75mΩ, 150V, N-Channel Power MOSFET SRT15N750L

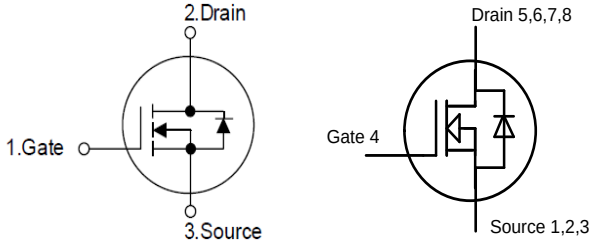
General Description

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.

Symbol



TO-252 PDFN5*6 SOP-8

Figure 1 Symbol of SRT15N750L

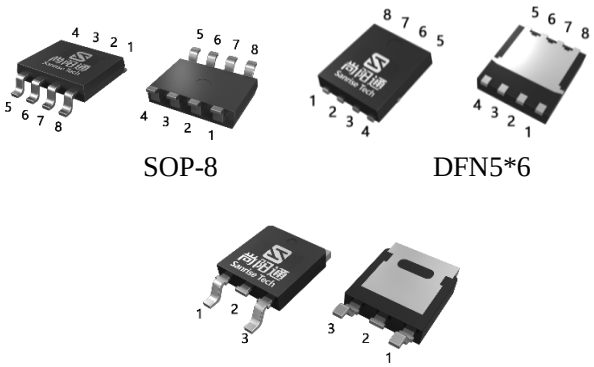
Features

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

Application

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

Package Type



SOP-8 DFN5*6

TO-252

Figure 2 Package Types of SRT15N750L

Ordering Information

SRT15N750L□□–□

Circuit Type

Package
D: TO-252
M: SOP-8
D56: PDFN5*6

E: Lead Free
G: Green
Blank: Tube
TR: Tape & Reel

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

75mΩ, 150V, N-Channel Power MOSFET SRT15N750L

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=25ºC	SOP8	I_D	8.2	A
		PDFN5*6		20.0	
		TO-252		18.2	
	T_C=100ºC	SOP8		4.5	
		PDFN5*6		14.0	
		TO-252		11.5	
Pulsed Drain Current (Note 2)		SOP8	I_{DM}	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	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}= 6.4A, V_{DD}= 50V, R_G= 25Ω, Starting T_J= 25°C
4. I_{AS_Limit}= 20A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C

Thermal Characteristics

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

75mΩ, 150V, N-Channel Power MOSFET **SRT15N750L**

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	150			V
Zero Gate Voltage Drain Current		I_{DSS}	V_{DS}=150V, 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	
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, Open Drain		4		Ω
Dynamic Characteristics							
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=1.6Ω, V_{GS}=10V		9		ns
Rise Time		t_r			7		
Turn-off Delay Time		$t_{d(off)}$			13		
Fall Time		t_f			4		
Gate Charge Characteristics							
Gate to Source Charge		Q_{gs}	V_{DD}=75V, I_D=10A V_{GS}=0 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
Reverse Diode Characteristics							
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 dI$_F$/dt=100A/us		35		ns
Reverse Recovery Charge		Q_{rr}			135		nC

Typical Performance Characteristics (TO252&TO-220C)

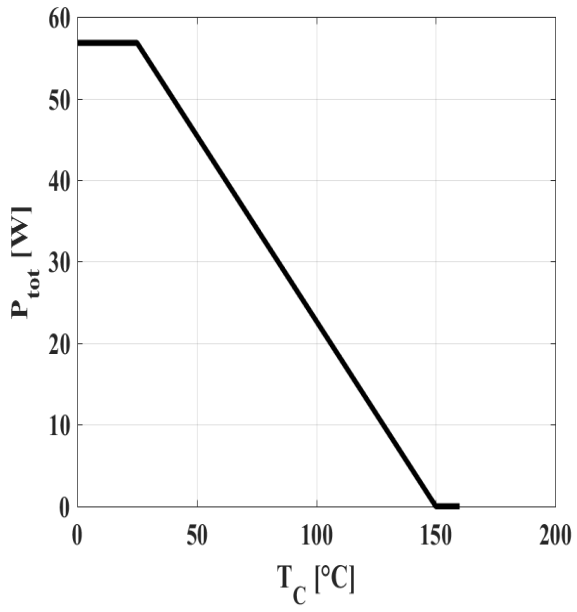
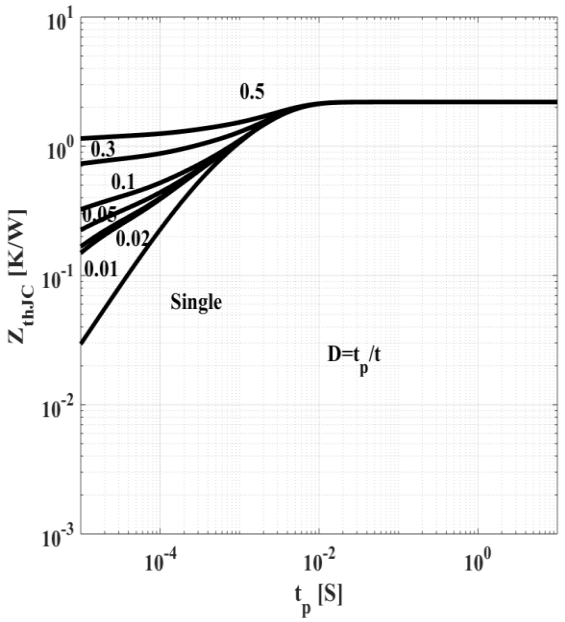
Figure 3: Power Dissipation	Figure 4: Max. Transient Thermal Impedance
	
