

## General Description

The Sanrise SRT15N750L uses advanced split gate trench technology. It has extremely low on resistance, low gate charge and fast switching time. This device is ideal for TV, Adapter applications and DC/DC converters.

The SRT15N750L break down voltage is 150V and it has a high rugged avalanche characteristic. The SRT15N750L is available in SOP8 and PDFN5\*6 and TO-252 packages.

## Features

- Ultra Low  $R_{DS(ON\_TYP)} = 57m\Omega @ V_{GS} = 10V$ .
- Ultra Low Gate Charge,  $Q_g = 7nC$  typ.
- Fast switching capability
- Robust design with better EAS performance
- Non-automotive Qualified

## Application

- TV Power
- LED Lighting Power
- DC/DC Converter

## Symbol

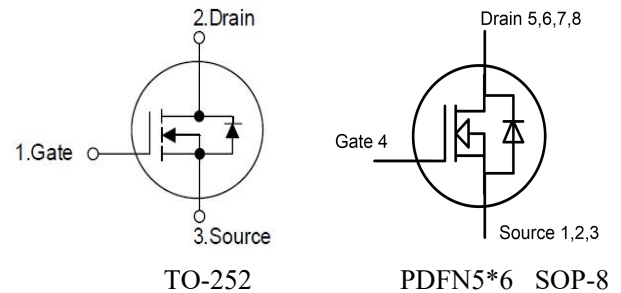


Figure 1 Symbol of SRT15N750L

## Package Type

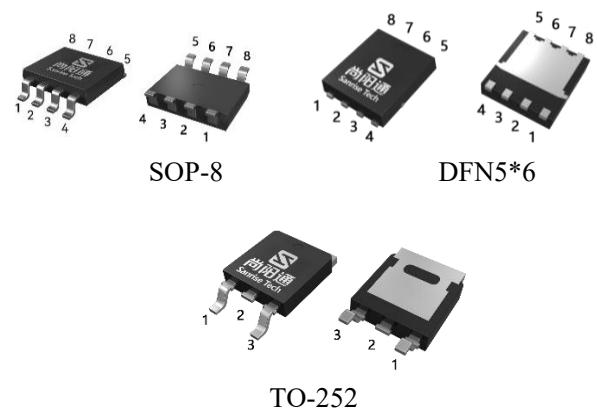
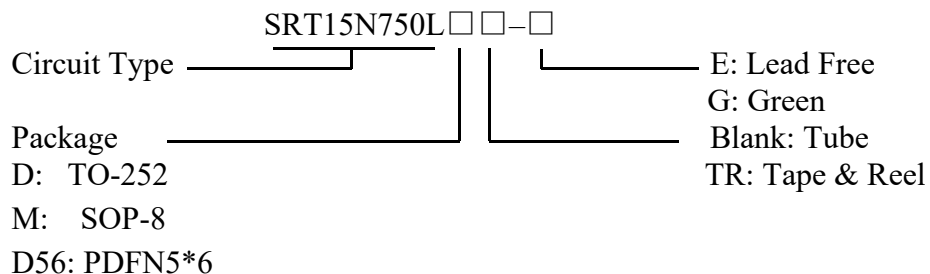


Figure 2 Package Types of SRT15N750L

## Ordering Information



Package	Part Number	Marking ID	Packing Type
TO-252	SRT15N750LDTR-G	SRT15N750LDG	Tape & Reel
SOP-8	SRT15N750LMTR-G	15N750LMG	Tape & Reel
PDFN5*6	SRT15N750LD56TR-G	SRT15N750LD56G	Tape & Reel

**Absolute Maximum Ratings**

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		$V_{DSS}$	150	V
Gate-Source Voltage		$V_{GSS}$	±20	V
Continuous Drain Current	$T_C=25^\circ\text{C}$	SOP8	8.2	A
		PDFN5*6	20.0	
		TO-252	18.2	
	$T_C=100^\circ\text{C}$	SOP8	4.5	
		PDFN5*6	14.0	
		TO-252	11.5	
Pulsed Drain Current (Note 2)		SOP8	33	A
		PDFN5*6	80	
		TO-252	73	
Avalanche Destructive Energy, Single Pulse (Note 4)		$E_{AS\_Limit}$	100	mJ
Avalanche Energy, Single Pulse (Note 3)		$E_{AS}$	10.2	mJ
Continuous Diode Forward Current		$I_S$	18.2	A
Diode Pulse Current		$I_{S\_PULSE}$	73	A
Max Power Dissipation		$P_D$	57	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
- $I_{AS}=6.4\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$
- $I_{AS\_Limit}=20\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$

