

**-30V, -80A P-CHANNEL POWER MOSFET**

**GENERAL DESCRIPTION**

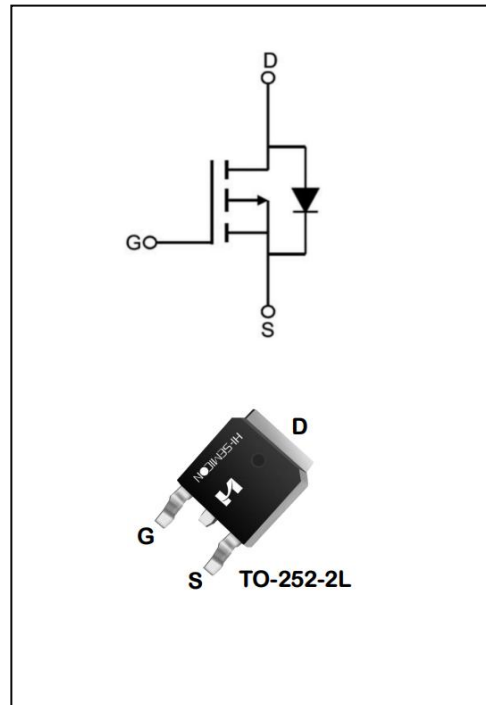
The SFD3008PT use advanced trench technology and design to provide excellent  $R_{DS(on)}$  with low gate charge. It can be used in a wide variety applications.

**Features**

- ◆  $V_{DS}=-30V, I_D=-80A$
- ◆  $R_{DS(on)}$   
 TYP:6.8mΩ@ $V_{GS}=-10V$   
 TYP:9.5mΩ@ $V_{GS}=-4.5V$

**Applications**

- ◆ Power faction correction (PFC)
- ◆ Switched mode power supplies (SMPS)
- ◆ Uninterruptible power supply (UPS)
- ◆ LED lighting power



**ORDERING INFORMATION**

Part No.	Package	Marking	Material	Packing
SFD3008PT	TO-252-2L	SFD3008PT	Pb free	Reel

**ABSOLUTE MAXIMUM RATINGS (T<sub>J</sub>=25°C unless otherwise noted)**

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V <sub>DS</sub>	-30	V
Gate-Source Voltage		V <sub>GS</sub>	±20	V
Drain Current	T <sub>C</sub> = 25°C	I <sub>D</sub>	-80	A
	T <sub>C</sub> = 100°C		-56	
Drain Current Pulsed (Note 1)		I <sub>DM</sub>	-320	A
Power Dissipation(T <sub>C</sub> =25°C)		P <sub>D</sub>	51	W
Single Pulsed Avalanche Energy (Note 2)		E <sub>AS</sub>	324	mJ
Operation Junction Temperature Range		T <sub>J</sub>	-55~+150	°C
Storage Temperature Range		T <sub>stg</sub>	-55~+150	°C
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		TL	300	°C

**THERMAL CHARACTERISTICS**

Characteristics	Symbol	MAX	Unit
Thermal Resistance, Junction-to-Case	R <sub>θJC</sub>	2.45	°C/W
Thermal Resistance, Junction-to-Ambient	R <sub>θJA</sub>	42.8	°C/W

