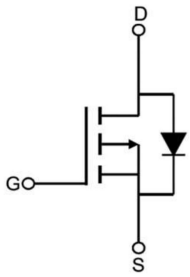
-40A, -40V P-CHANNELMOSFET

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



TO-252

FEATURES

- $R_{DS(on)}$=11mΩ(Typ)@V_{GS}=-10V，ID=-10A
- $R_{DS(on)}$=14mΩ(Typ)@V_{GS}=-4.5V，ID=-10A
- V_{DS}=-40V,I_D=-40A
- 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	T_C = 25°C	I_D	-40	A
	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	$R_{\theta JC}$	2.6	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	°C/W

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	--	--	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	--	-2.5	V
Static Drain- Source On State Resistance(Note 3)	$R_{DS(on)}$	V_{GS}=-10V, I_D=-10A	--	11	13	mΩ
		V_{GS}=-4.5V, I_D=-10A	--	14	17	
Forward Transconductance	g_{FS}	V_{GS}=-5.0V, I_D=-12A	--	31	--	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=-20V	--	2523	--	pF
Output Capacitance	C_{oss}	V_{GS}=0V	--	320	--	
Reverse Transfer Capacitance	C_{rss}	f=1.0MHZ	--	305	--	
Total Gate Charge	Q_g	V_{DS}=-20V I_D=-12A	--	65	--	nC
Gate-Source Charge	Q_{gs}	V_{GS}=-10V	--	12	--	
Gate-Drain Charge	Q_{gd}	(Note 3.4)	--	13	--	
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-20V I_D=-12A	--	11	--	ns
Turn-on Rise Time	t_r	V_{GS}=-10V R_G=2.5Ω	--	16	--	
Turn-off Delay Time	$t_{d(off)}$	(Note 3.4)	--	35	--	

Turn-off Fall Time	t_f	V_{DD}=-20V I_D=-12A V_{GS}=-12V R_G=2.5Ω	--	25	--	ns

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.Pluse width limited by maximum junction temperature

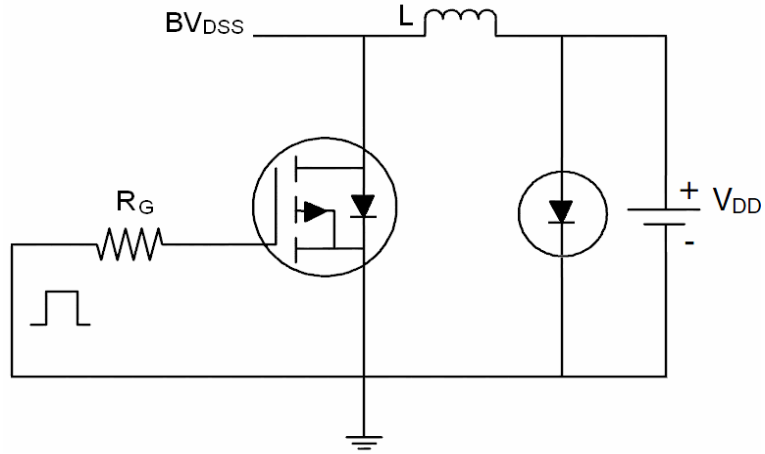
2.L=0.5mH,V_{DD}=-20V, V_G=-10V, R_G=25Ω, starting T_J=25°C

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

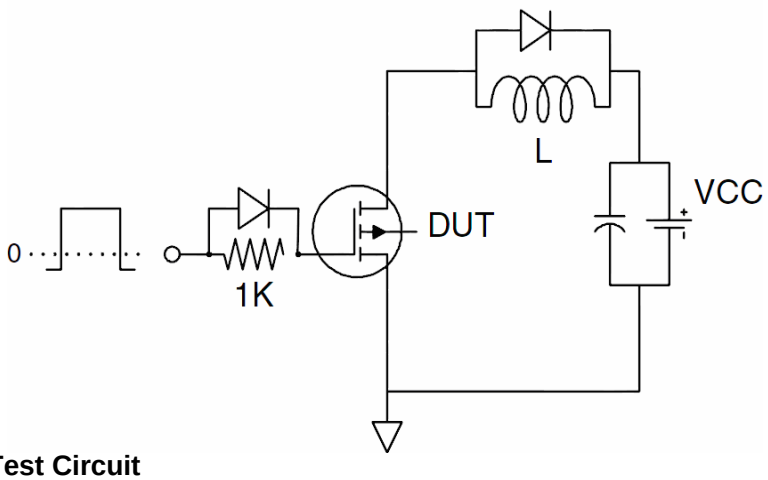
4.Essentially independent of operating temperature

