5.0mΩ, 30V, N-Channel Power MOSFET SRT03N050L

General Description

The Sanrise SRT03N050L uses advanced split gate trench technology. It has extremely low on resistance, low gate charge and fast switching time. This device is ideal for high frequency switching and synchronous rectification.

The SRT03N050L break down voltage is 30V and it has a high rugged avalanche characteristics. The SRT03N050L is available in PDFN3.3*3.3 package.

Features

- BV_{DSS} = 30V, I_D = 67A
- Low On Resistance
  $R_{DS(ON)\_TYP}$ = 4.1mΩ @ V_{GS} = 10V.
  $R_{DS(ON)\_TYP}$ = 6.7mΩ @ V_{GS} = 4.5V.
- Ultra Low Gate Charge, Qg=17.4nC typ.
- Fast switching capability
- Robust design with better EAS performance
- 100% UIS Tested

Application

- DC/DC Converters
- Synchronous Rectifier
- Power Switch
- Motor Driver
- BMS

Symbol

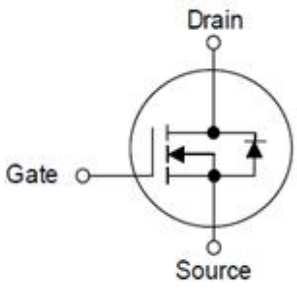
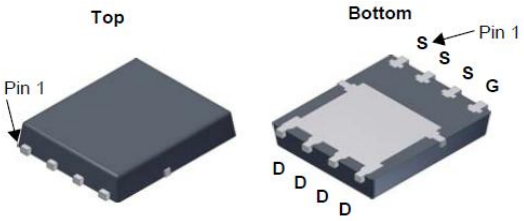


Figure 1 Symbol of SRT03N050L

Package Type



PDFN3.3*3.3

Figure 2 Package Type of SRT03N050L

Ordering Information

SRT03N050L□□–□

Circuit Type

Package
D33: PDFN3.3*3.3

E: Lead Free
G: Green

Blank: Tube
TR: Tape & Reel

Package	Part Number	Marking ID	Packing Type
	Green	Green	
PDFN3.3*3.3	SRT03N050LD33TR-G	03N050LD33G	Tape&Reel

5.0mΩ, 30V, N-Channel Power MOSFET SRT03N050L

Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	30	V
Gate-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current	I_D	67	A
Pulsed Drain Current (4)	I_{DM}	268	A
Avalanche Current (5)	I_{AS}	17	A
Single Pulse Avalanche Energy (5)	E_{AS}	29	mJ
Power Dissipation (T_C = 25°C)	P_D	37	W
Operating Junction Temperature	T_J	150	ºC
Storage Temperature	T_{STG}	-55 ~ 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. Limited by package.
3. Rated according to $R_{\theta JC}$.
4. Limited by maximum T_J.
5. TA = 25°C, L = 0.1mH, I_{AS} = 17A.

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance，Junction-to-Case	$R_{\theta JC}$			3.4	ºC/W
Thermal Resistance，Junction-to-Ambient	$R_{\theta JA}$			62	

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Electrical Characteristics

T_J = 25ºC, 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	30			V
Zero Gate Voltage Drain Current		I_{DSS}	V_{DS}=30V, V_{GS}=0V			1	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	nA
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250uA	1.0		2.0	V
Static Drain-Source On-Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=10A		4.1	5.0	mΩ
			V_{GS}=4.5V, I_D=10A		6.7	10.0	mΩ
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=15V, V_{GS}=0V, f=1MHz		960		pF
Output Capacitance		C_{OSS}			410		
Reverse Transfer Capacitance		C_{RSS}			60		
Turn-on Delay Time		$t_{d(on)}$	V_{DD}=15V, I_D=20A R_G=3.0Ω, V_{GS}=10V		7		ns
Rise Time		t_r			2.8		
Turn-off Delay Time		$t_{d(off)}$			21.4		
Fall Time		t_f			5.3		
Gate Charge Characteristics							
Gate to Source Charge		Q_{gs}	V_{DD}=15V, I_D=20A V_{GS}=0 to 10V		3.4		nC
Gate to Drain Charge		Q_{gd}			3.1		
Gate Charge Total		Q_g			17.4		
Gate Plateau Voltage		g_{fs}	V_{DD}=15V, I_D=20A		85		S
Reverse Diode Characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_{SD}=10A		0.8		V
Reverse Recovery Time		t_{rr}	V_{GS}=0V, I_F=10A dI$_F$/dt=100A/us		12.3		ns
Reverse Recovery Charge		Q_{rr}			17.6		nC

