

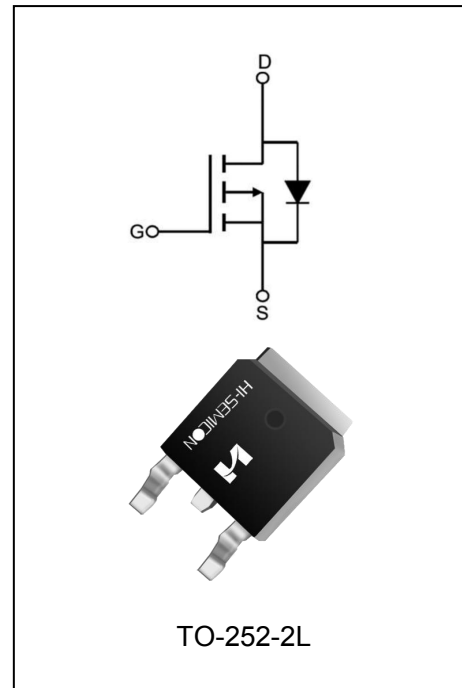
-40A,-40V P-CHANNEL MOSFET

GENERAL DESCRIPTION

The SFD4004PT uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge. It can be used in a wide variety of applications. Such as: PWM Applications, Power Management

FEATURES

- ◆ $V_{DS}=-40V, I_D=-40A$
- ◆ $R_{DS(on)}=15m\Omega(Typ)@V_{GS}=-10V, I_D=-10A$
- ◆ $R_{DS(on)}=20m\Omega(Typ)@V_{GS}=-4.5V, I_D=-10A$
- ◆ Advance Trench Technology
- ◆ Fast Switching and High efficiency
- ◆ Lead Free and Green Devices Available: Rohs Compliant



ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SFD4004PT	TO-252-2L	SFD4004PT	Pb Free	Reel

ABSOLUTE MAXIMUM RATINGS (T_C=25°C unless otherwise noted)

Characteristics	Symbol	Ratings	Unit
Drain-Source Voltage	V _{DS}	-40	V
Gate-Source Voltage	V _{GS}	± 20	V
Drain Current	I _D	T _C = 25°C	-40
		T _C = 100°C	-28
Drain Current Pulsed(Note 1)	I _{DM}	-160	A
Power Dissipation(T _C =25°C)	P _D	80	W
Single Pulsed Avalanche Energy (Note 2)	E _{AS}	523	mJ
Operation Junction Temperature Range	T _J	-55~+175	°C
Storage Temperature Range	T _{stg}	-55~+175	°C

THERMAL CHARACTERISTICS

Characteristics	Symbol	MAX	Unit
Thermal Resistance, Junction-to-Case	R _{θJC}	2.6	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	62.5	°C/W

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B _{VDS}	V _{GS} =0V, I _D =-250μA	-40	--	--	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-40V, V _{GS} =0V	--	--	100	nA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =20V, V _{DS} =0V	--	--	100	nA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =-20V, V _{DS} =0V	--	--	-100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{GS} = V _{DS} , I _D =-250μA	-1.0	-1.5	-2.5	V
Static Drain- Source On State Resistance(Note 3)	R _{DS(on)}	V _{GS} =-10V, I _D =-10A	--	15	20	mΩ
		V _{GS} =-4.5V, I _D =-10A	--	20	26	
Forward Transconductance	g _{FS}	V _{GS} =-5.0V, I _D =-12A	--	31	--	S
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =-20V V _{GS} =0V f=1.0MHZ	--	2520	--	pF
Output Capacitance	C _{oss}		--	320	--	
Reverse Transfer Capacitance	C _{rss}		--	305	--	
Total Gate Charge	Q _g	V _{DS} =-20V I _D =-12A V _{GS} =-10V (Note 3.4)	--	65	--	nC
Gate-Source Charge	Q _{gs}		--	12	--	
Gate-Drain Charge	Q _{gd}		--	13	--	
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} =-20V I _D =-12A V _{GS} =-10V R _G =2.5Ω (Note 3.4)	--	11	--	ns
Turn-on Rise Time	t _r		--	16	--	
Turn-off Delay Time	t _{d(off)}		--	35	--	