**ELECTRICAL CHARACTERISTICS**

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain -Source Breakdown Voltage	B <sub>VDS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-30	--	--	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V	--	--	-1	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =20V, V <sub>DS</sub> =0V	--	--	100	nA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V	--	--	-100	
<b>On Characteristics</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> =-250μA	-1.0	-1.5	-2.5	V
Static Drain- Source On State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-20A	--	6.8	9.5	mΩ
	R <sub>DS(on)</sub>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-15A	--	9.5	13	
<b>Dynamic Characteristics</b>						
Gate Resistance	R <sub>g</sub>	V <sub>GS</sub> =0V; f=1.0MHZ	1	--	10	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-15V V <sub>GS</sub> =0 f=1.0MHZ	--	3142	--	pF
Output Capacitance	C <sub>oss</sub>		--	424	--	
Reverse Transfer Capacitance	C <sub>rss</sub>		--	420	--	
<b>Switching Characteristics</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-15V, V <sub>GS</sub> =-10V R <sub>G</sub> =2.5Ω, I <sub>D</sub> =-15A	--	13	--	ns
Turn-on Rise Time	t <sub>r</sub>		--	47	--	
Turn-off Delay Time	t <sub>d(off)</sub>	V <sub>DD</sub> =-15V, V <sub>GS</sub> =-10V R <sub>G</sub> =2.5Ω, I <sub>D</sub> =-15A	--	99	--	ns
Turn-off Fall Time	t <sub>f</sub>		--	22	--	

Total Gate Charge	$Q_g$	$V_{DS}=-15V, I_D=-15A$ $V_{GS}=-10V$	--	65	--	nc
Gate-Source Charge	$Q_{gs}$		--	9	--	
Gate-Drain Charge	$Q_{gd}$		--	15	--	

**SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS**

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	$I_S$	Integral Reverse P-N Junction Diode in the MOSFET	--	--	-80	A
Pulsed Source Current	$I_{SM}$		--	--	-320	
Diode Forward Voltage	$V_{SD}$	$I_S=-20A, V_{GS}=0V$	--	-0.8	-1.2	V

- 1.Pulse width limited by maximum junction temperature
- 2.L=0.5mH,  $V_{DD}=-20V$ ,  $R_G=25\Omega$ , starting  $T_J=25^\circ C$
- 3.Pulse Test: Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$
- 4.Essentially independent of operating temperature