$P_{tot}=f(T_c)$	$Z_{(thJC)}=f(t_p)$;parameter:$D=t_p/T$

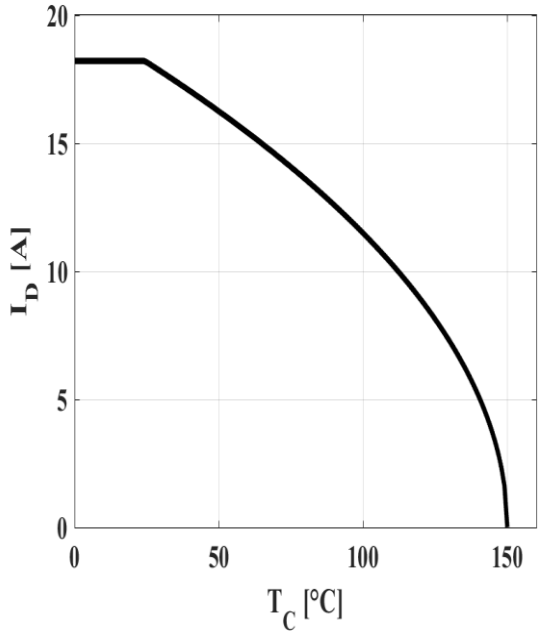
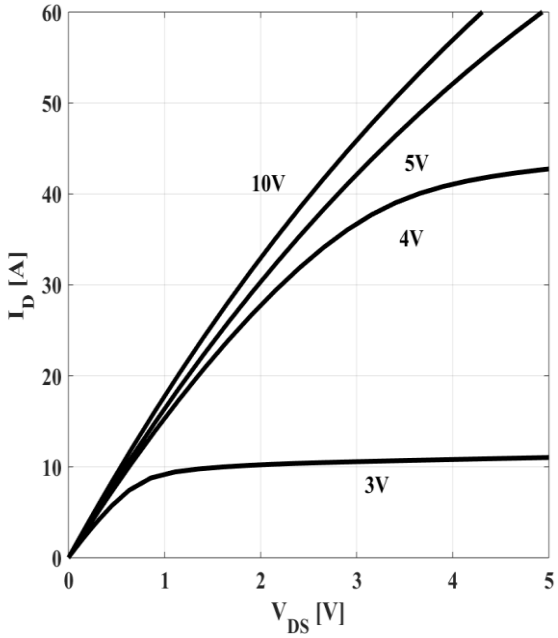
Figure 5: Drain Current	Figure 6: Typ. Output Characteristics
	
$I_D=f(T_C)$;$V_{GS}\geq 10V$	$I_D=f(V_{DS})$;Tj=25ºC; parameter:V_{GS}

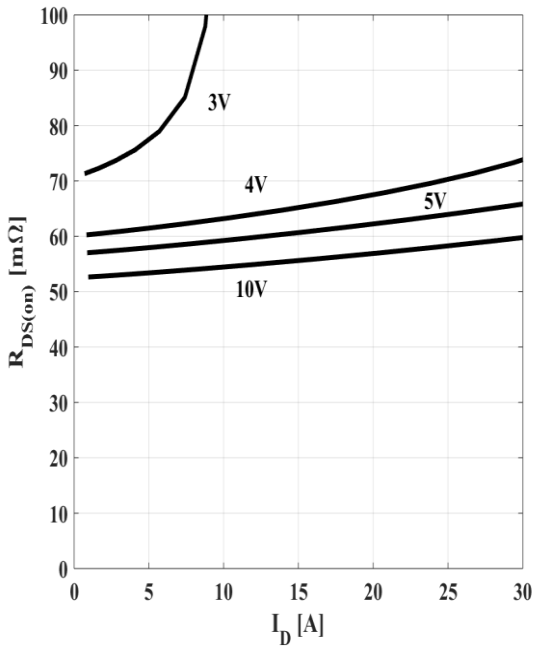
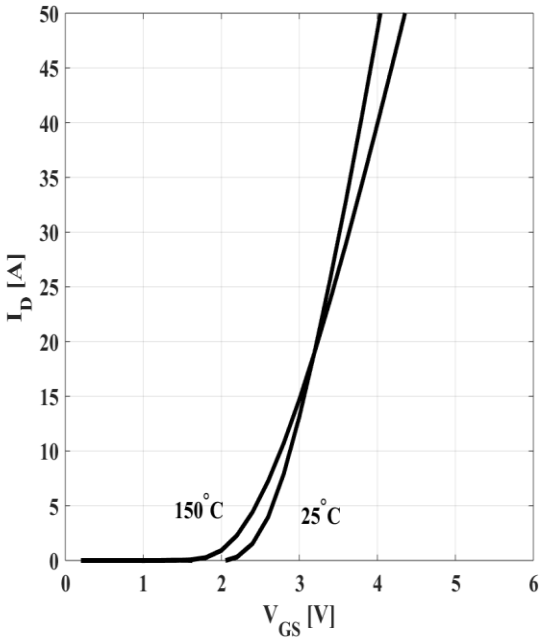
Figure7: Typ. Drain-Source On-State Resistance	Figure8: Typ. Transfer Characteristics
	