TYPICAL TEST CIRCUIT

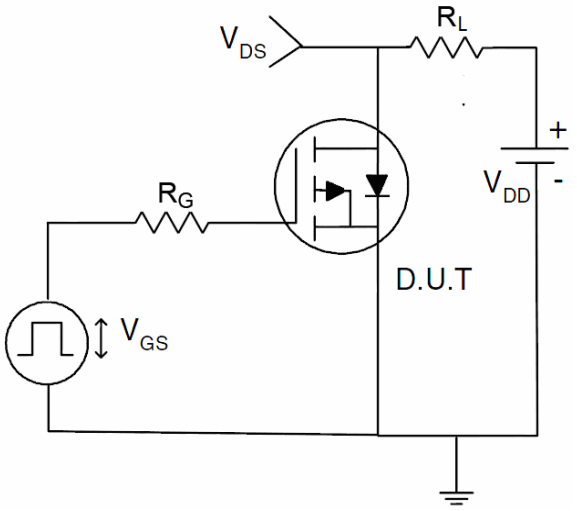
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



TYPICAL CHARACTERISTICS

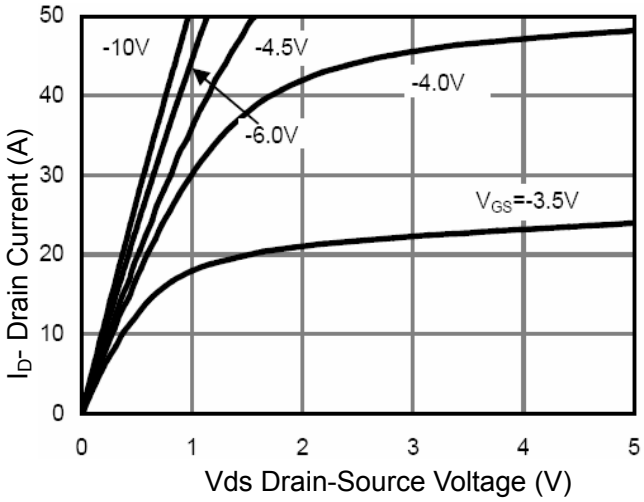


Figure 1 Output Characteristics

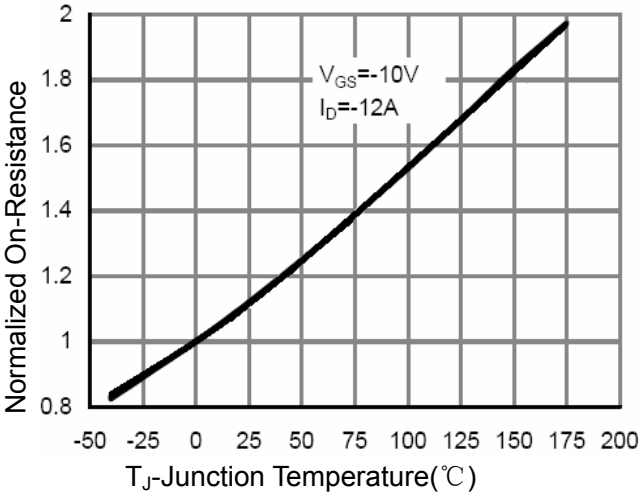


Figure 4 Rdson-Junction Temperature