Turn-off Fall Time	t_f	$V_{DD}=-20V$ $I_D=-12A$ $V_{GS}=-12V$ $R_G=2.5\Omega$	--	25	--	ns
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SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

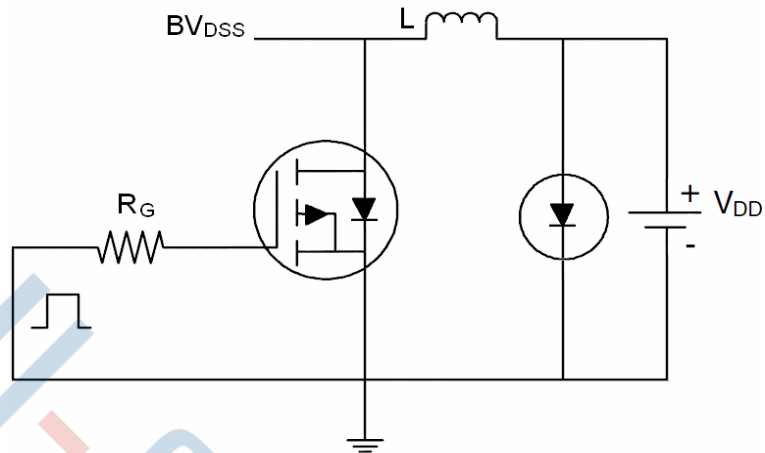
Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	--	--	-40	A
Pulsed Source Current	I_{SM}		--	--	-160	
Diode Forward Voltage	V_{SD}	$I_S=-12A, V_{GS}=0V$	--	--	1.2	V

Notes:

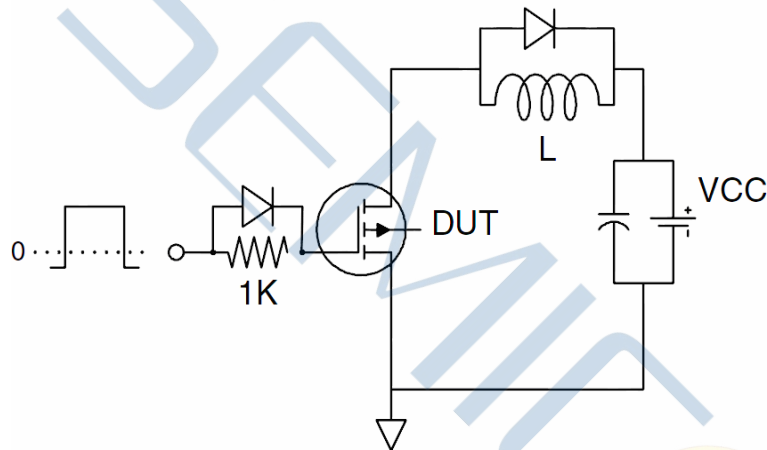
- 1.Pulse width limited by maximum junction temperature
- 2.L=0.5mH, $V_{DD}=-20V$, $V_G=-10V$, $R_G=25\Omega$, starting $T_J=25^\circ C$
- 3.Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
- 4.Essentially independent of operating temperature

TYPICAL TEST CIRCUIT

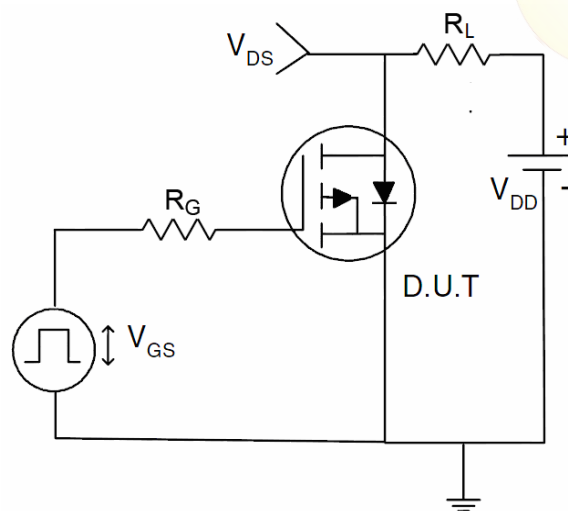
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



