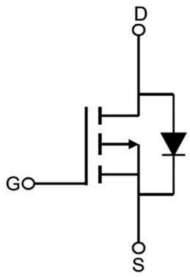
-40A, -20V P-CHANNEL MOSFET

GENERAL DESCRIPTION

The SFD4002PT 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.



TO-252

Features

- N-CHANNEL
  V_{DS}=-40V,I_D=-20A
  $R_{DS(on)(TYP)}$=23mΩ ; (V_{GS}=-10V, ID=-15A)
  $R_{DS(on)(TYP)}$=29mΩ ; (V_{GS}=-4.5V, ID=-8A)

Application

- Load switch
- PWM application

ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SFD4002PT	TO-252-2L	SFD4002PT	Pb Free	Reel

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

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	-40	V
Gate-Source Voltage		V_{GS}	±20	
Drain Current	T_C = 25℃	I_D	-20	A
	T_C = 100℃		-14	
Drain Current Pulsed(Note 1)		I_{DM}	-80	
Power Dissipation(T_C=25°C)		P_D	50	W
Avalanche energy(Note 4)		E_{AS}	81	mJ
Operation Junction Temperature Range		T_J	-55～+150	℃
Storage Temperature Range		T_{stg}	-55～+150	
Maximum lead temperature for soldering purposes,1/8" from case for 5 seconds		TL	300	

THERMAL CHARACTERISTICS

Characteristics	Symbol	MAX	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.5	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B_{VDSS}	V_{GS}=0V, I_D=-250μA	-40	--	--	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-40V, V_{GS}=0V	--	--	1	uA
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	
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=-250μA	-1.0	-1.5	-2.0	V
Static Drain- Source On State Resistance	$R_{DS(on)}$	V_{GS}=-10V, I_D=-15A	--	23	27	mΩ
		V_{GS}=-4.5V, I_D=-8A	--	29	36	
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=-20V V_{GS}=0V f=1.0MHZ	--	1382	--	pF
Output Capacitance	C_{oss}		--	91	--	
Reverse Transfer Capacitance	C_{rss}		--	88	--	
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-20V, V_{GS}=-10V R_G=6.0Ω, I_D=-10A (Note 1.2)	--	8.1	--	nS
Turn-on Rise Time	t_r		--	3.7	--	
Turn-off Delay Time	$t_{d(off)}$		--	31.8	--	
Turn-off Fall Time	t_f		--	7.2	--	

Total Gate Charge	Q_g	V_{DS}=-20V, I_D=-10A	--	25.5	--	nC
Gate-Source Charge	Q_{gs}	V_{GS}=-10V	--	3.2	--	
Gate-Drain Charge	Q_{gd}	(Note 1.2)	--	6.9	--	

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	--	--	-20	A
Pulsed Source Current	I_{SM}		--	--	-80	
Diode Forward Voltage	V_{SD}	I_S= -20A,V_{GS}= 0V	--	--	-1.2	V
Body Diode Reverse Recovery Time	trr	IF=-20A, di/dt=100A/uS	--	28	--	ns
Body Diode Reverse Recovery Charge	Qrr		--	35	--	uc

NOTE:

1.Pulse width limited by maximum junction temperature

2.Pulse Test: Pulse width ≤300μs, Duty cycle≤2%

3.Essentially independent of operating temperature

4.E_{AS} condition:T_J=25℃,V_{DD}=-20V,V_G=-10V,Rg=25, L=0.5mH.