Typical Performance Characteristics

Figure 3: Output Characteristics

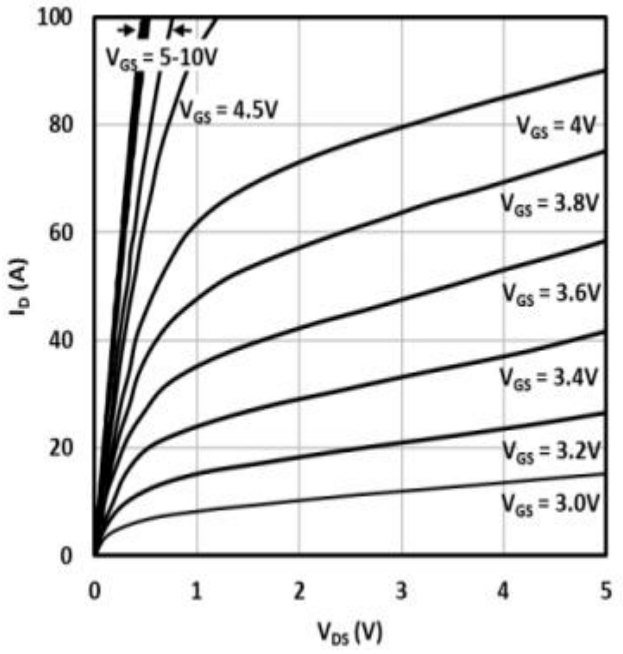


Figure 4: Transfer Characteristics

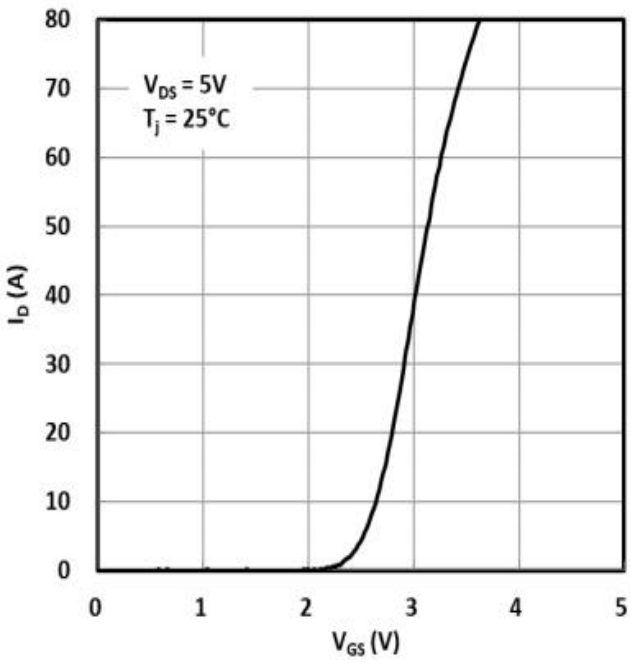


Figure5: On-resistance Vs. Gate voltage