TYPICAL CHARACTERISTICS

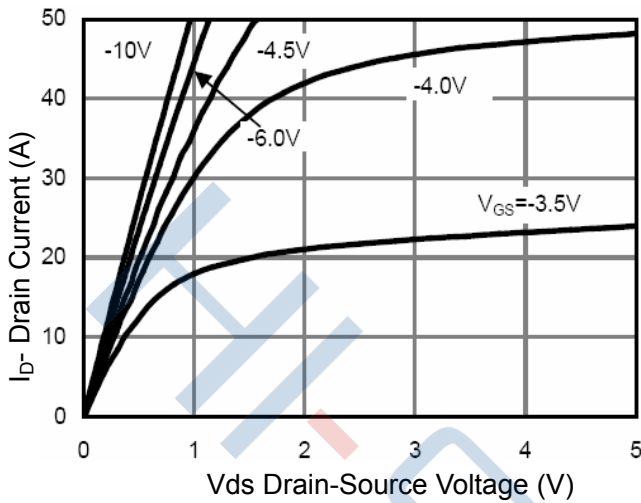


Figure 1 Output Characteristics

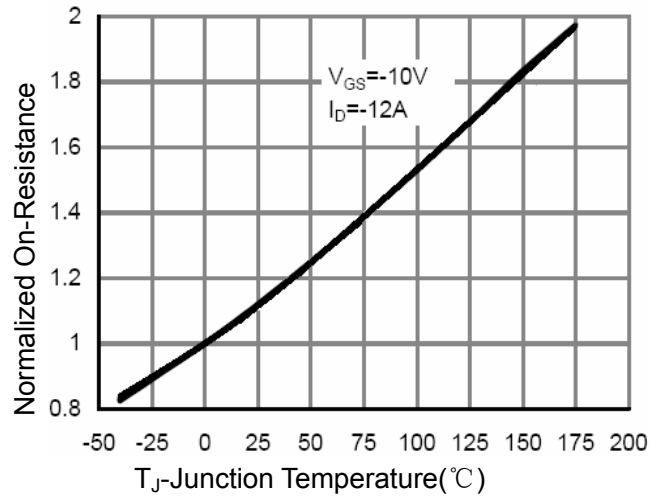


Figure 4 Rdson-Junction Temperature

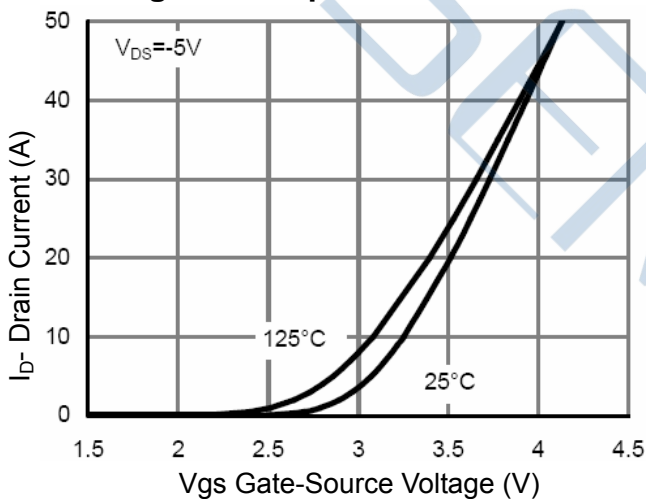