$R_{DS(ON)}$=f(I_D);T_j=25ºC; parameter:V_{GS}	I_D=f(V_{GS}); |V_{DS}|>2|I_D|$R_{DS(on)max}$; parameter: T_j

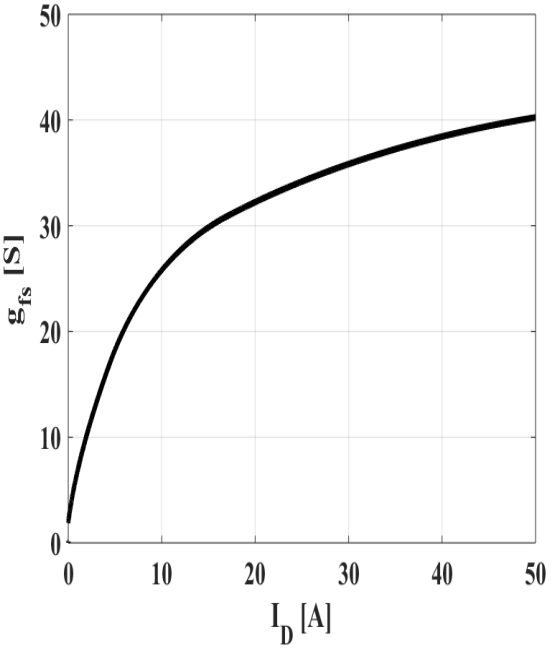
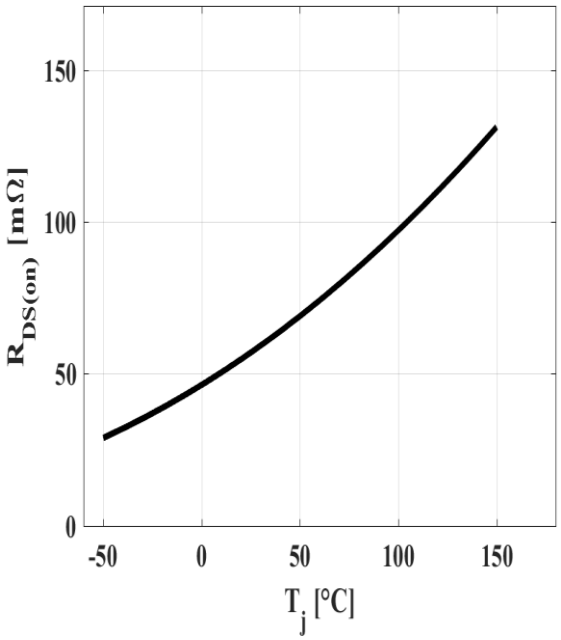
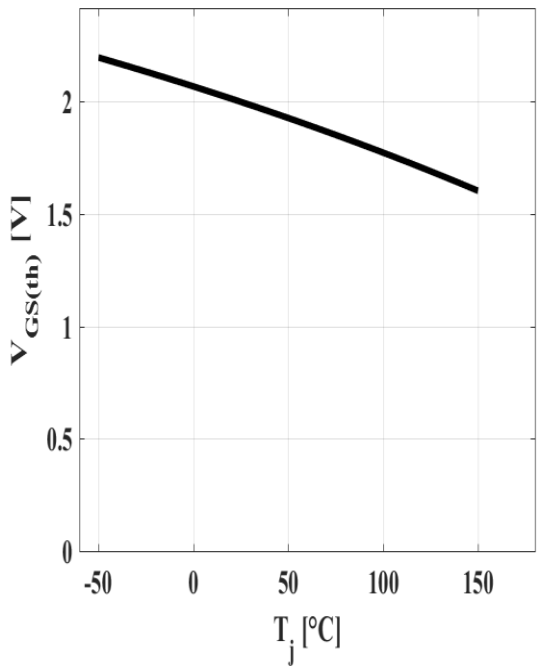
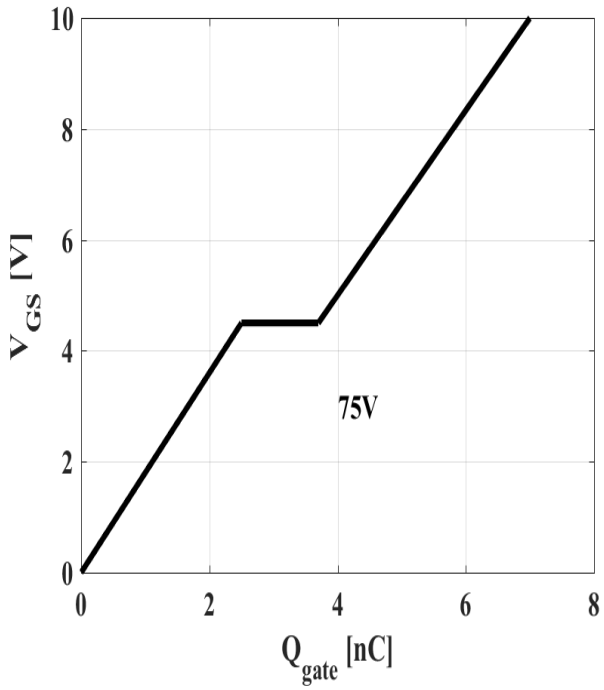
Figure 9: Typ. Forward Transconductance	Figure 10: Typ. Drain-Source On-State Resistance
	