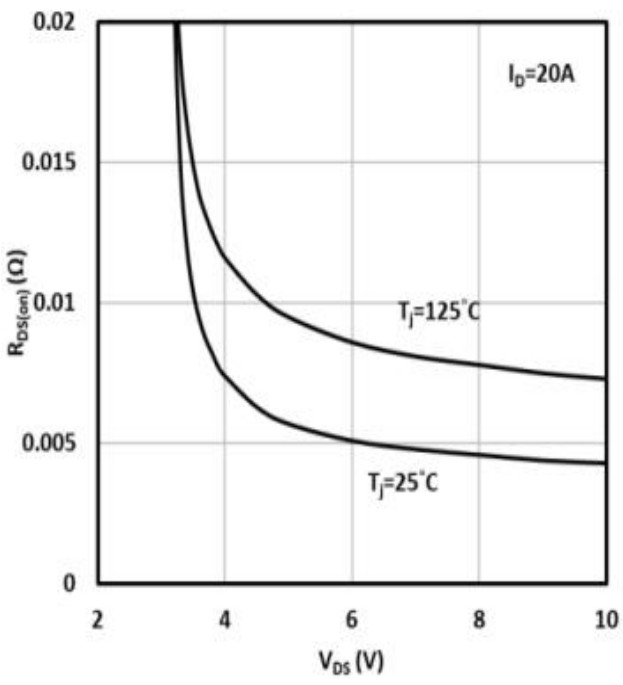


Figure6: On-resistance vs. Drain current

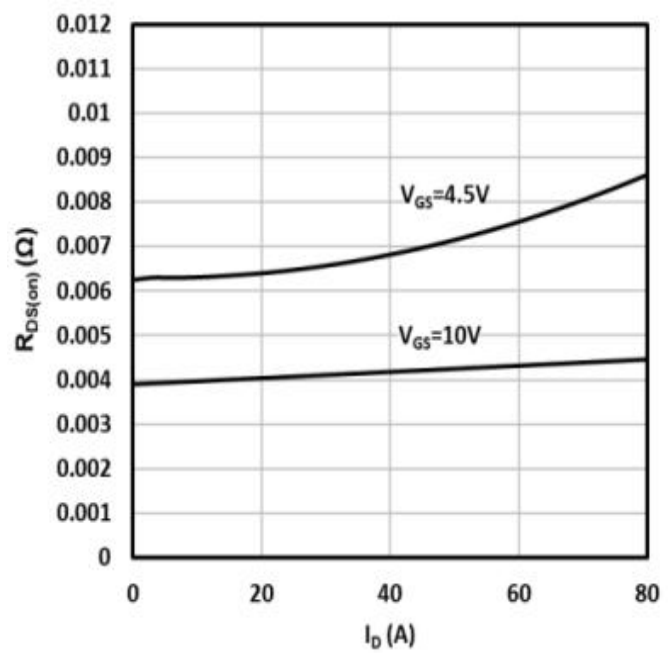


Figure 7:Source to drain diode forward Characteristics

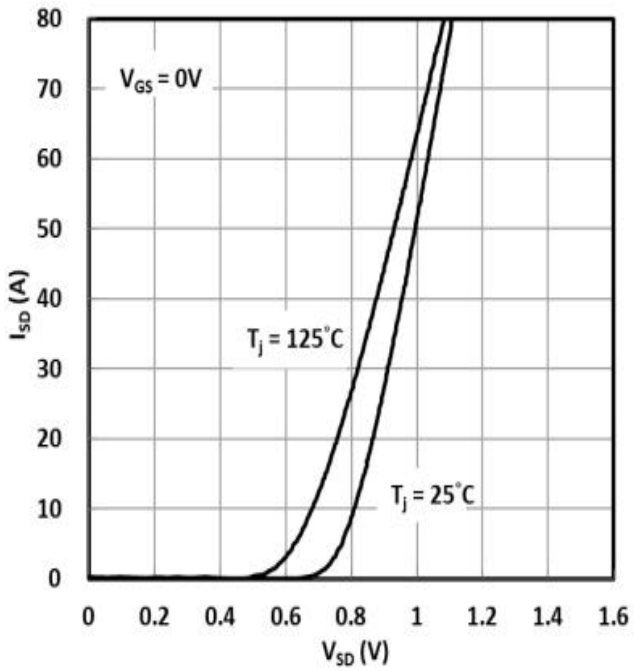