Figure 2 Transfer Characteristics

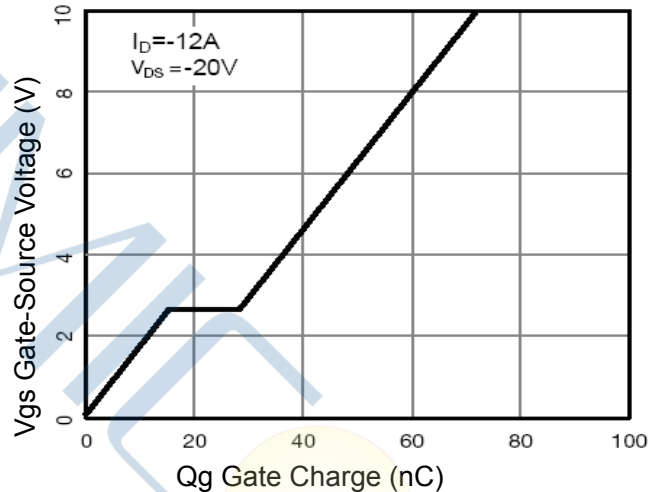


Figure 5 Gate Charge

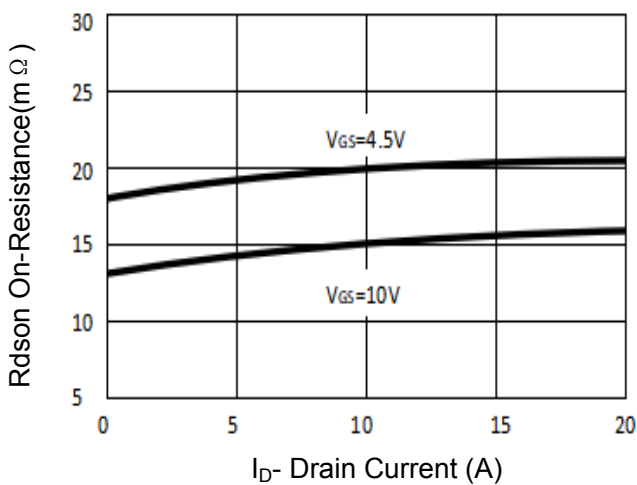


Figure 3 Rdson- Drain Current

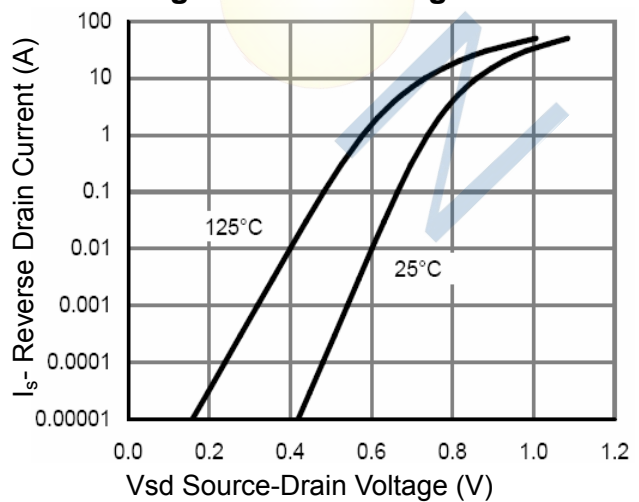