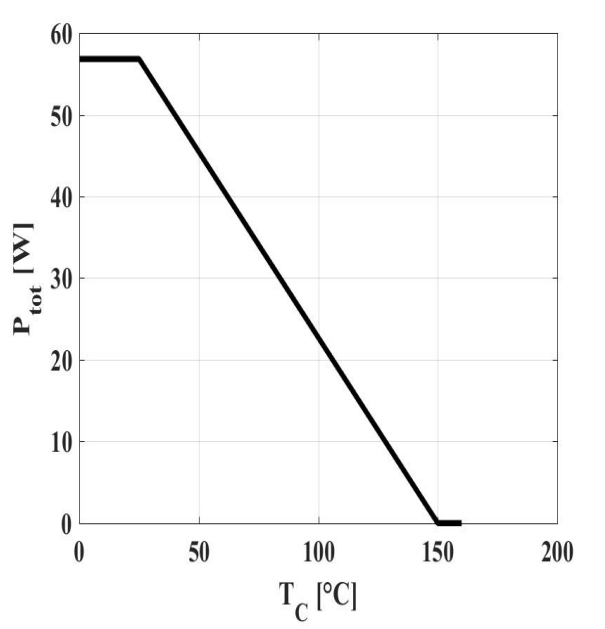
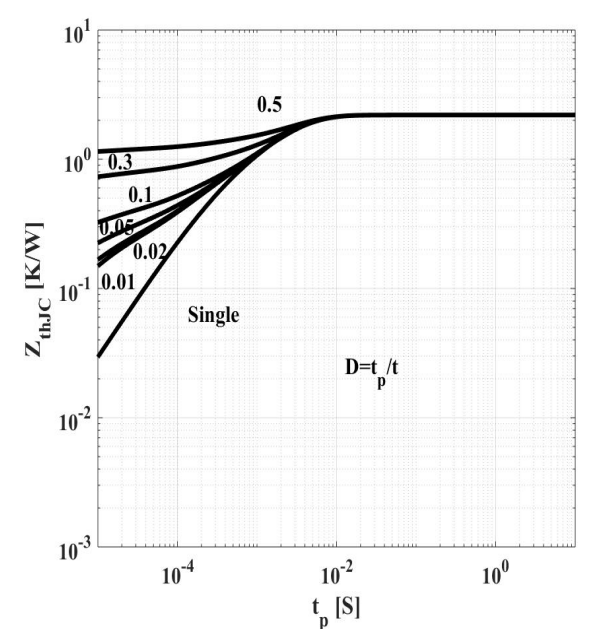
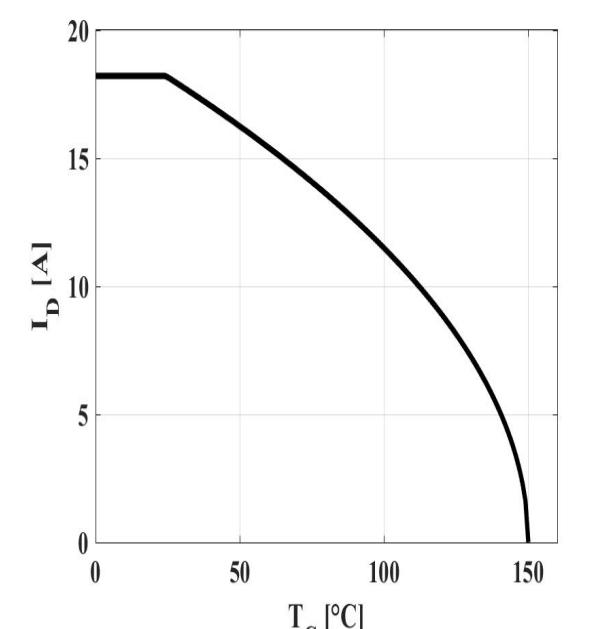
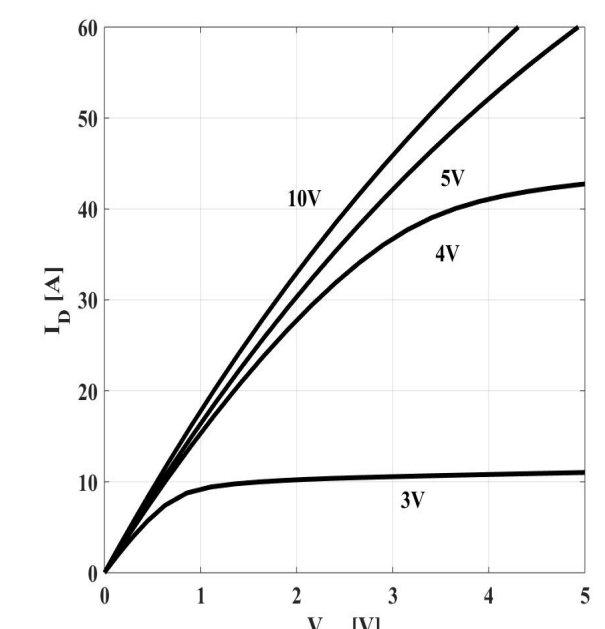
**Thermal Characteristics**