Figure 8: Capacitance vs. Drain-to-Source voltage

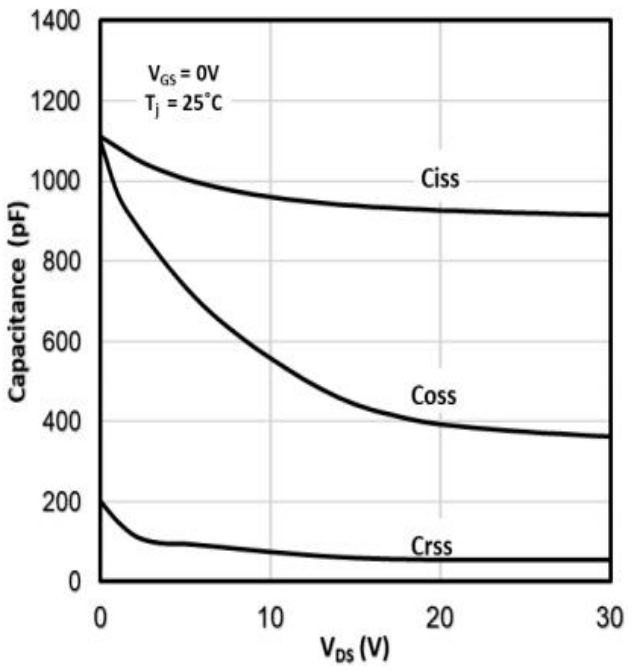


Figure9: Gate-to-Source voltage vs.Gate charge

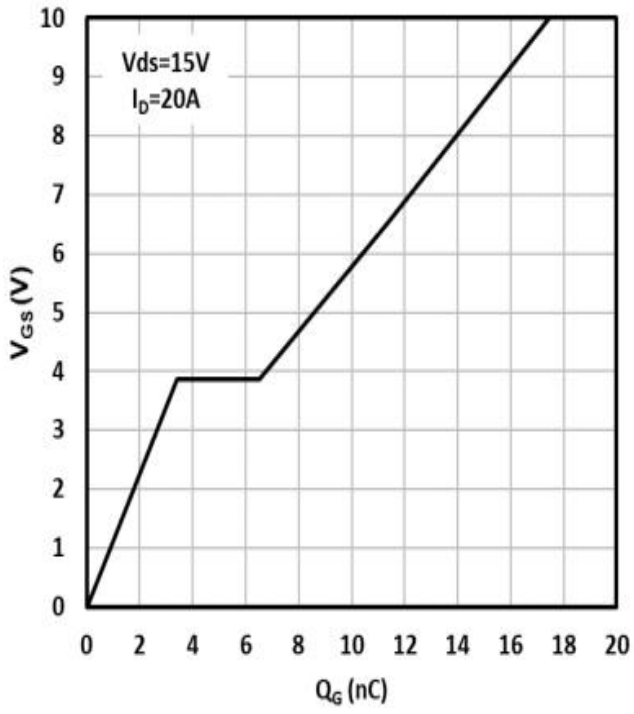


Figure10: Maximum Drain current vs.Case temperature

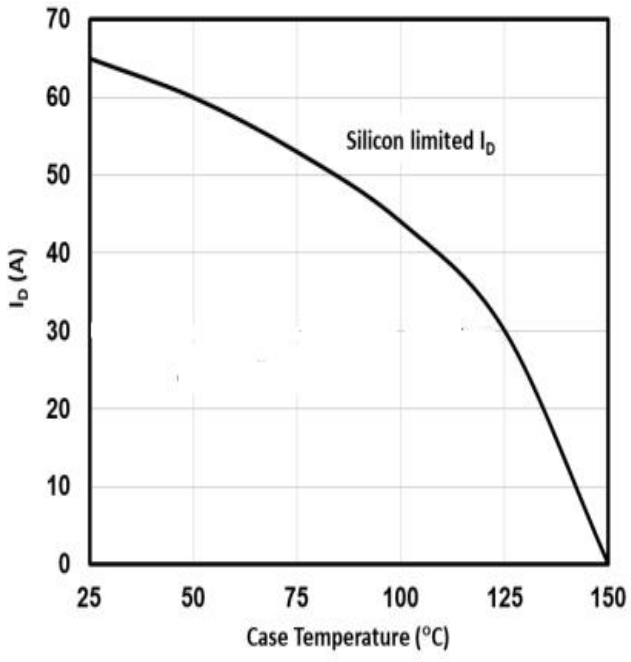