g_{fs}=f(I_D); T_j=25°C	$R_{DS(ON)}$=f(T_j);I_D=10A;V_{GS}=10V

Figure11: Typ.Gate Threshold Voltage



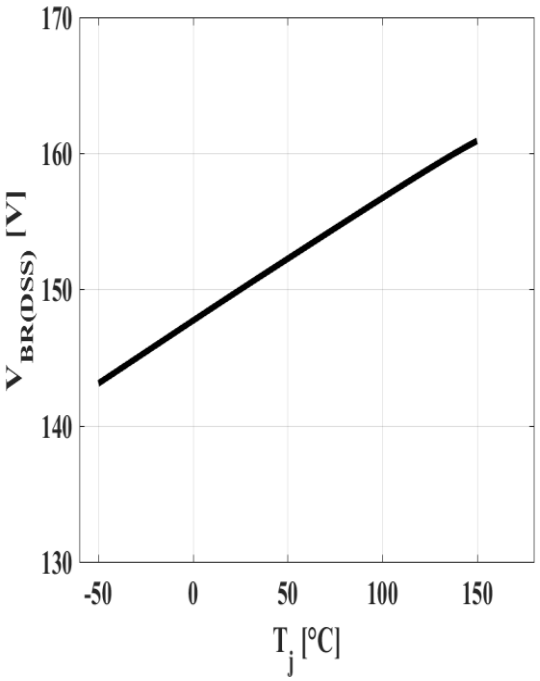
$V_{GS(th)}=f(T_j)$; $V_{GS}=V_{DS}$; $I_{DS}=250\mu A$

