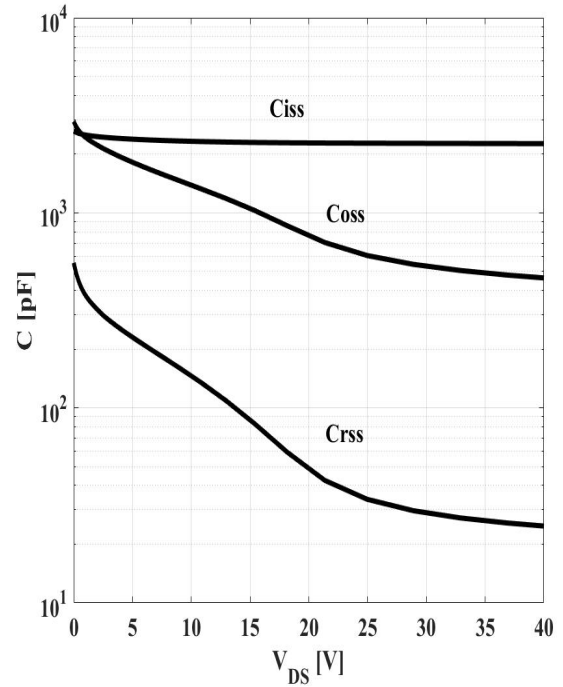
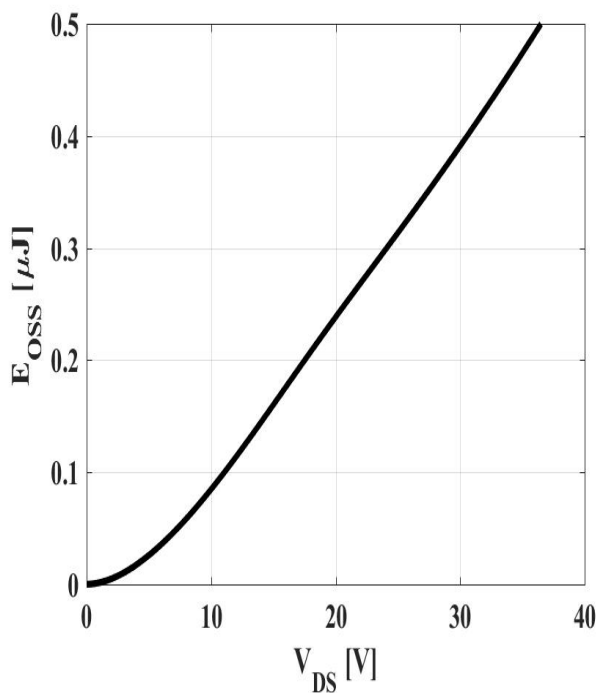
Figure 11: Drain-Source Leakage Current

 $I_{DSS}=f(V_{DS}); V_{GS}=0V; \text{parameter: } T_j$
Figure12: Typ. Gate Threshold Voltage

 $V_{GS(th)}=f(T_j); V_{GS}=V_{DS}; I_{DS}=250\mu A$
Figure 13: Typ. Gate Charge

 $V_{GS}=f(Q_{gate}), I_D=35A \text{ pulsed}$
Figure 14: Forward Characteristics of Reverse Diode

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

Figure 15: Avalanche Energy


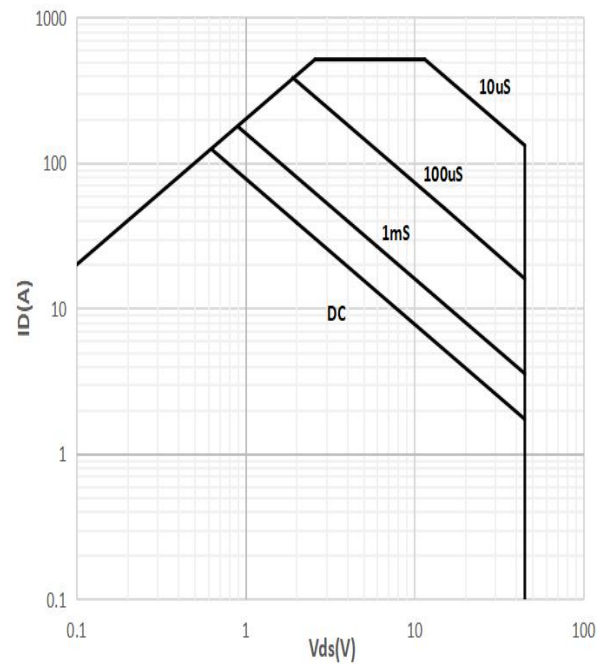
$$E_{AS}=f(T_j); I_D=20.0A; V_{DD}=20V$$