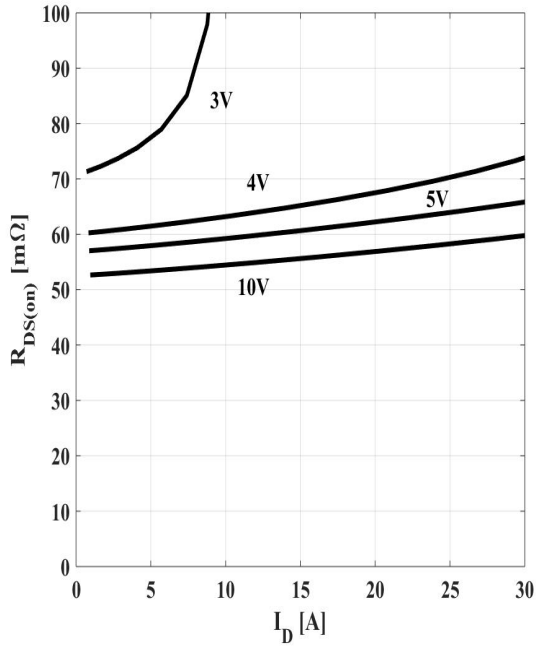
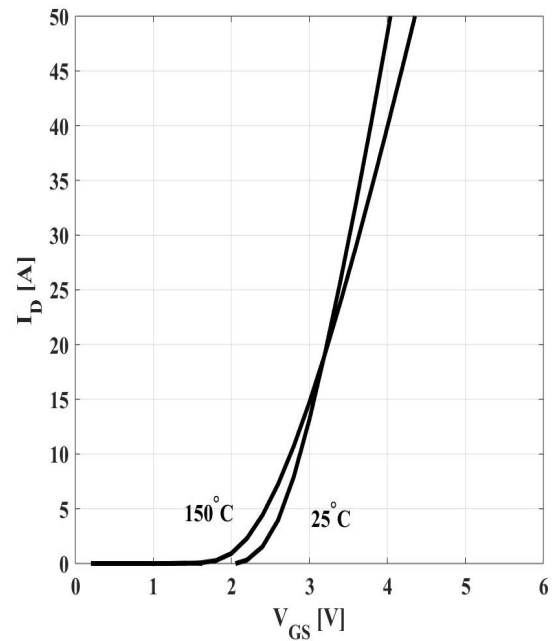
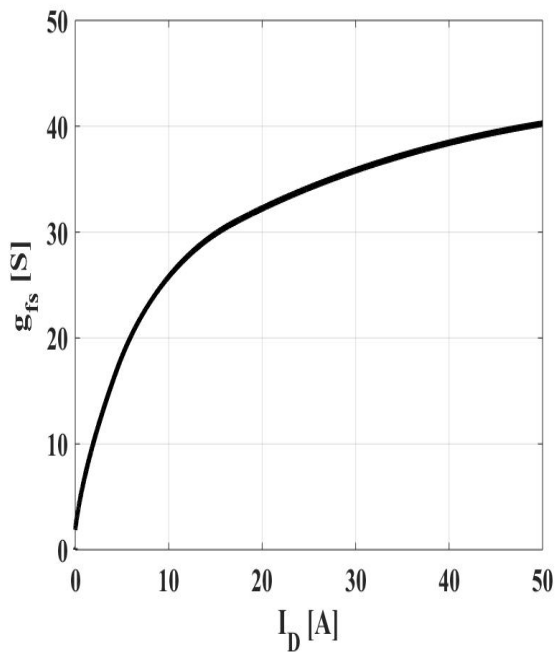
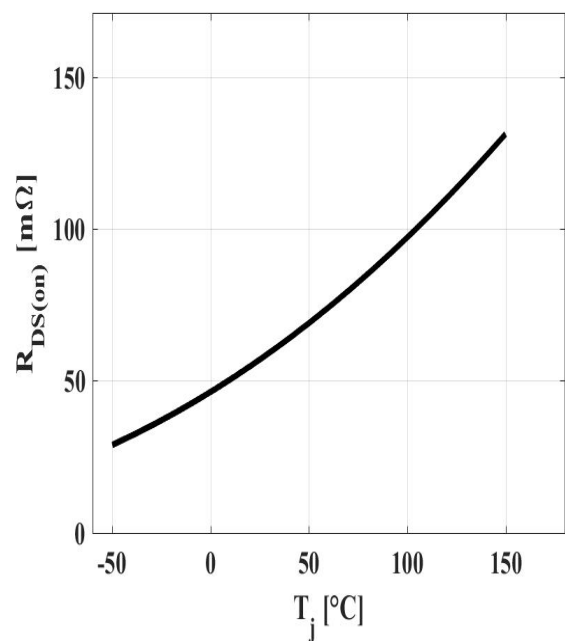
Parameter		Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Lead	SOP8	$R_{thJC}$			25	°C/W
	PDFN5*6				1.84	
Thermal Resistance, Junction-to-Case	TO-252				2.2	
	Thermal Resistance, Junction-to-Ambient	SOP8	$R_{thJA}$			
PDFN5*6					41.7	
TO-252					62	

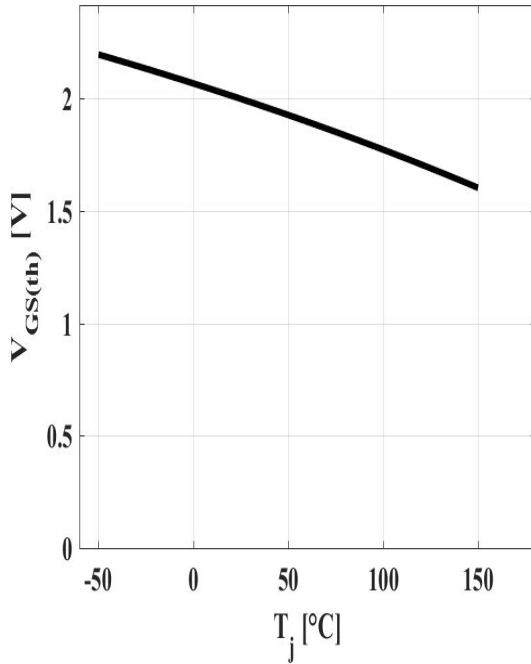
**Electrical Characteristics**
 $T_J = 25^\circ\text{C}$ , unless otherwise specified.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Statistic Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	150			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=150V, V_{GS}=0V$			1	$\mu A$
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	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=0.25mA$	1.4	2.0	2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=10A$		57	75	mΩ
		$V_{GS}=4.5V, I_D=8A$		65	90	
Gate Resistance	$R_G$	$f=1MHz, \text{Open Drain}$		4		Ω
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=75V, V_{GS}=0V, f=1MHz$		566		pF
Output Capacitance	$C_{OSS}$			61		pF
Reverse Transfer Capacitance	$C_{RSS}$			2.4		pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=75V, I_D=10A, R_G=1.6\Omega, V_{GS}=10V$		9		ns
Rise Time	$t_r$			7		
Turn-off Delay Time	$t_{d(off)}$			13		
Fall Time	$t_f$			4		
<b>Gate Charge Characteristics</b>						
Gate to Source Charge	$Q_{gs}$	$V_{DD}=75V, I_D=10A, V_{GS}=0 \text{ to } 10V$		2.5		nC
Gate to Drain Charge	$Q_{gd}$			1.2		
Gate Charge Total	$Q_g$			7		
Gate Plateau Voltage	$V_{plateau}$			4.5		V
<b>Reverse Diode Characteristics</b>						
Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_{SD}=10A$		0.86	1.0	V
Reverse Recovery Time	$t_{rr}$	$V_R=75V, I_F=10A$		35		ns
Reverse Recovery Charge	$Q_{rr}$	$dI_F/dt=100A/\mu s$		135		nC