Typical Performance Characteristics

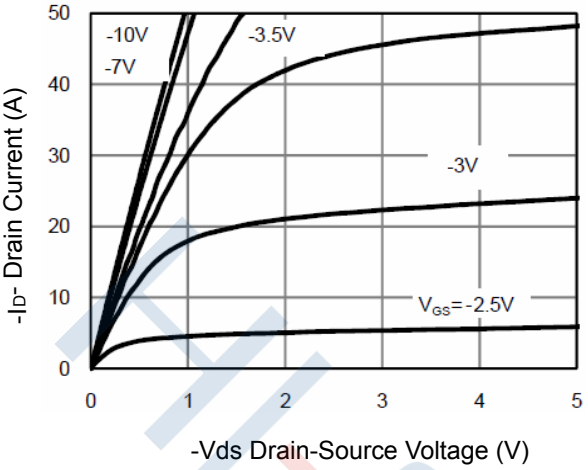


Figure 1 Output Characteristics

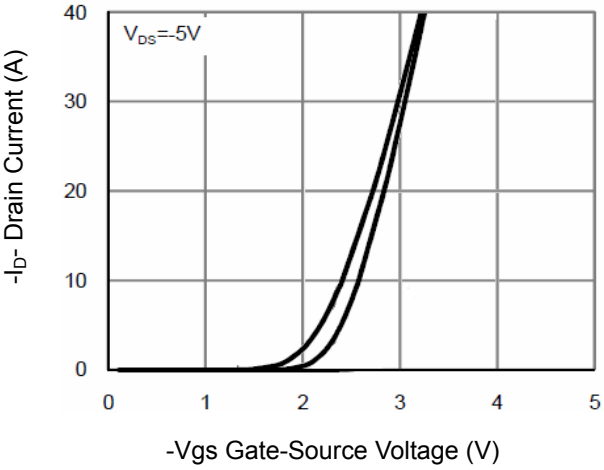


Figure 2 Transfer Characteristics

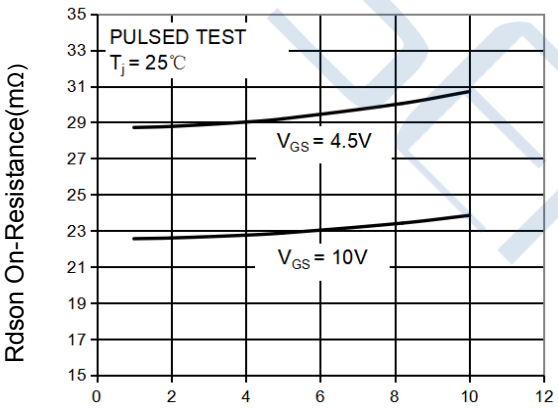


Figure 3 Rdson- Drain Current

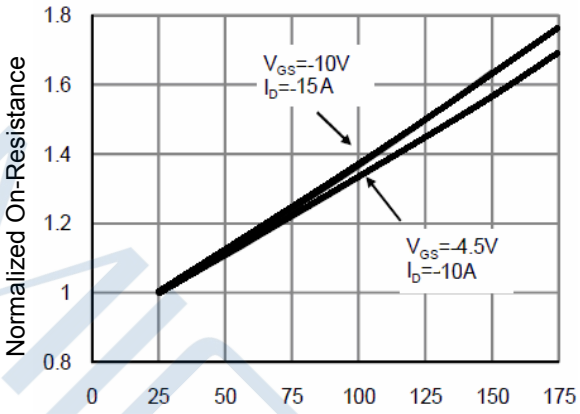


Figure 4 Rdson-Junction Temperature

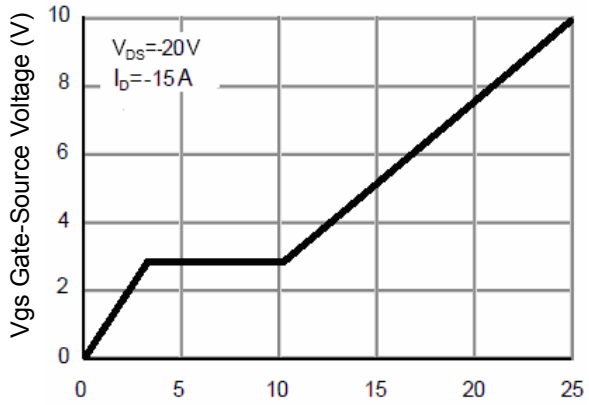


Figure 5 Gate Charge

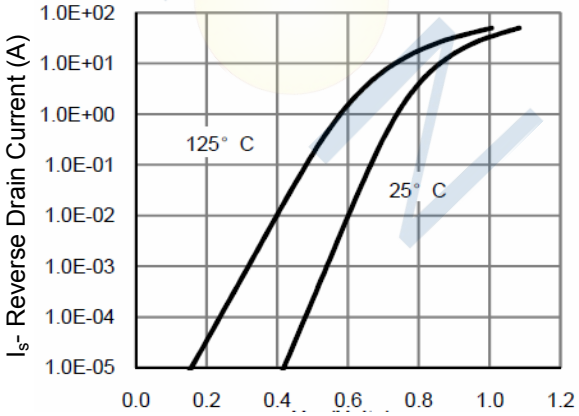


Figure 6 Source- Drain Diode Forward

Typical Performance Characteristics

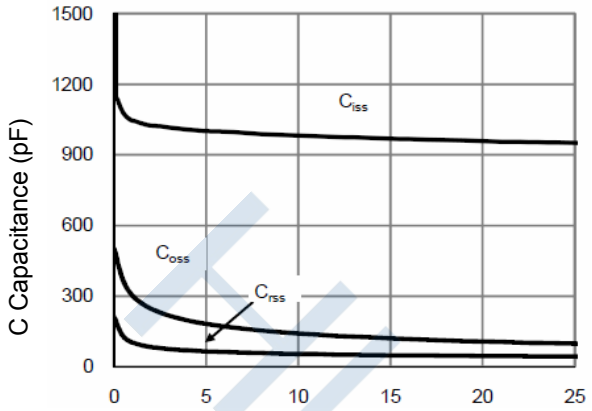


Figure 7 Capacitance vs Vds

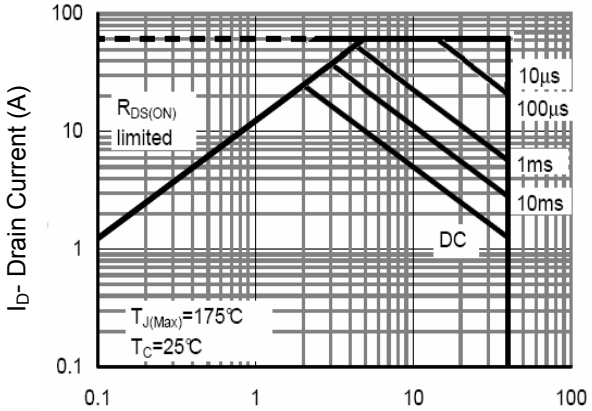
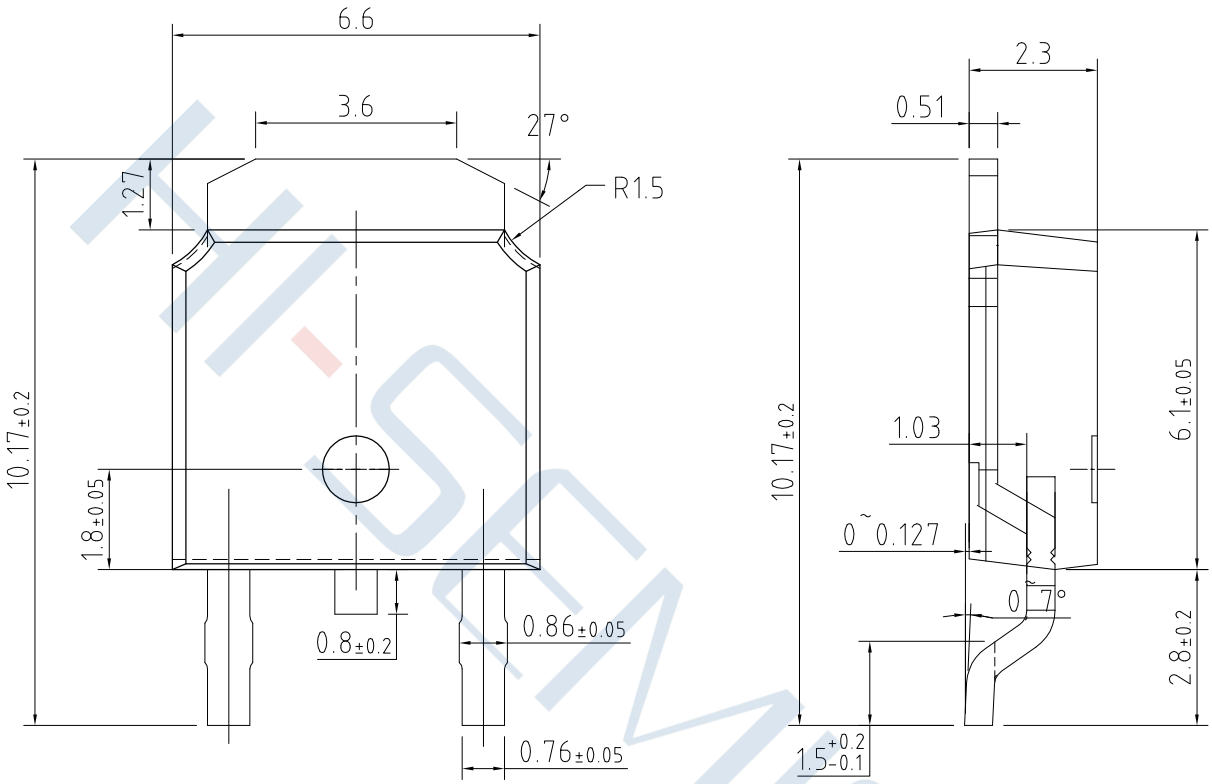


Figure 8 Safe Operation Area

Package Dimensions of SOT-23-3L



Disclaimer:

► Hi-semicon reserves the right to make changes to the information herein for the improvement of the design and performance without further notice! Customers should obtain the latest relevant information before placing orders and should verify that such information is complete and current.

► All semiconductor products malfunction or fail with some probability under special conditions. When using Hi-semicon products in system design or complete machine manufacturing, it is the responsibility of the buyer to comply with the safety standards strictly and take essential measures to avoid situations in which a malfunction or failure of such Hi-semicon products could cause loss of body injury or damage to property.

► Hi-semicon will supply the best possible product for customers!