Figure 12: Typ. Gate Charge



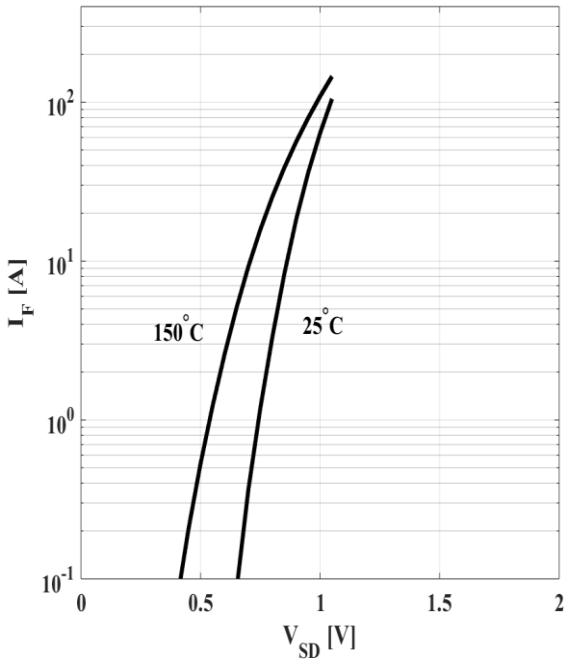
$V_{GS}= f(Q_{gate})$, $I_D=50A$ pulsed

Figure 13: Drain-Source Breakdown Voltage



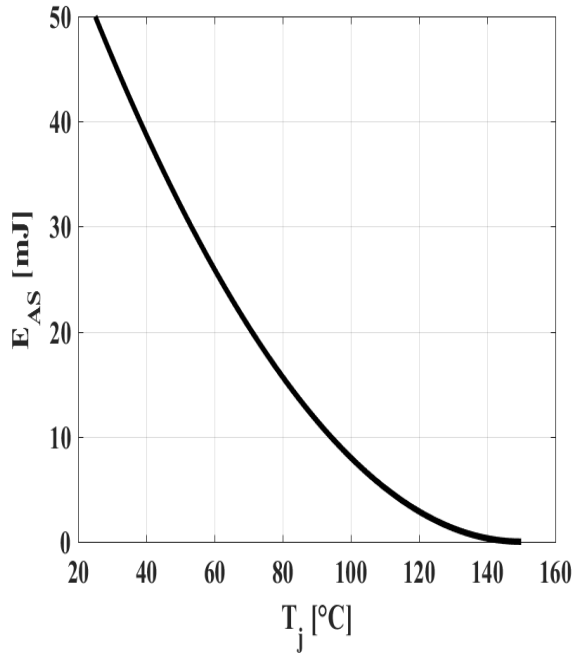
$V_{BR(DSS)}=f(T_j)$; $I_D=1mA$

Figure 14: Forward Characteristics of Reverse Diode



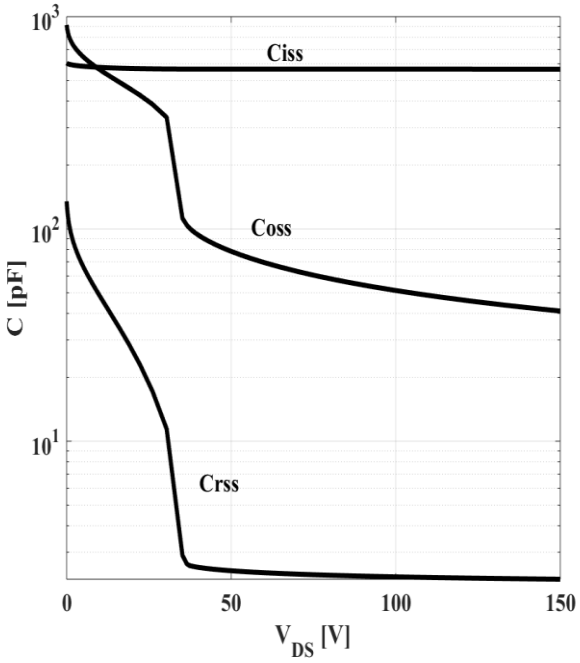
$I_F=f(V_{SD})$; parameter: T_j

Figure 15: Avalanche Energy



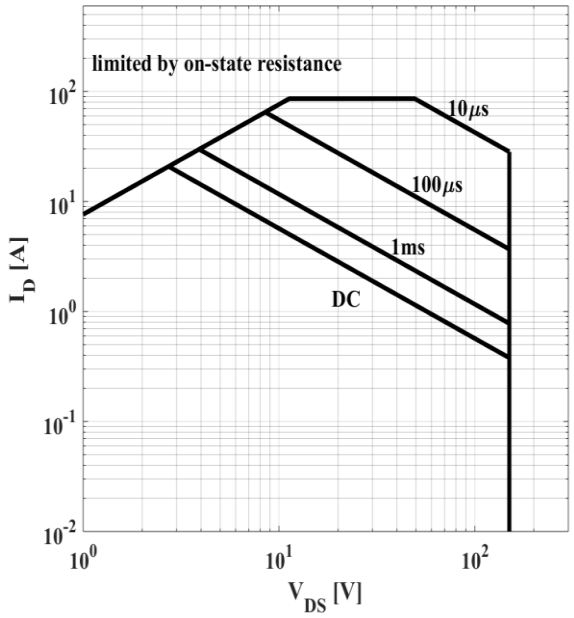
$E_{AS}=f(T_j)$;I_D=20.0A; V_{DD}=50V

Figure 16: Typ. Capacitances



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