Figure 6 Source- Drain Diode Forward

TYPICAL CHARACTERISTICS

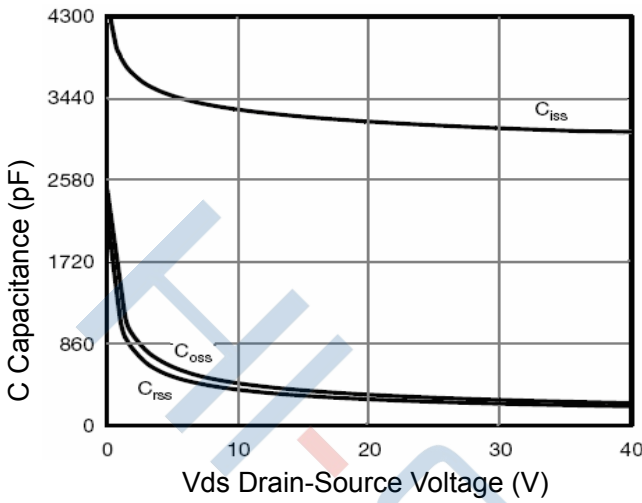


Figure 7 Capacitance vs Vds

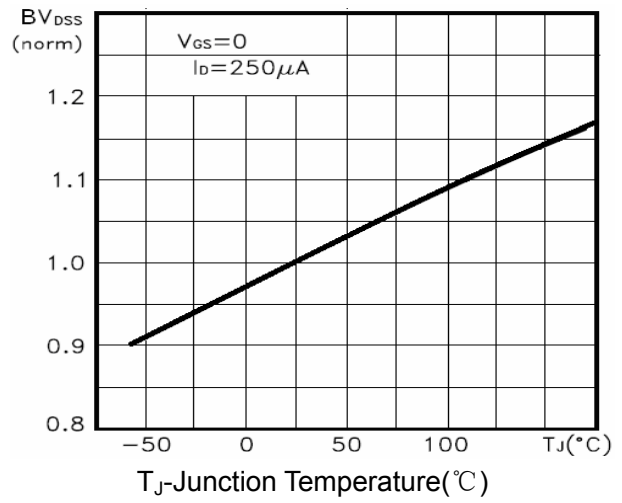


Figure 9 BV_{DSS} vs Junction Temperature

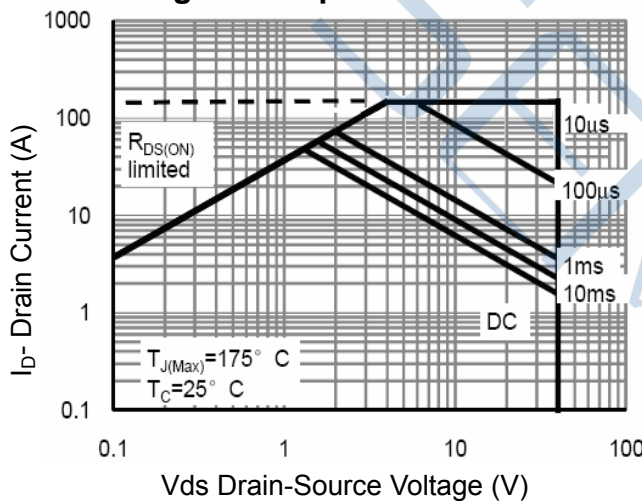