Typical Performance Characteristics

Fig.1 Power Dissipation Derating Curve

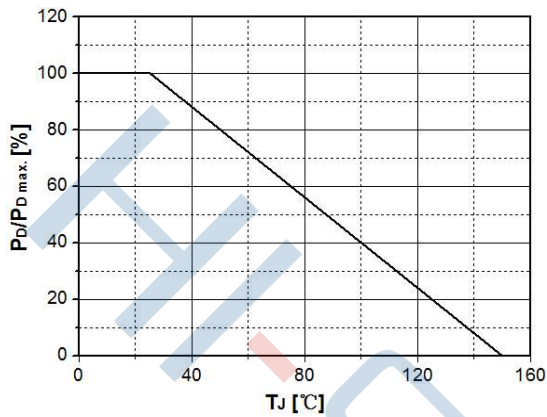


Fig.2 Avalanche Energy Derating Curve vs. Junction Temperature

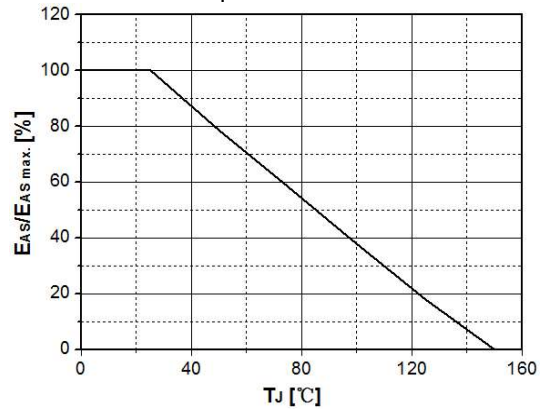


Fig.3 Typical Output Characteristics

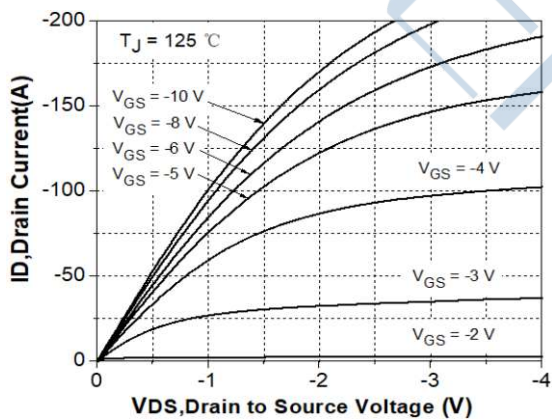


Fig. 4 Transconductance vs. Drain Current

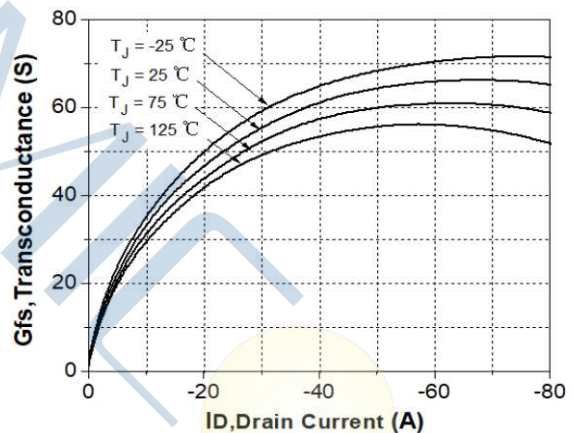


Fig.5 Typical Transfer Characteristics

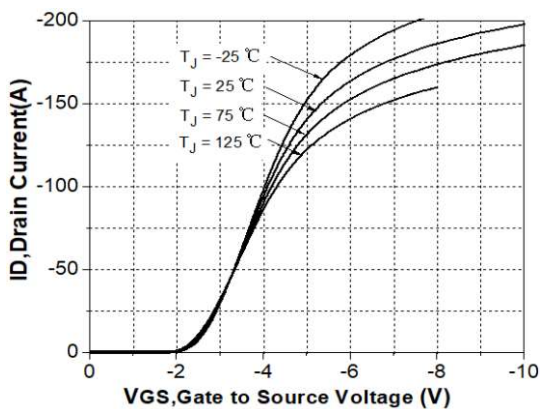
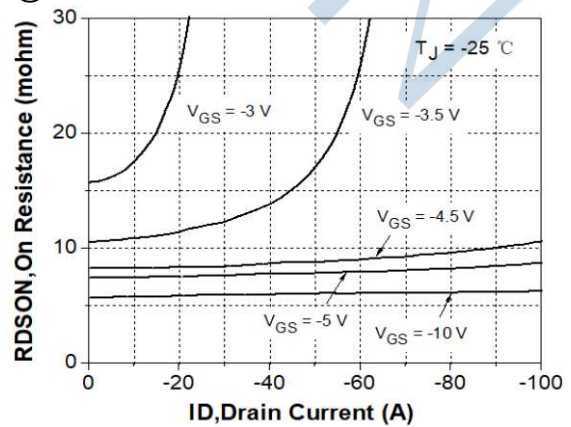