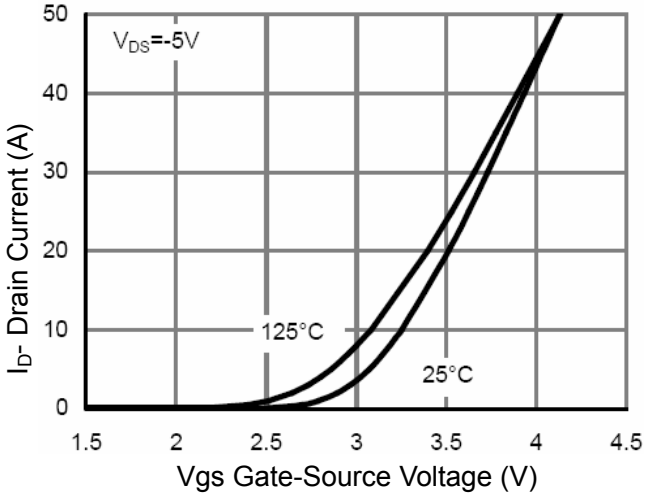


Figure 2 Transfer Characteristics

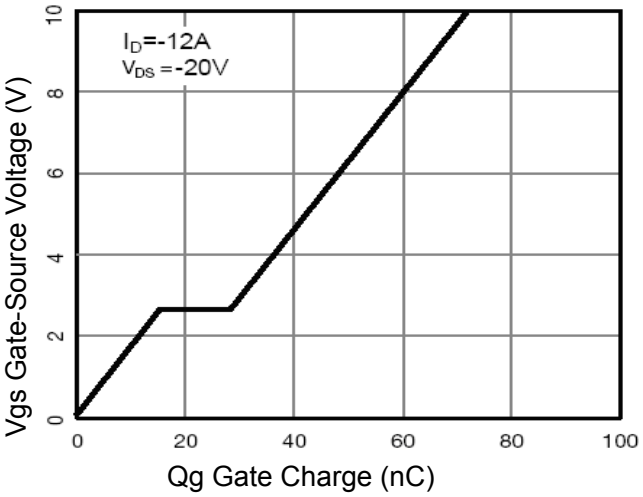


Figure 5 Gate Charge

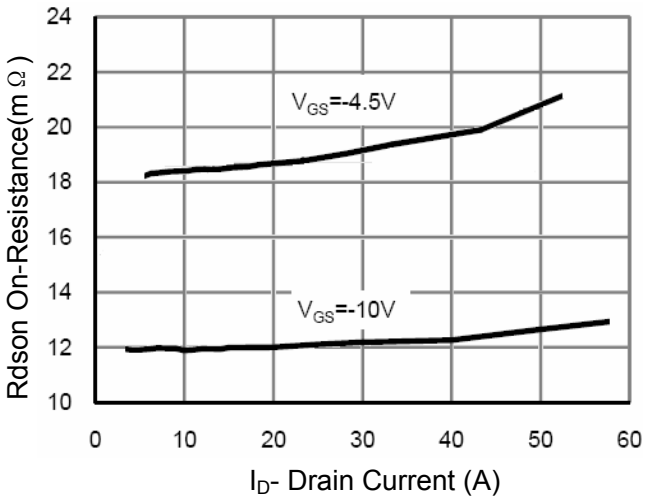


Figure 3 Rdson- Drain Current

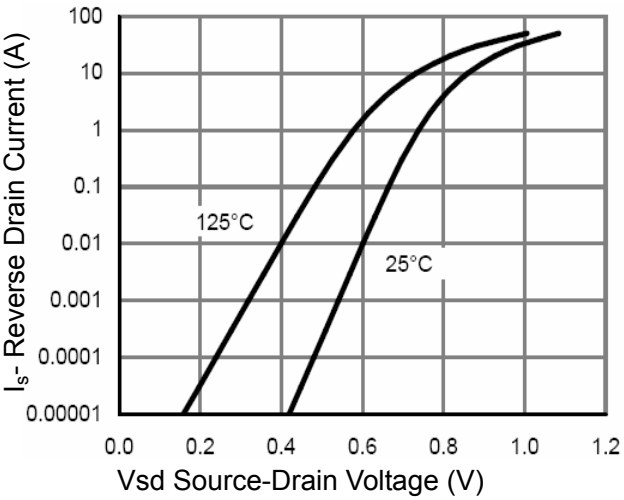


Figure 6 Source- Drain Diode Forward