Figure 8 Safe Operation Area

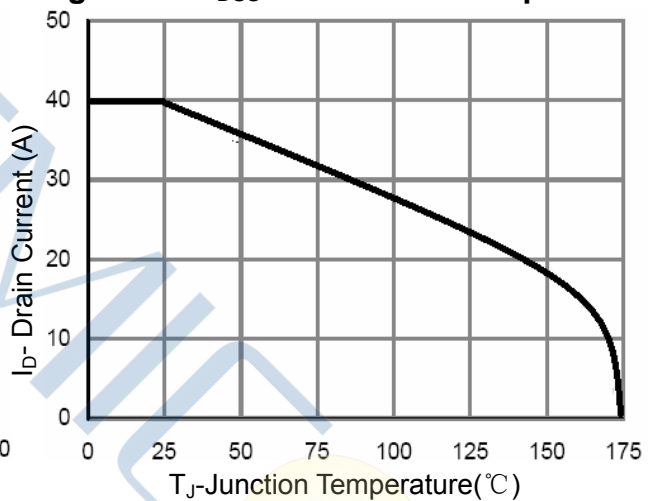


Figure 10 ID Current Derating vs Junction Temperature

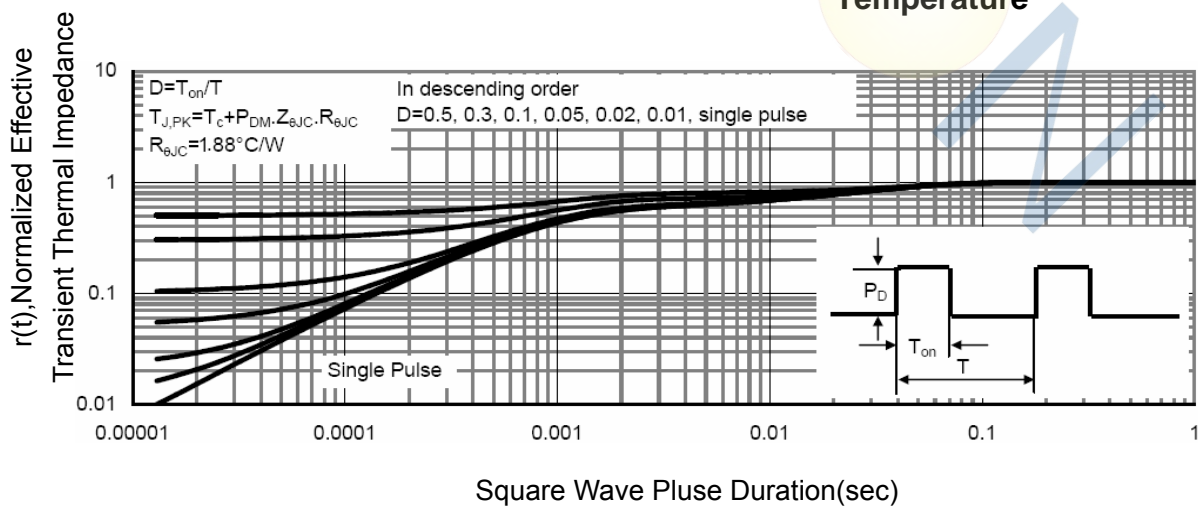
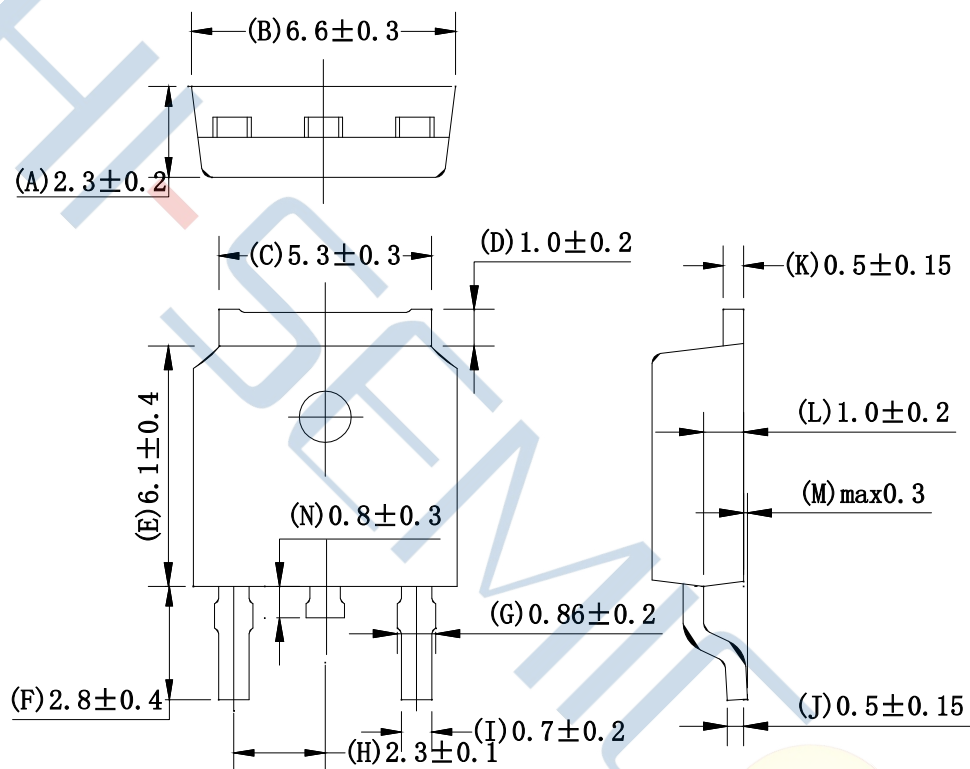