Figure 11:Normalized drain-to-source breakdown vs.temperature

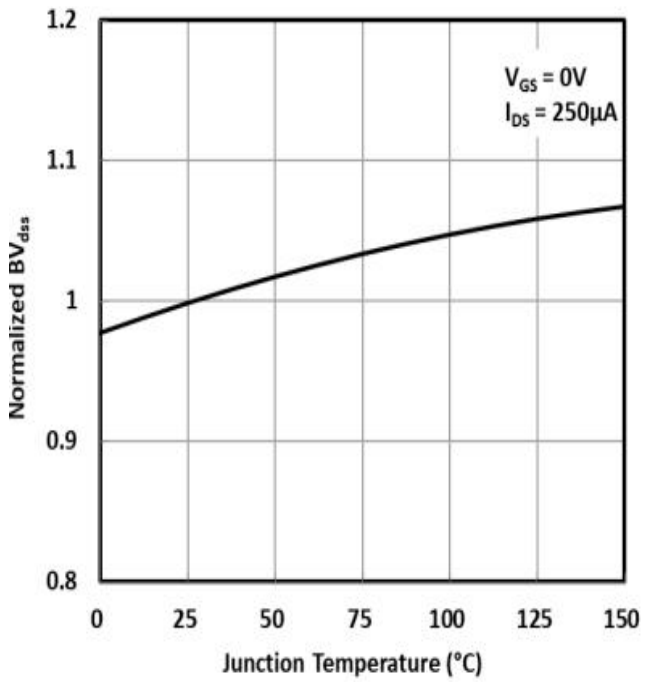


Figure 12: Drain-to-source leakage current vs.voltage

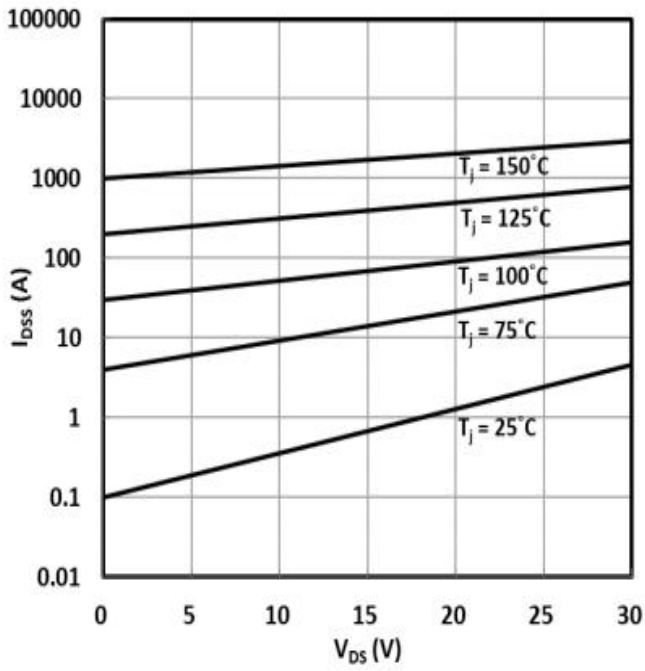