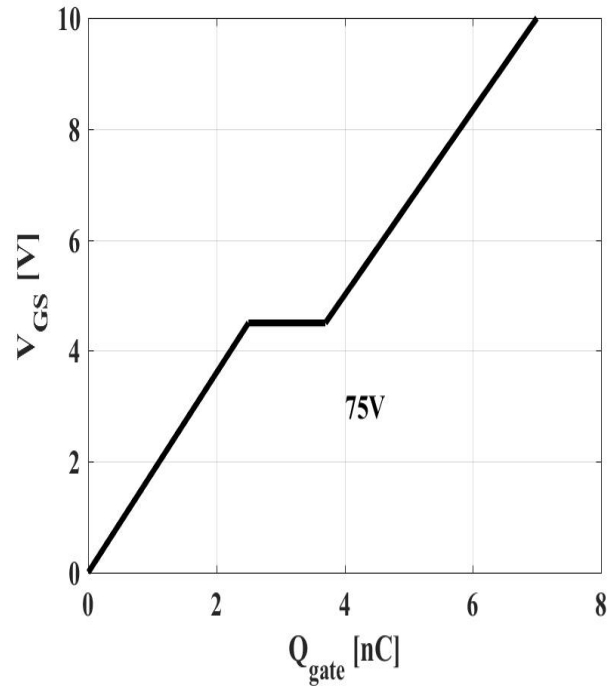
**Typical Performance Characteristics (TO252&TO-220C)**

<p>Figure 3: Power Dissipation</p>  <p><math>P_{tot}=f(T_C)</math></p>	<p>Figure 4: Max. Transient Thermal Impedance</p>  <p><math>Z_{(th)JC}=f(t_p)</math>; parameter: <math>D=t_p/T</math></p>
<p>Figure 5: Drain Current</p>  <p><math>I_D=f(T_C); V_{GS} \geq 10V</math></p>	<p>Figure 6: Typ. Output Characteristics</p>  <p><math>I_D=f(V_{DS}); T_j=25^\circ C</math>; parameter: <math>V_{GS}</math></p>

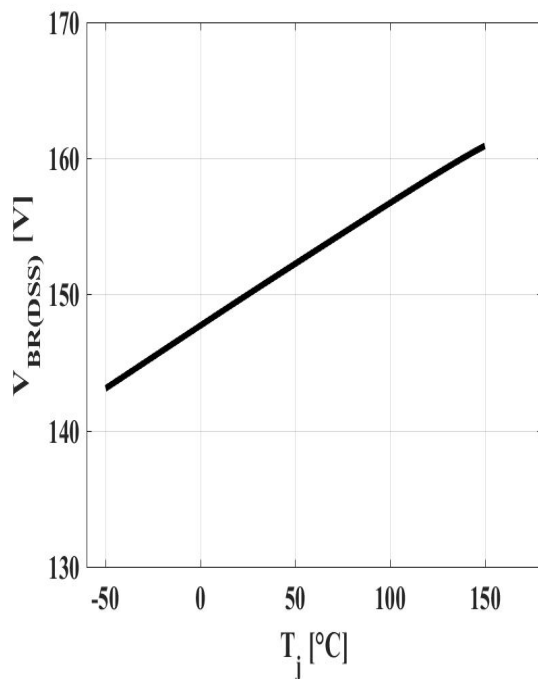
**Figure7: Typ. Drain-Source On-State Resistance**

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

 $I_D=f(V_{GS}); |V_{DS}|>2|I_D|R_{DS(on)max}; \text{parameter: } T_j$ 
**Figure 9: Typ. Forward Transconductance**

 $g_{fs}=f(I_D); T_j=25^\circ C$ 
**Figure 10: Typ. Drain-Source On-State Resistance**