Fig. 6 State Resistance vs. Drain Current @-25°C



Typical Performance Characteristics

Fig.7 State Resistance vs. Drain Current @25°C

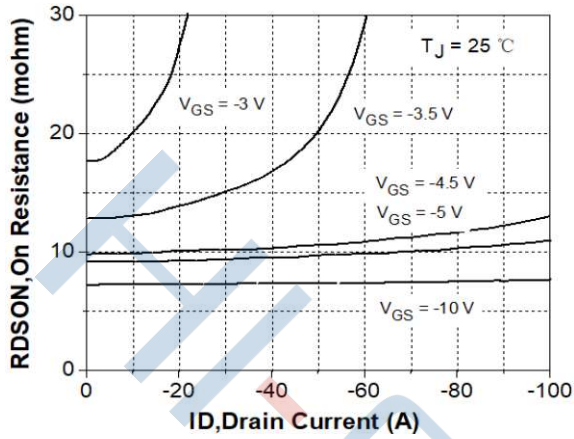


Fig. 8 State Resistance vs. Drain Current @125°C

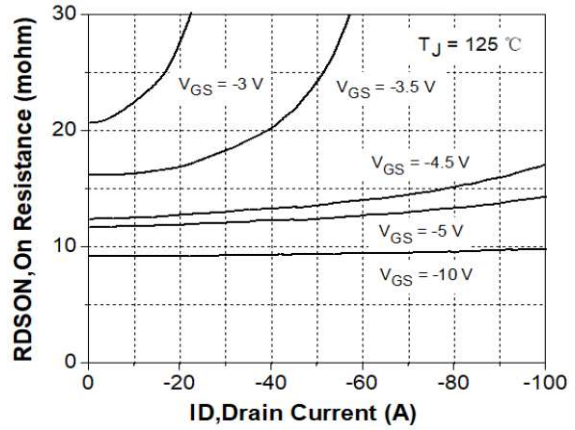


Fig.9 Typical Capacitance vs. Drain Source Voltage

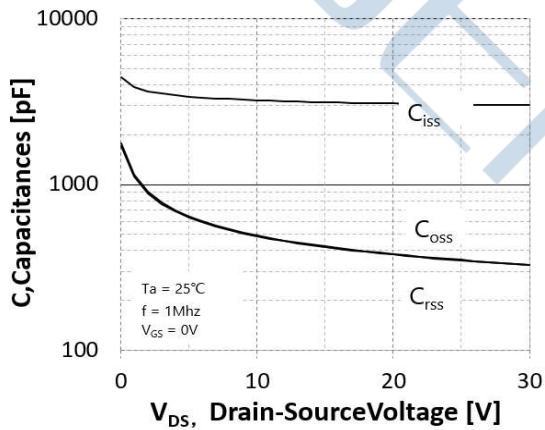


Fig.10 Dynamic Input Characteristics

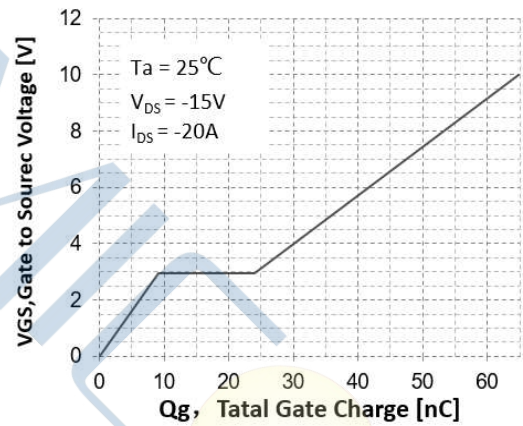


Fig.11 Breakdown Voltage vs. Junction Temperature

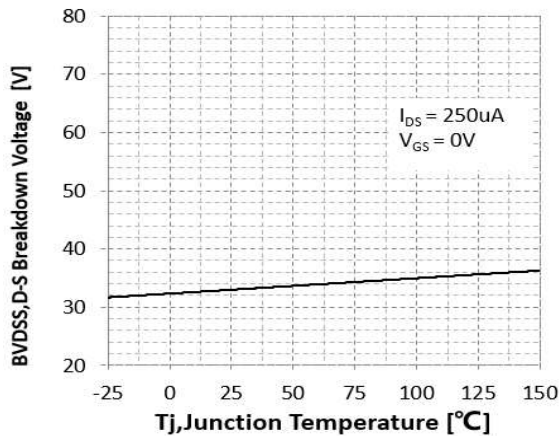
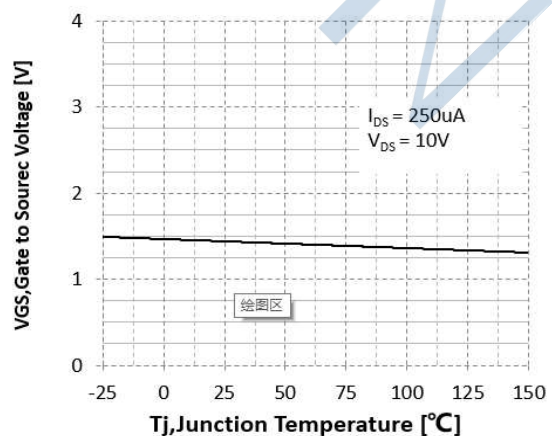