Figure13:Maximum Drain current vs. Ambient temperature

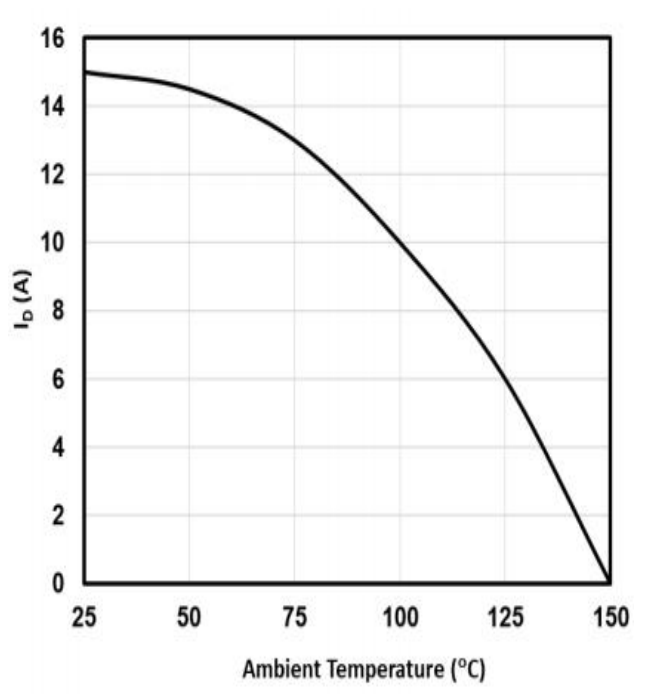
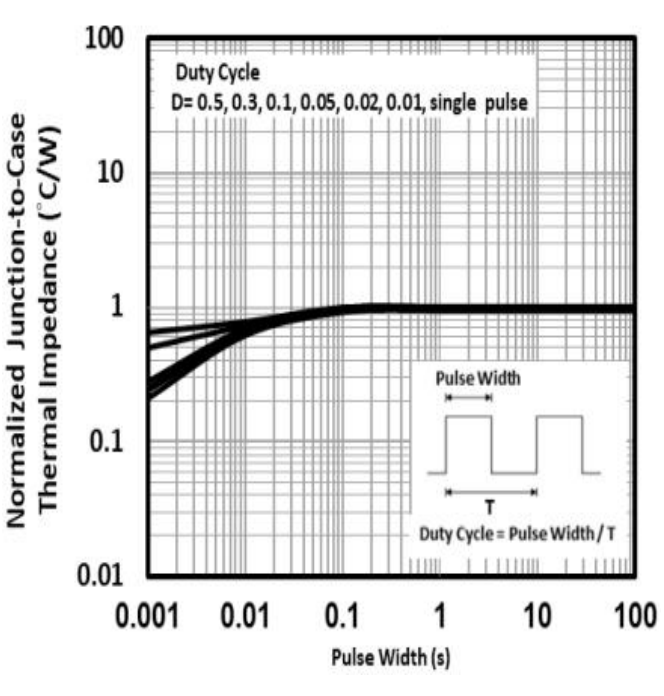
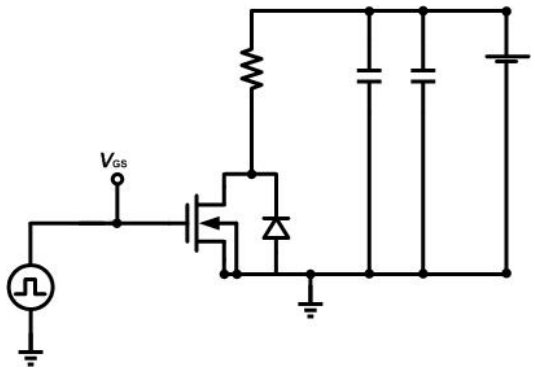


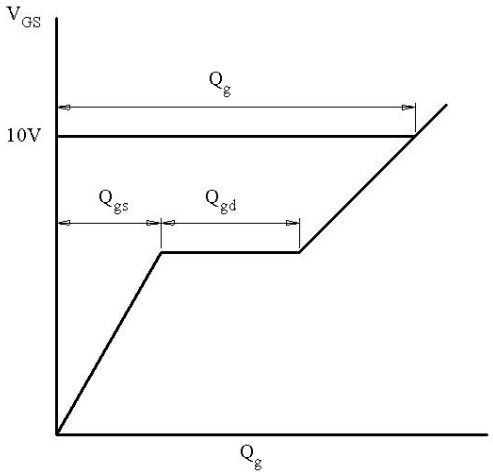
Figure14: Junction-to-case thermal impedance