Figure 16: Typ. Capacitances


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

Figure 17: Coss Stored Energy


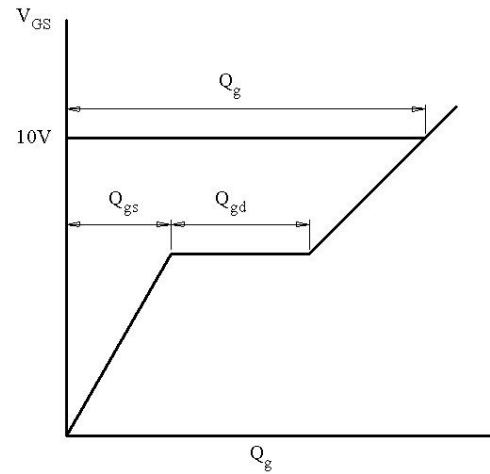
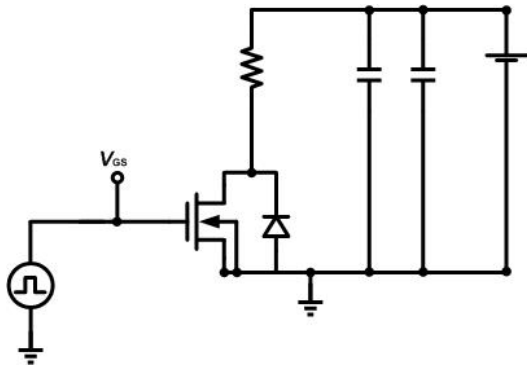
$$E_{OSS}=f(V_{DS})$$

Figure 18: Safe Operating Area


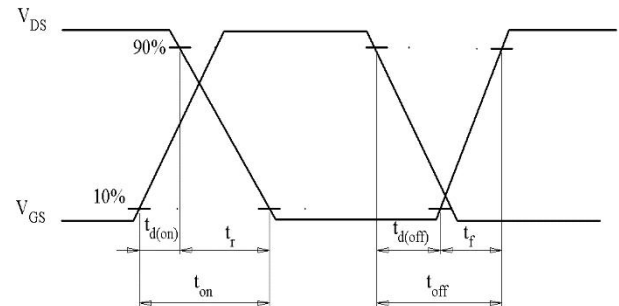
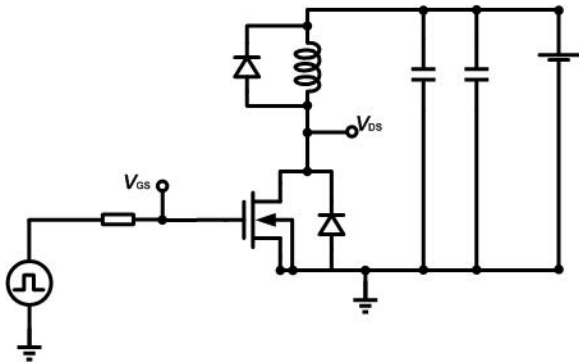
$$I_D = f(V_{DS}); T_c = 25^{\circ}C; V_{GS} > 7V; \text{parameter } t_p$$

Test Circuits

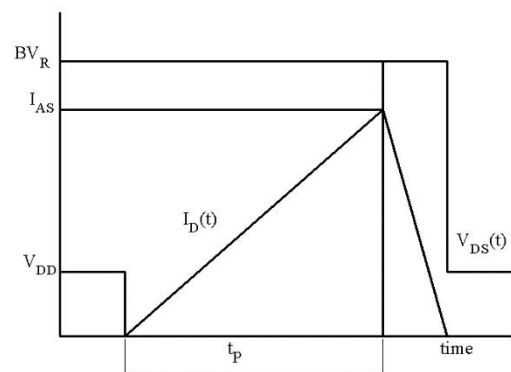
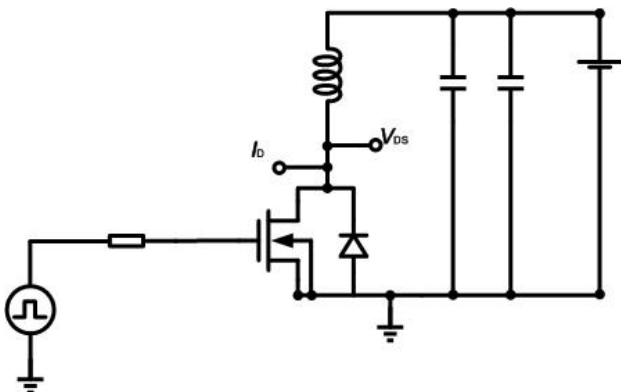
1. Gate Charge Test Circuit & Waveform