Fig. 12 Gate Threshold Voltage vs. Junction Temperature





Typical Performance Characteristics

Fig.13 On-Resistance Variation vs. Junction Temperature

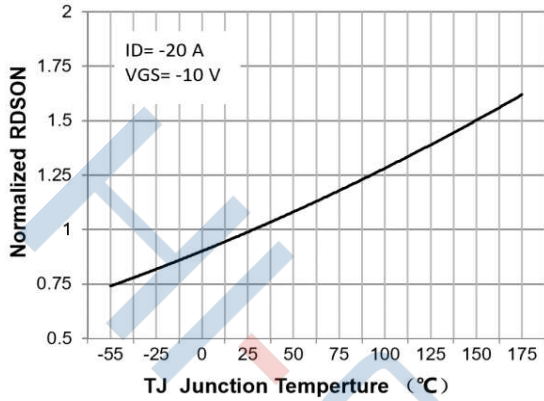


Fig.14 Maximum Drain Current vs. Case Temperature

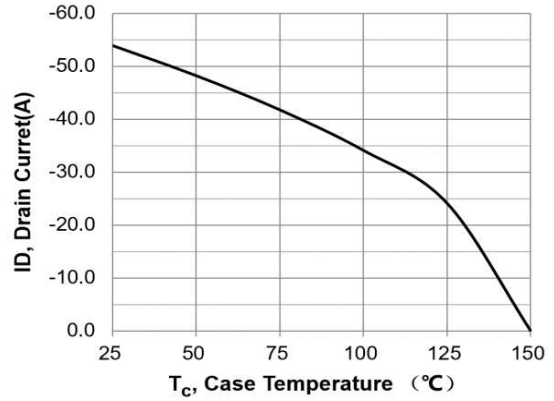