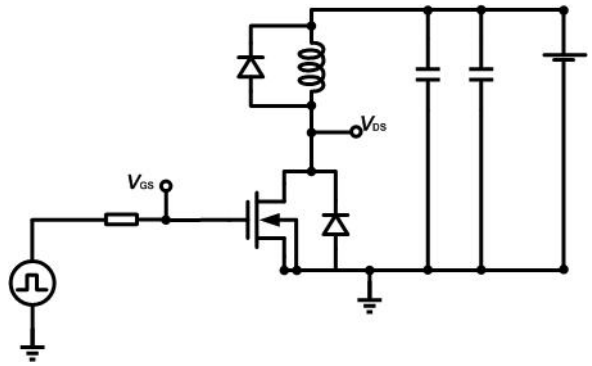
Test Circuits

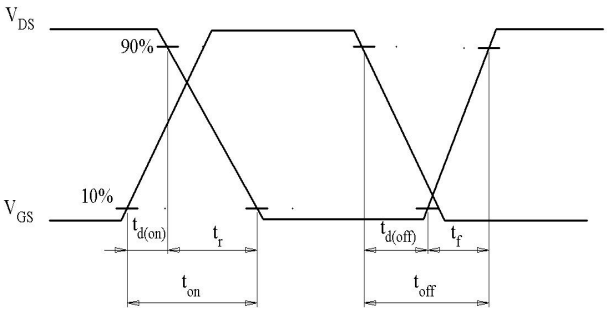
1. Gate Charge Test Circuit & Waveform



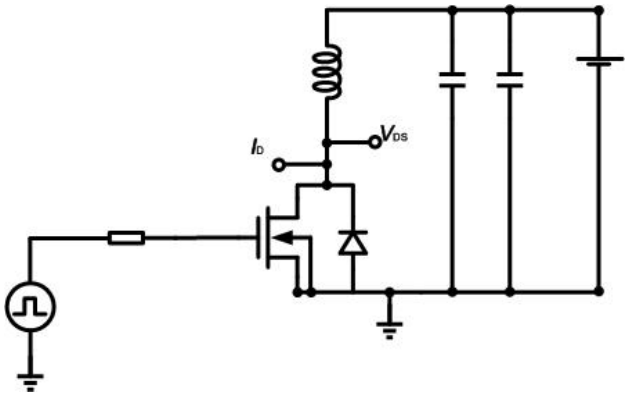


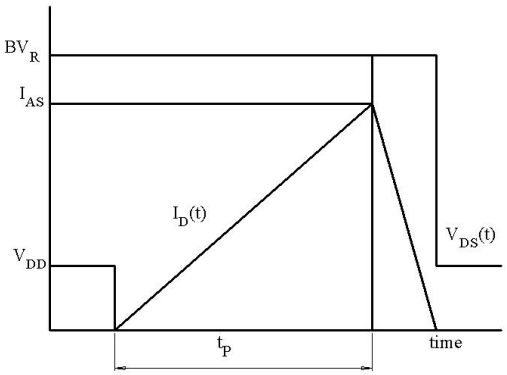
2. Switch Time Test Circuit



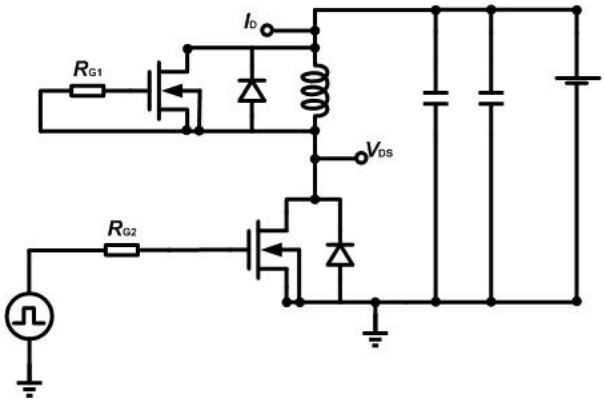


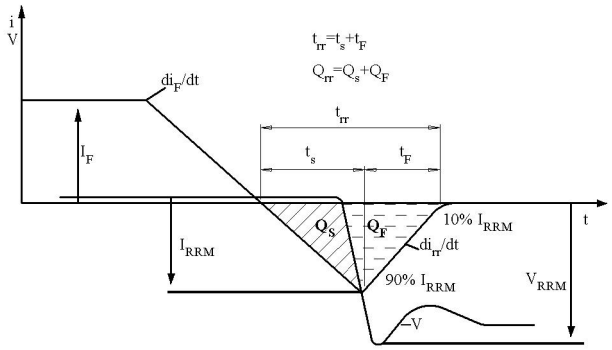
3. Unclamped Inductive Switching Test Circuit & Waveforms