TYPICAL CHARACTERISTICS

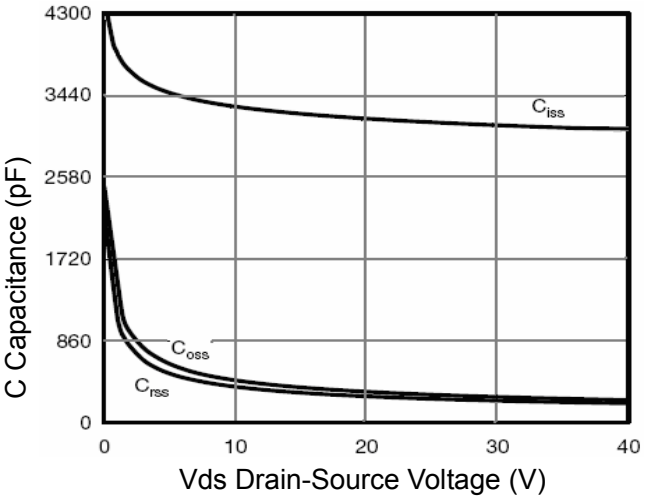


Figure 7 Capacitance vs Vds

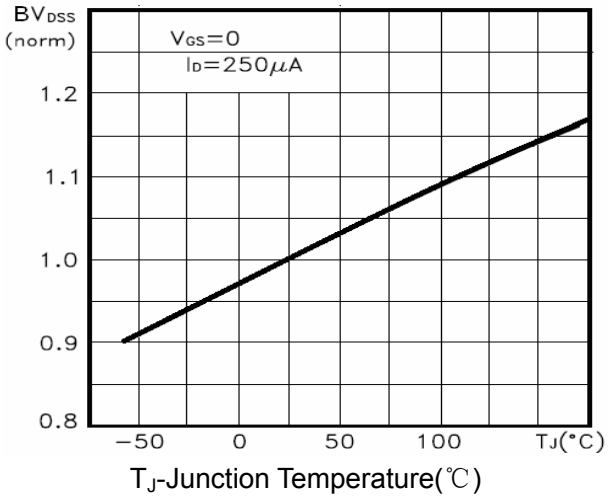


Figure 9 BV_{DSS} vs Junction Temperature

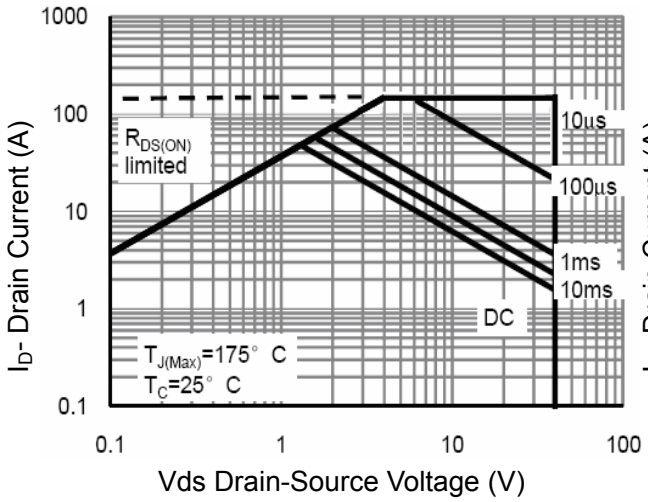


Figure 8 Safe Operation Area

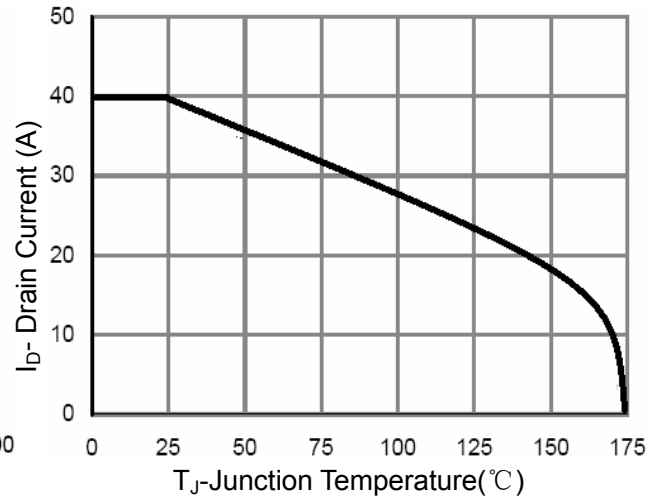