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

**Figure 11: Typ. Gate Threshold Voltage**


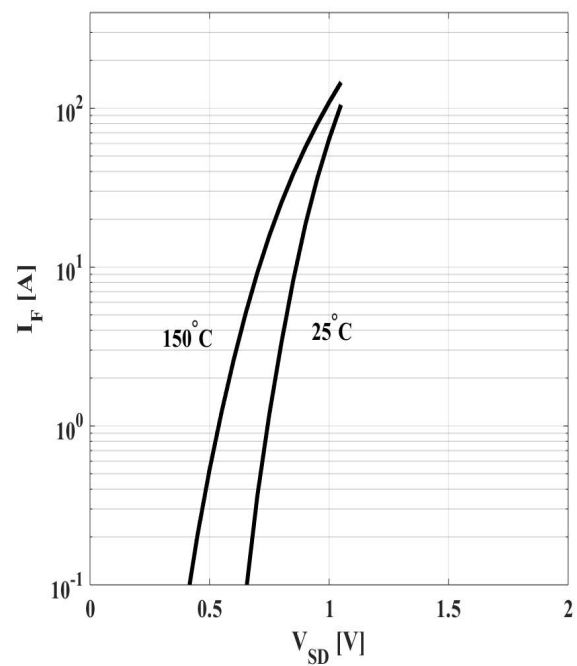
$$V_{GS(th)}=f(T_j); V_{GS}=V_{DS}; I_{DS}=250\mu A$$

**Figure 12: Typ. Gate Charge**


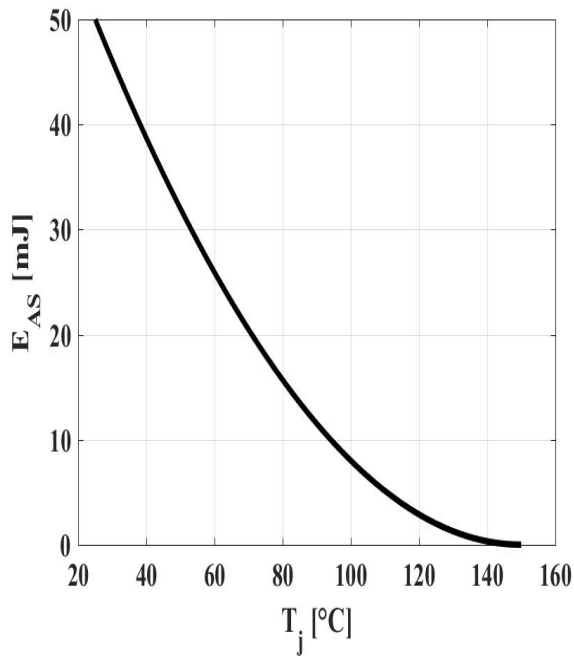
$$V_{GS}=f(Q_{gate}), I_D=50A \text{ pulsed}$$

**Figure 13: Drain-Source Breakdown Voltage**


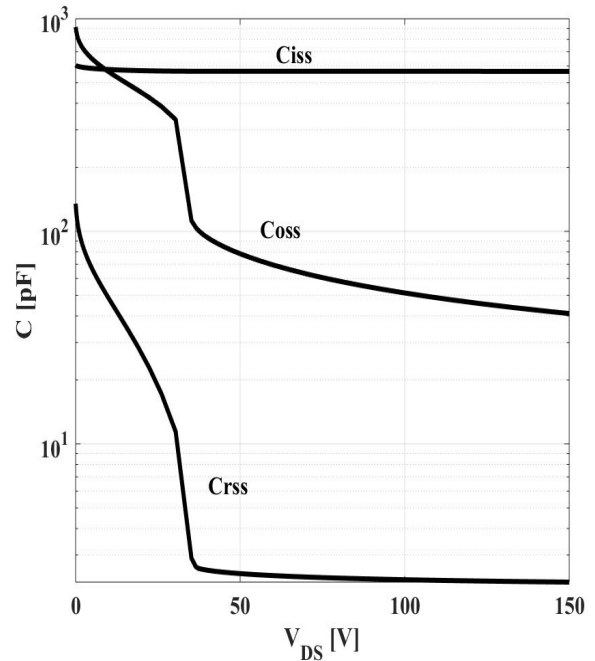
$$V_{BR(DSS)}=f(T_j); I_D=1mA$$

**Figure 14: Forward Characteristics of Reverse Diode**


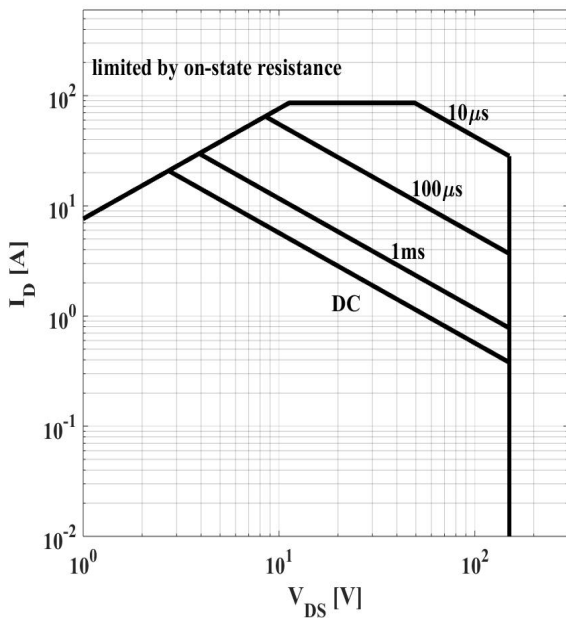
$$I_F=f(V_{SD}); \text{parameter: } T_j$$