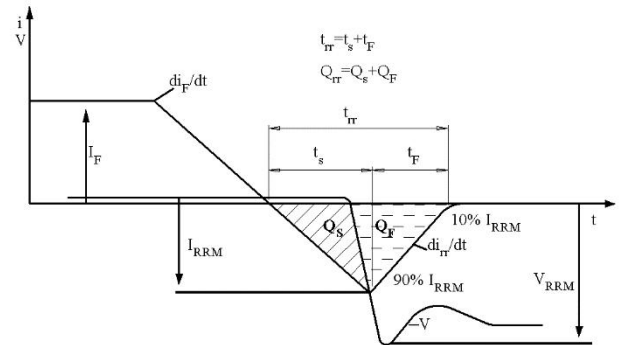
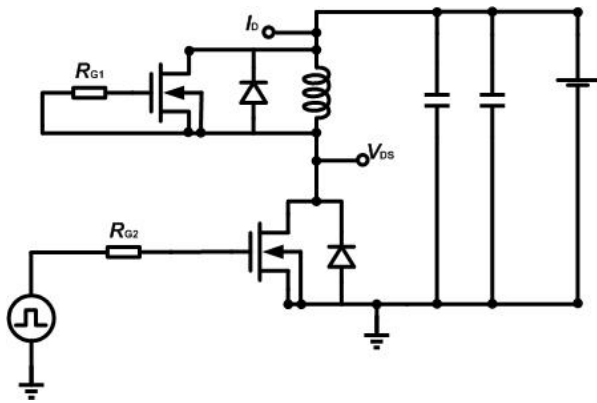
2. Switch Time Test Circuit

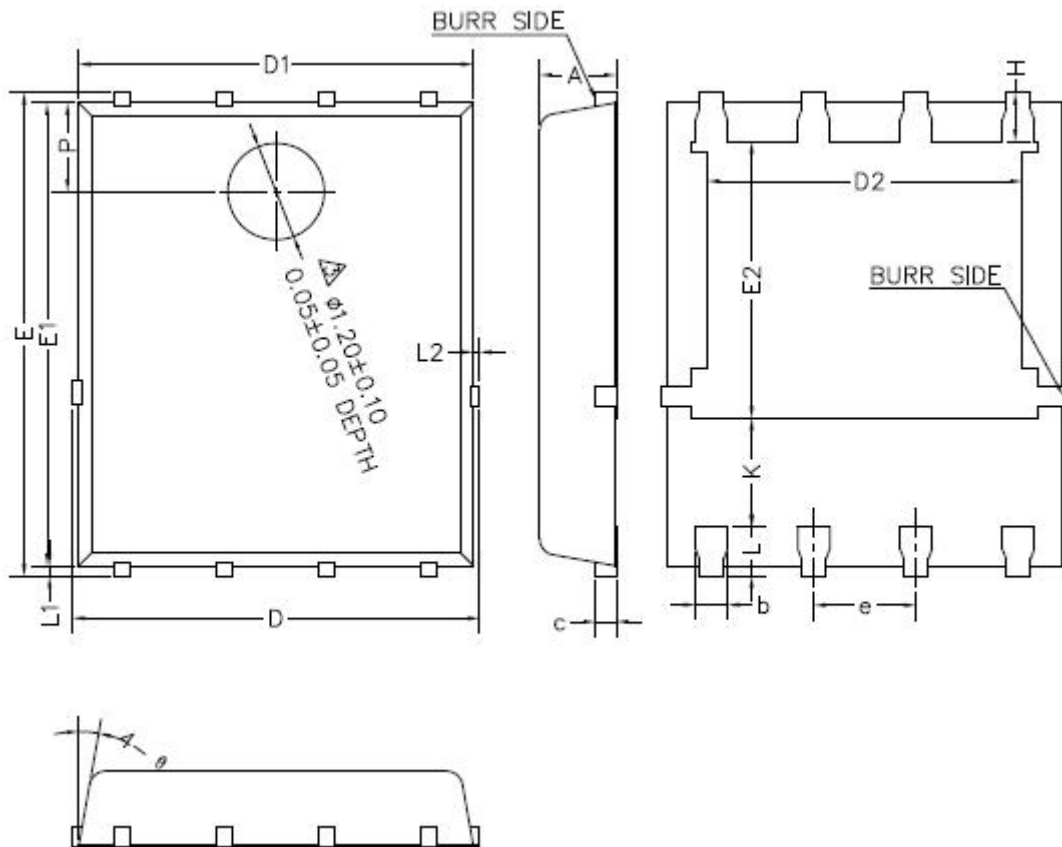


3. Unclamped Inductive Switching Test Circuit & Waveforms



4. Test Circuit and Waveform for Diode Characteristics



Mechanical Dimension
PDFN5*6-8 Unit: mm


Symbol	Dimensions(mm)		
	Min.	Typ.	Max.
A	0.90	1.10	1.20
b	0.35	0.40	0.45
c	0.21	0.25	0.34
D			5.10
D1	4.80	4.90	5.00
D2	3.91	4.01	4.11
e	1.17	1.27	1.37
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.34	3.44	3.54
H	0.51	0.61	0.71
K	1.10		
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
L2			0.10
P	1.00	1.10	1.20
θ	8°	10°	12°



Sanrise Technology Limited Company

<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

Sanrise Technology Limited Company

Rm.401, Building B, No. 666, Zhangheng Road,
Zhangjiang Hi-Tech Park, Shanghai, P.R.China

Tel: +86-21-68825918