Fig.15 Body Diode Forward Voltage Vs Reverse Drain Current

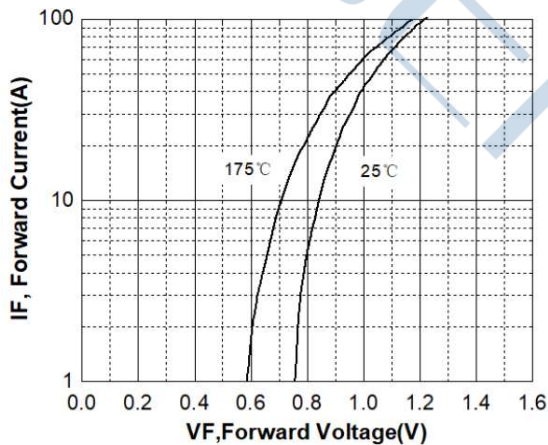


Fig.16 Safe Operating Area

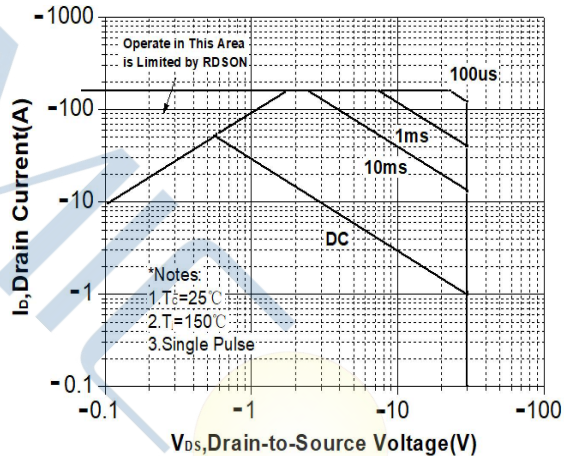
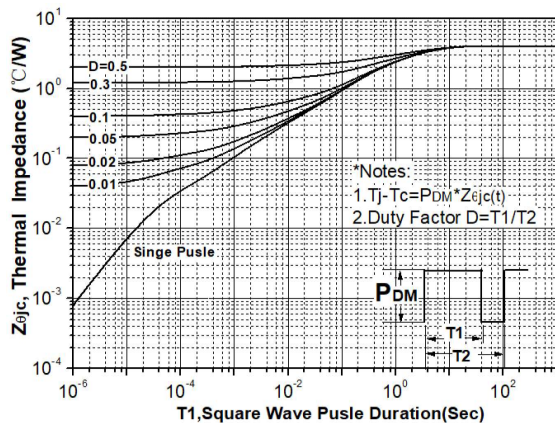
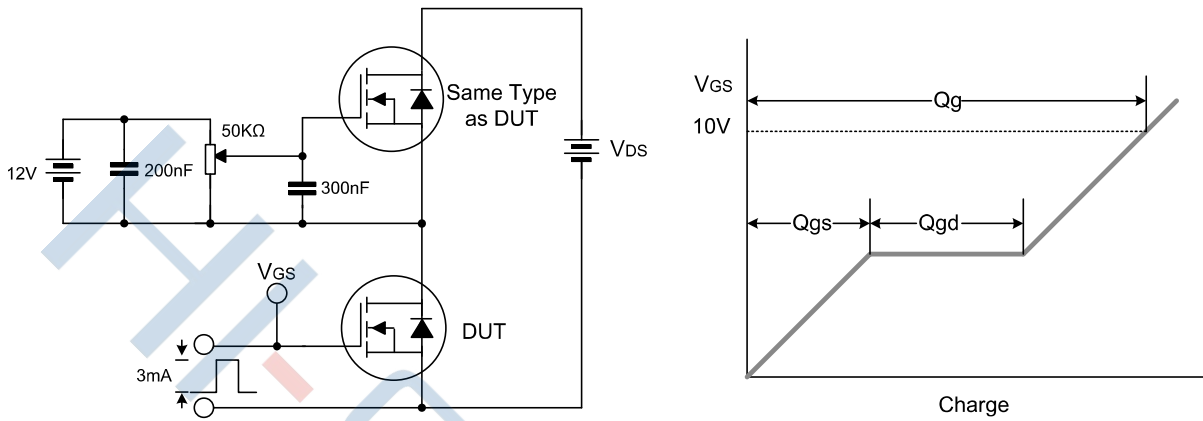