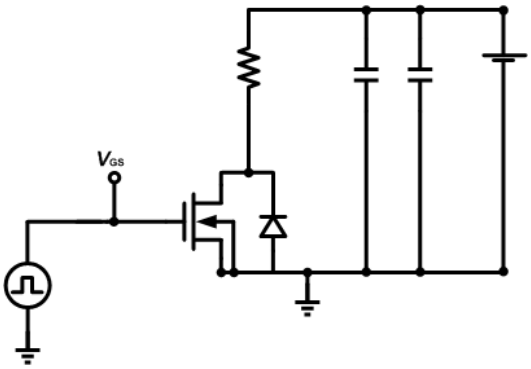
Figure 17: Safe Operating Area

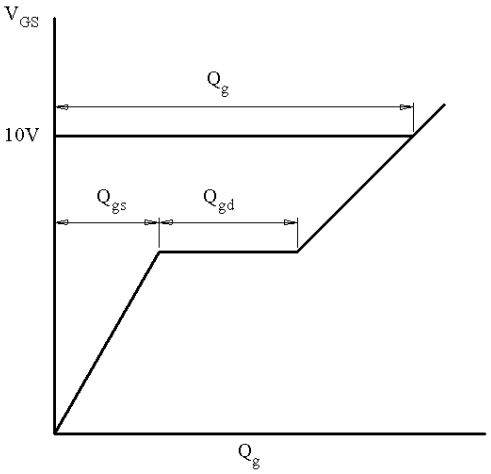


$I_D=f(V_{DS})$; T_C=25ºC;V_{GS}>7V; parameter: t_p

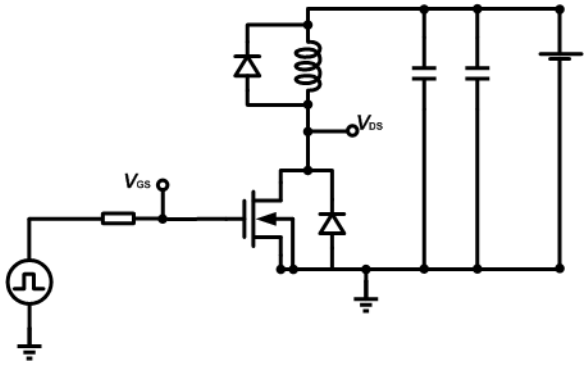
Test Circuits

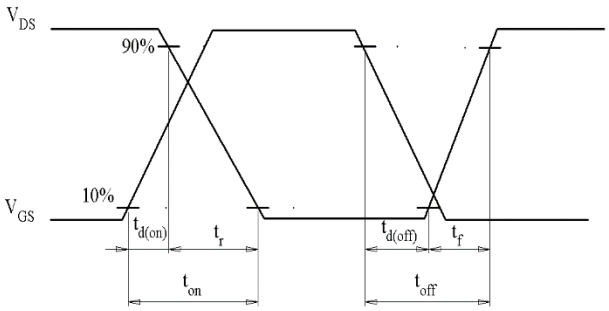
1. Gate Charge Test Circuit & Waveform



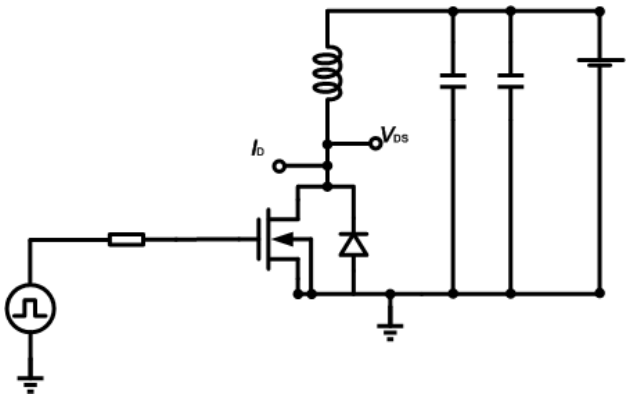


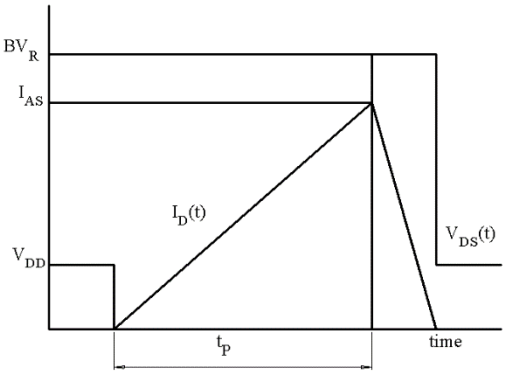
2. Switch Time Test Circuit



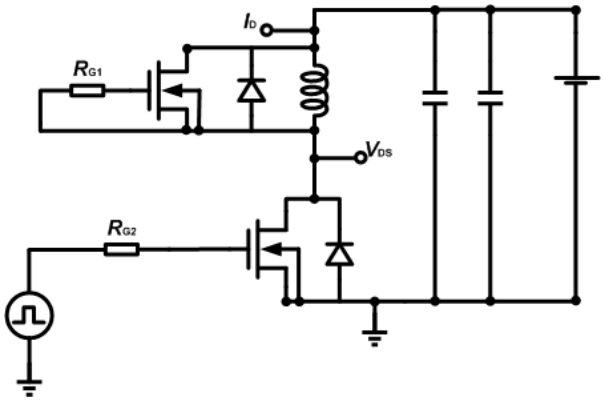


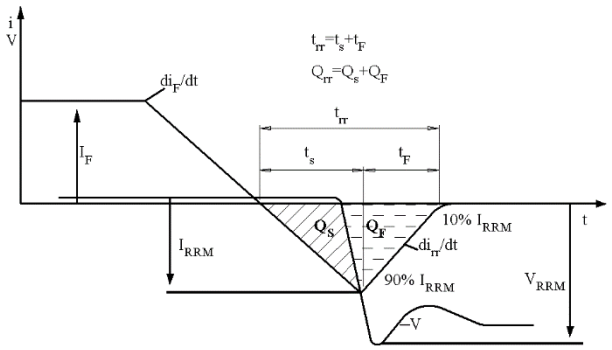
3. Unclamped Inductive Switching Test Circuit & Waveforms