**Figure 15: Avalanche Energy**


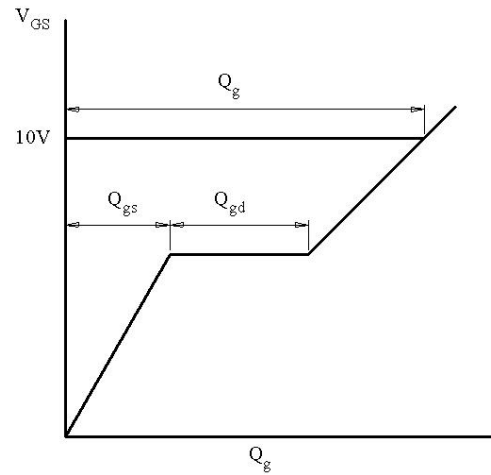
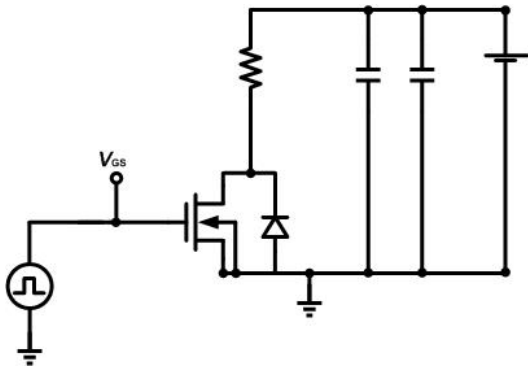
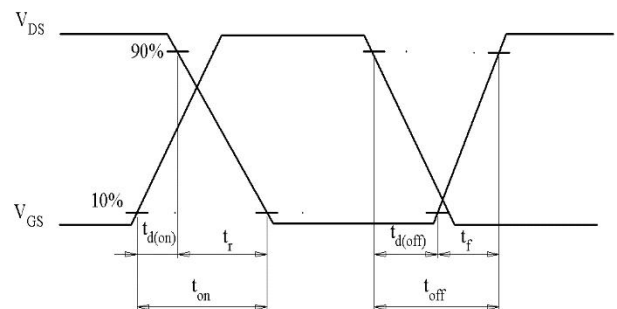
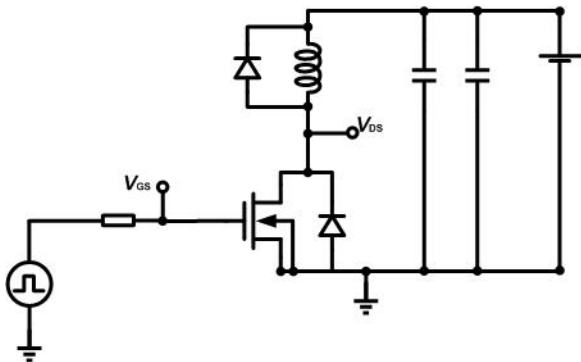
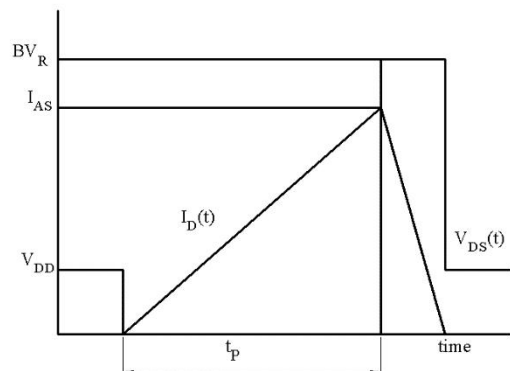
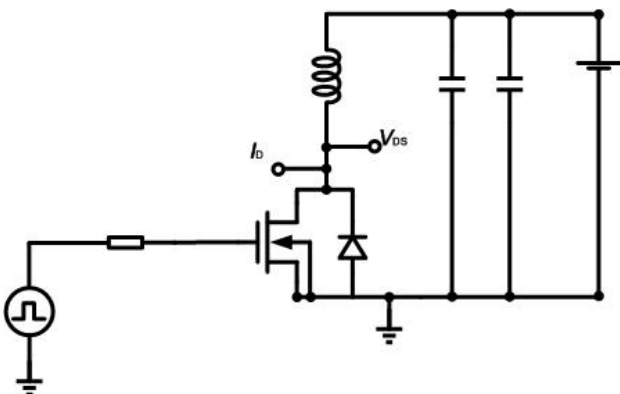
$$E_{AS}=f(T_j); I_D=20.0A; V_{DD}=50V$$

**Figure 16: Typ. Capacitances**


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

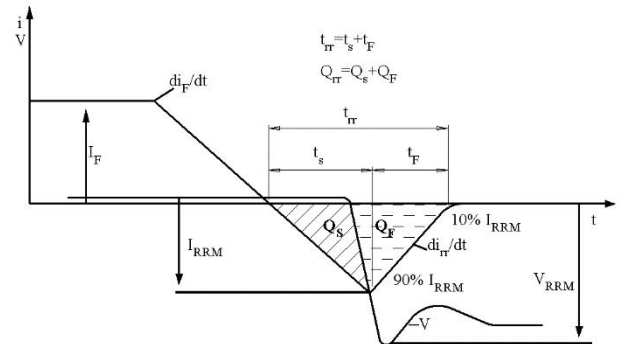
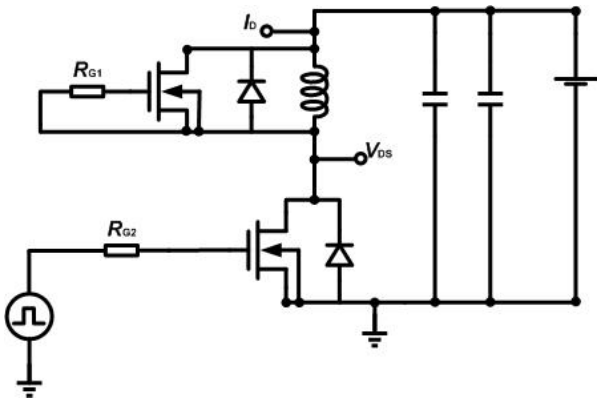
**Figure 17: Safe Operating Area**