Figure 11 Normalized Maximum Transient Thermal Impedance

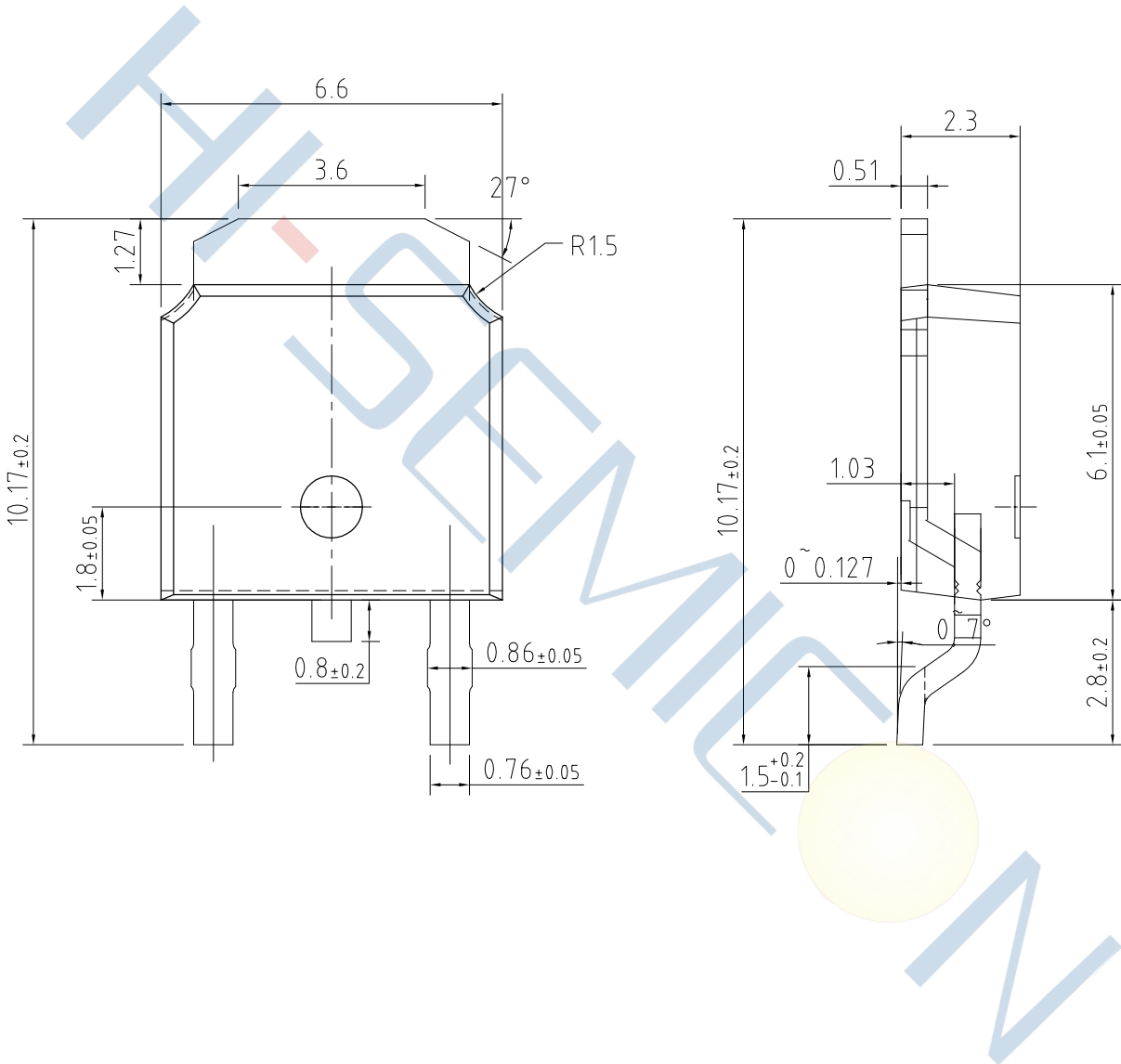
Package Dimensions of TO-252-2L

Unit:mm



Package Dimensions of TO-252-2L

Unit:mm



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