4. Test Circuit and Waveform for Diode Characteristics

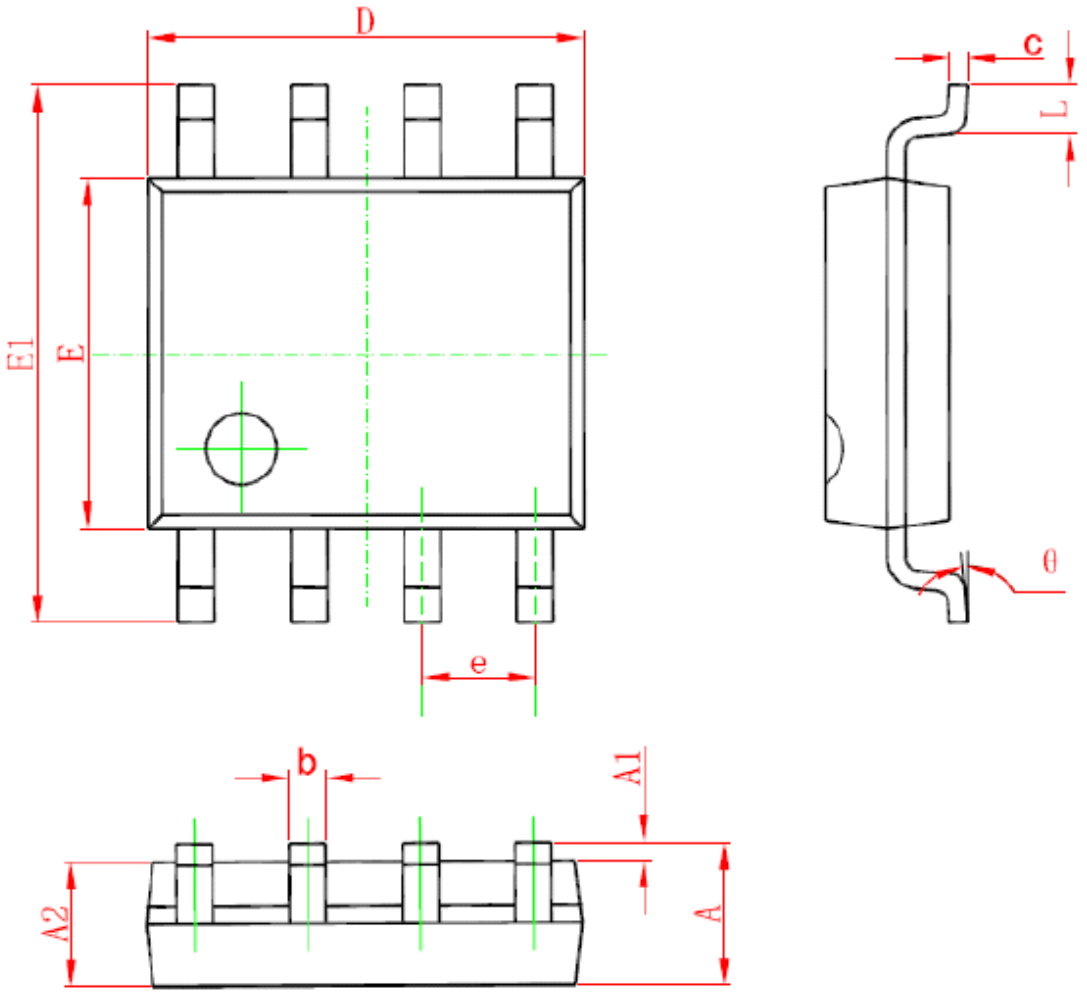




75mΩ, 150V, N-Channel Power MOSFET **SRT15N750L**

Mechanical Dimensions

SOP-8 **Unit: mm**

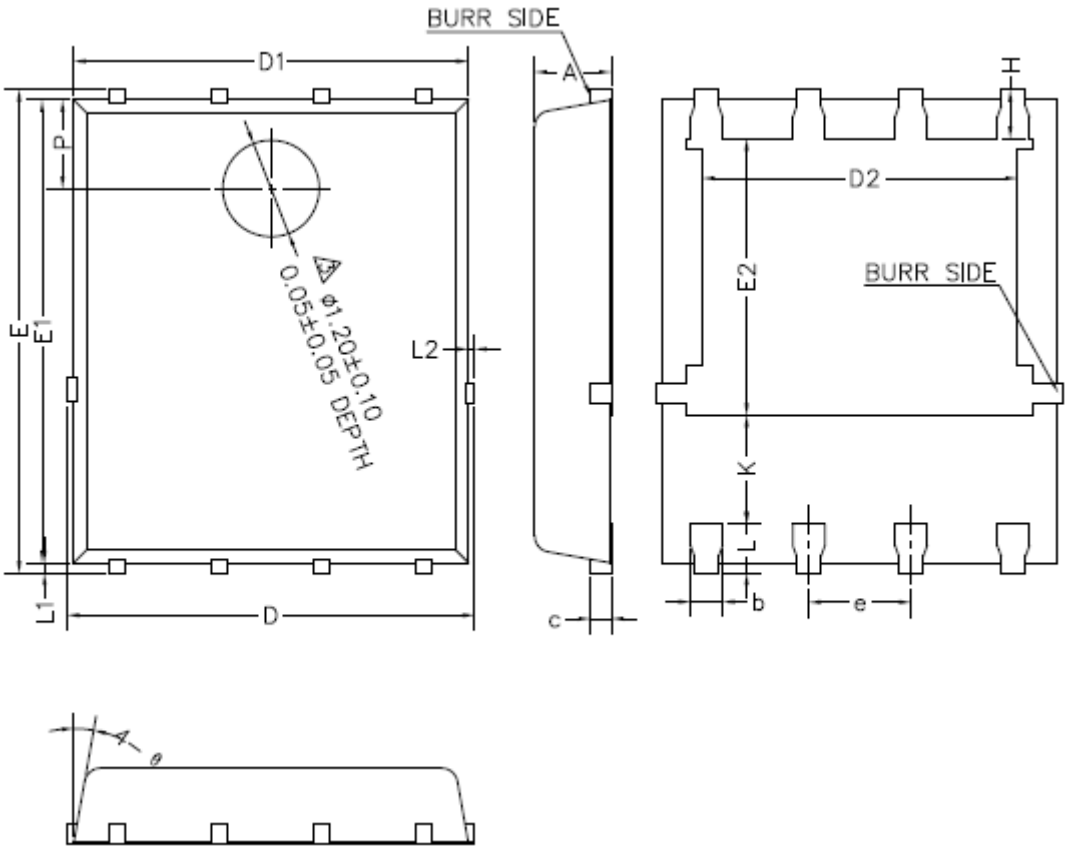


Symbol	Dimensions(mm)		
	Min.	Typ.	Max.
A	1.35	1.55	1.75
A1	0.05	0.15	0.25
A2	1.25	1.40	1.65
b	0.31	-	0.51
c	0.10	-	0.26
D	4.70	4.90	5.15
E	3.70	3.90	4.10
E1	5.80	6.00	6.20
e	1.27(BSC)		
L	0.40	-	1.27
θ	0°	-	8°

75mΩ, 150V, N-Channel Power MOSFET **SRT15N750L**

Mechanical Dimensions

PDFN5*6 **Unit: mm**

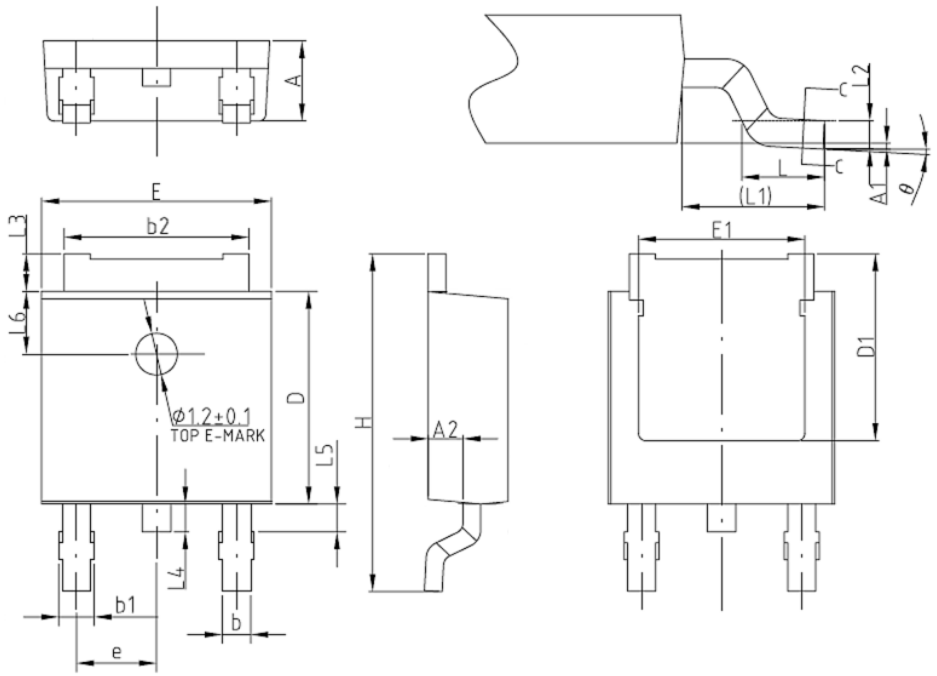


Symbol	Dimensions(mm)		
	Min.	Typ.	Max.
A	0.90	1.10	1.20
b	0.35	0.40	0.45
c	0.21	0.25	0.34
D			5.10
D1	4,80	4.90	5.00
D2	3.91	4.01	4.11
e	1.17	1.27	1.37
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.34	3.44	3.54
H	0.51	0.61	0.71
K	1.10		
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
L2			0.10
P	1.00	1.10	1.20
θ	8°	10°	12°

75mΩ, 150V, N-Channel Power MOSFET SRT15N750L

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°

75mΩ, 150V, N-Channel Power MOSFET SRT15N750L

Sanrise Technology Limited Company

http://www.sanrise-tech.com

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