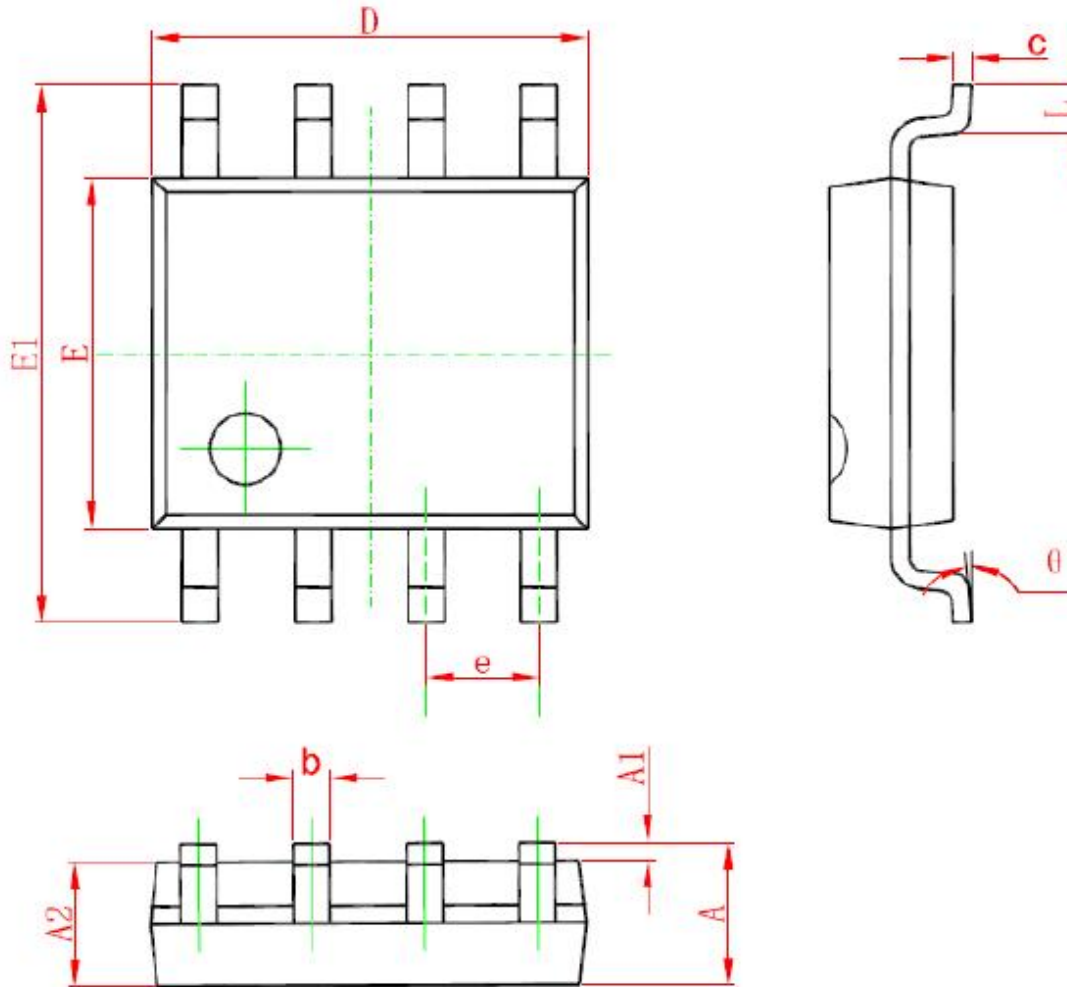
$$I_D=f(V_{DS}); T_C=25^{\circ}C; V_{GS}>7V; \text{parameter: } t_p$$