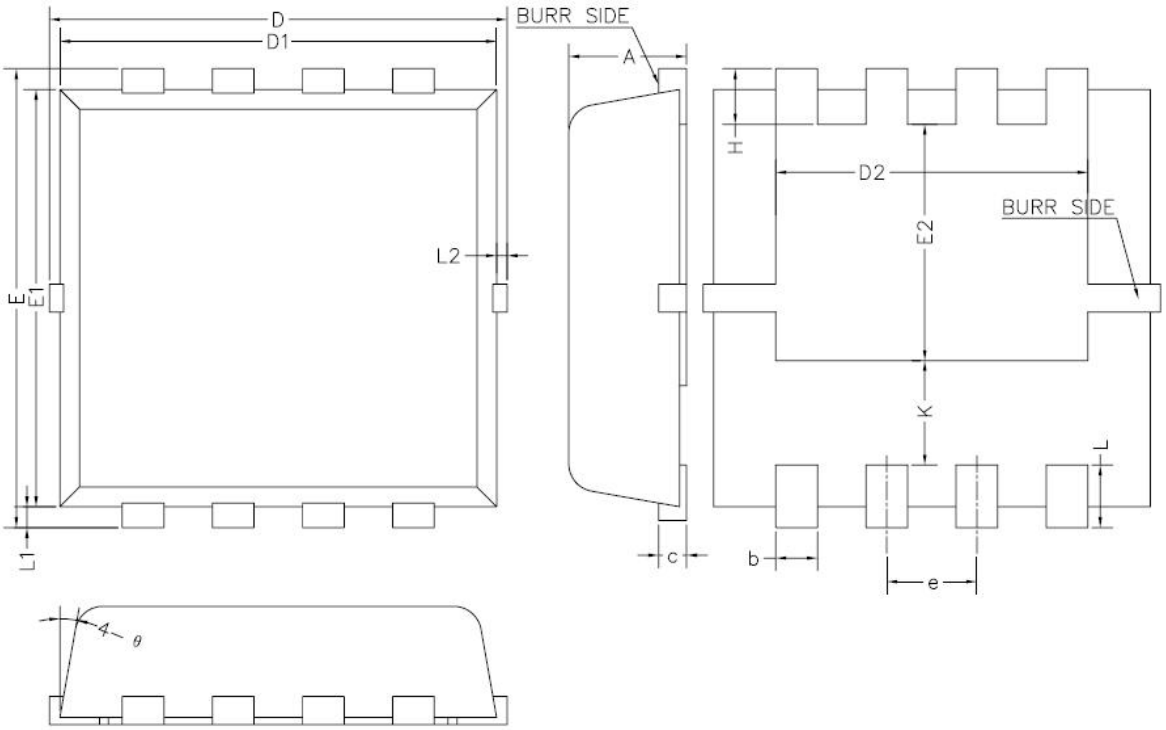
4. Test Circuit and Waveform for Diode Characteristics





Mechanical Dimensions

PDFN3.3*3.3 **Unit: mm**



Symbol	Dimensions(mm)		
	Min.	Typ.	Max.
A	0.70	0.8	0.9
b	0.25	0.30	0.39
c	0.14	0.15	0.20
D	3.10	3.30	3.50
D1	3.05	3.15	3.25
D2	2.15	2.25	2.35
e	0.55	0.65	0.75
E	3.10	3.30	3.50
E1	2.90	3.00	3.10
E2	1.60	1.70	1.80
H	0.25	0.40	0.55
K	0.65	0.75	0.85
L	0.30	0.45	0.60
L1	0.05	0.15	0.25
L2	-	-	0.15
θ	8°	10°	12°

5.0mΩ, 30V, N-Channel Power MOSFET SRT03N050L

Sanrise Technology Limited Company

http://www.sanrise-tech.com

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