Fig. 17 Transient Thermal Response Curve

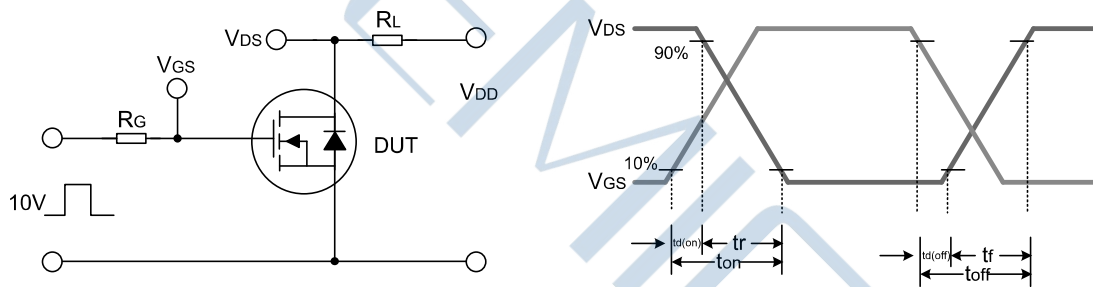


Test Circuit

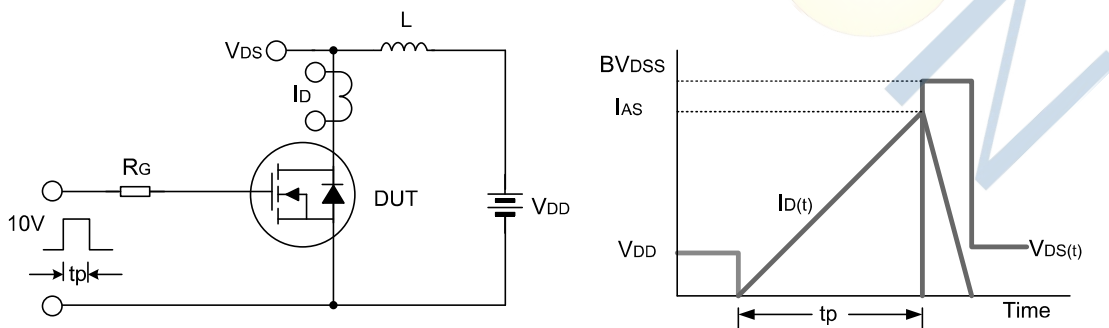
Gate Charge Test Circuit & Waveform



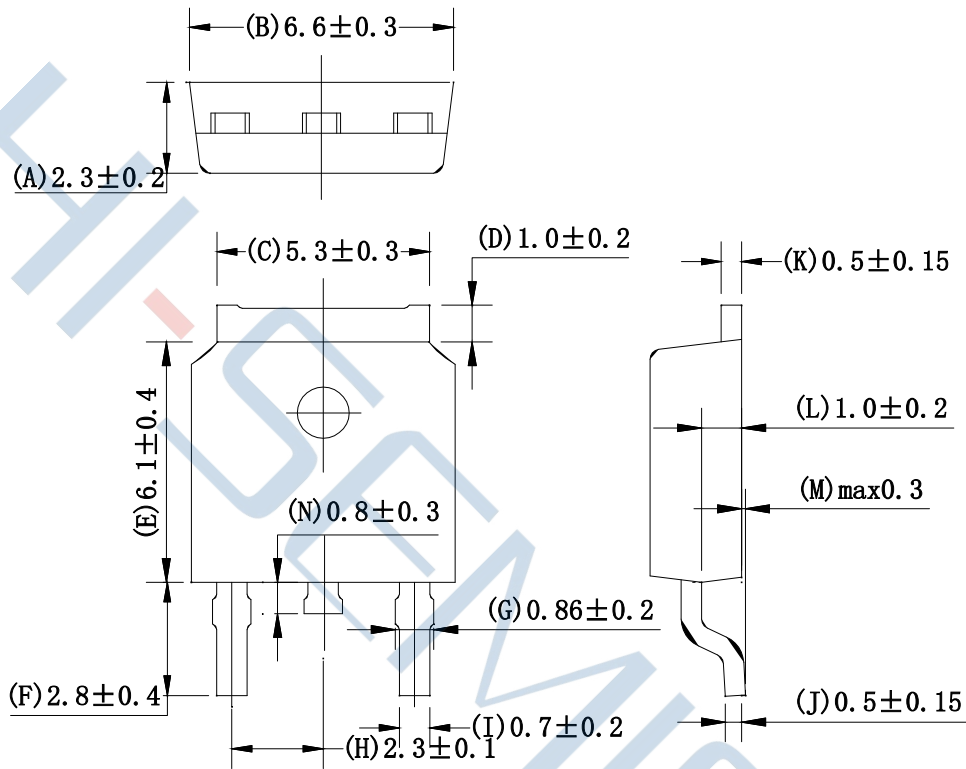
Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



Package Dimensions of TO-252-2L





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