Figure 10 ID Current Derating vs Junction Temperature

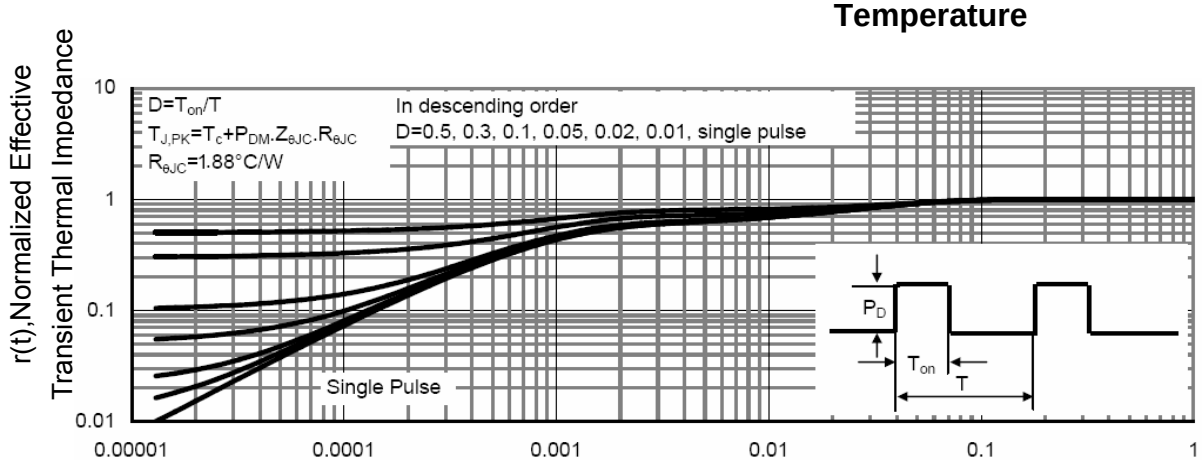
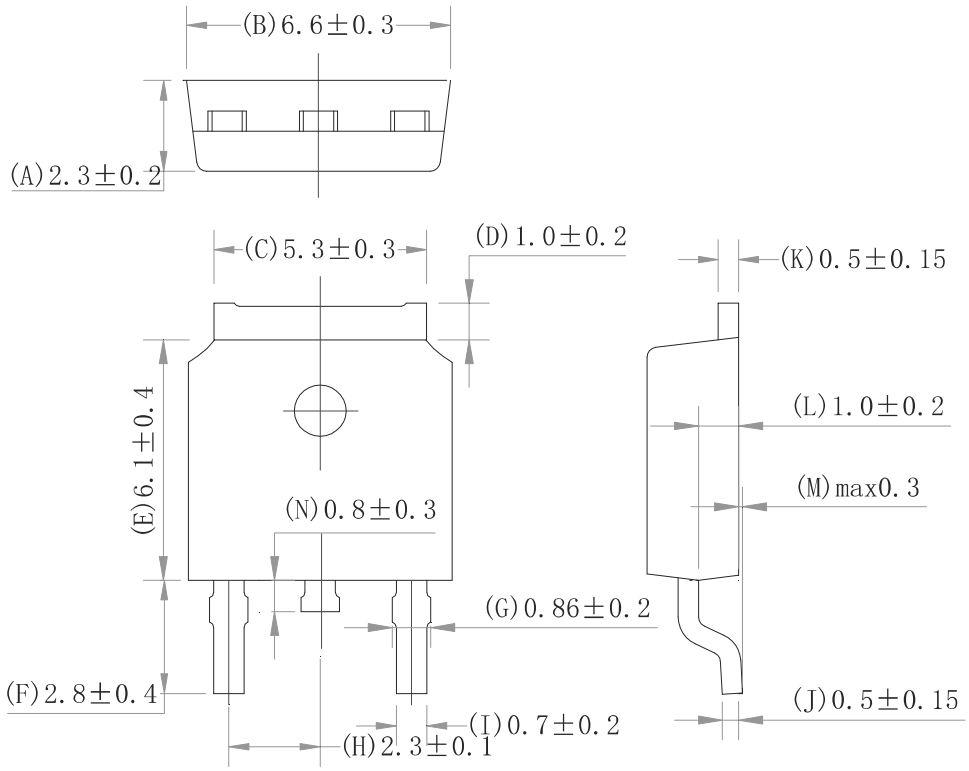


Figure 11 Normalized Maximum Transient Thermal Impedance

PACKAGE MECHANICAL



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