**Test Circuits**
**1. Gate Charge Test Circuit & Waveform**

**2. Switch Time Test Circuit**

**3. Unclamped Inductive Switching Test Circuit & Waveforms**


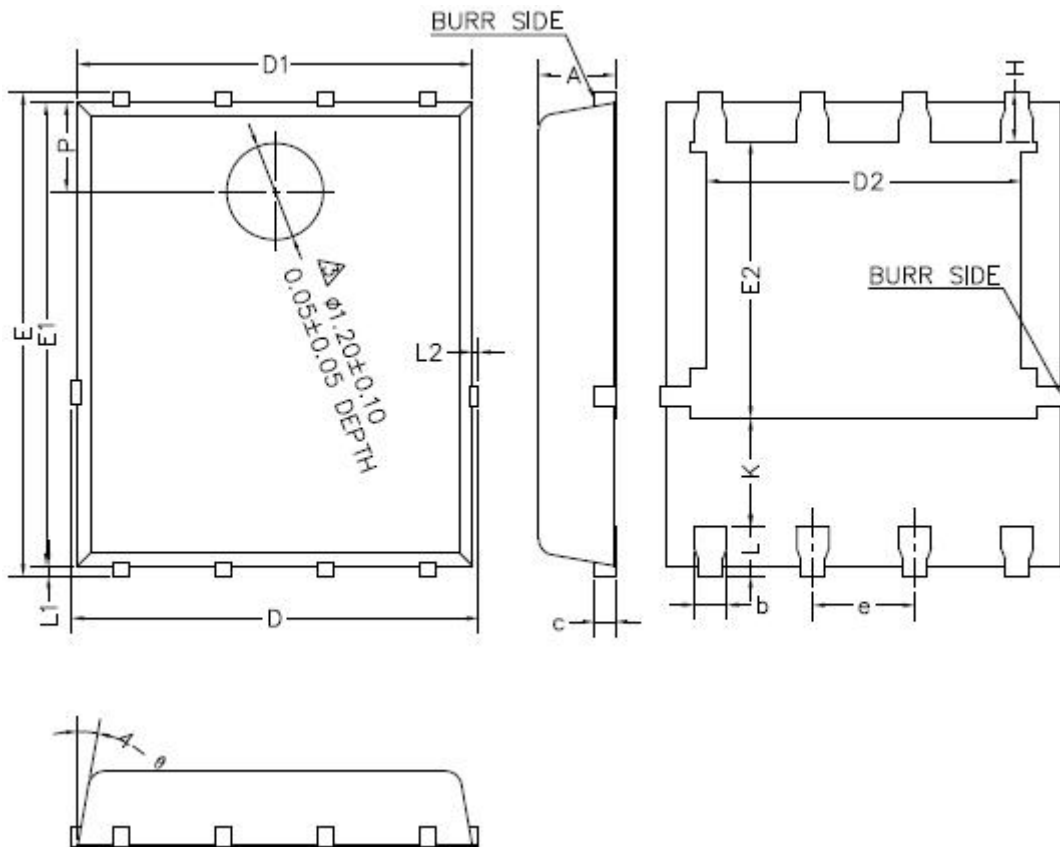


**4. Test Circuit and Waveform for Diode Characteristics**

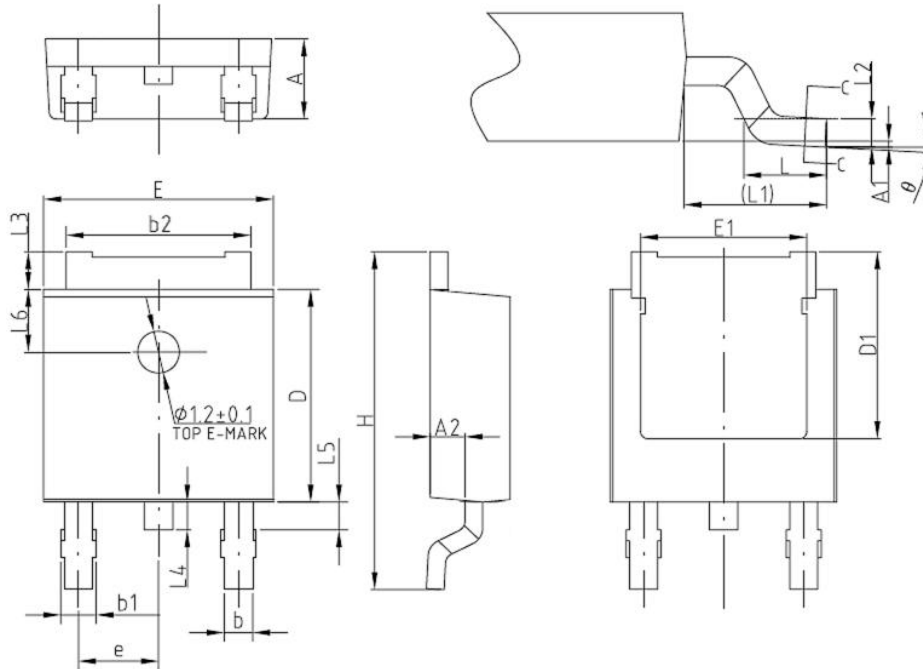


**Mechanical Dimensions**
**SOP-8**
**Unit: mm**


Symbol	Dimensions(mm)		
	Min.	Typ.	Max.
A	1.35	1.55	1.75
A1	0.05	0.15	0.25
A2	1.25	1.40	1.65
b	0.31	-	0.51
c	0.10	-	0.26
D	4.70	4.90	5.15
E	3.70	3.90	4.10
E1	5.80	6.00	6.20
e	1.27(BSC)		
L	0.40	-	1.27
θ	0°	-	8°

**Mechanical Dimensions**
**PDFN5\*6 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
$\theta$	8°	10°	12°

**Mechanical Dimensions**
**TO-252**
**Unit: mm**


Symbol	Dimensions(mm)		
	Min.	Typ.	Max.
A	2.20	2.30	2.40
A1	0	-	0.10
A2	0.90	1.00	1.17
b	0.70	0.76	0.90
b1	0.77	-	1.10
b2	5.13	5.33	5.46
c	0.45	-	0.60
D	5.95	6.10	6.25
D1	-	5.30	-
E	6.45	6.60	6.75
E1	-	4.80	-
e	2.286(BSC)		
H	9.70	10.10	10.40
L	1.25	1.50	1.75
L1	-	2.90	-
L2	-	0.51	-
L3	0.90	-	1.25
L4	-	0.80	-
L5	-	1.00	-
L6	-	1.80	-
θ	0°	-	8°



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**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