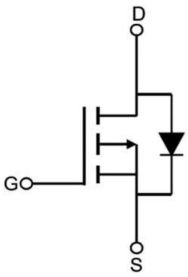
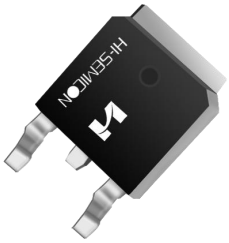
-30A, -60V P-CHANNEL MOSFET





TO-252

GENERAL DESCRIPTION

The SFD6003PT 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,etc.

FEATURES

- $R_{DS(on)}$=24mΩ(Typ)@V_{GS}=-10V，ID=-15A
- $R_{DS(on)}$=26mΩ(Typ)@V_{GS}=-4.5V，ID=-10A
- V_{DS}=-60V,I_D=-30A
- Low Crss:201pF@V_{DS}=-25V
- Advance Trench Technology
- Fast Switching and High efficiency
- Lead Free and Green Devices Available:Rohs Compliant

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

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	-60	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current	T_C = 25°C	I_D	-30	A
	T_C = 100°C		-20	
Drain Current Pulsed(Note 1)		I_{DM}	-120	A
Power Dissipation(T_C=25°C)		P_D	52	W
Single Pulsed Avalanche Energy (Note 2)		E_{AS}	92	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	-60	--	--	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-60V, V_{GS}=0V	--	--	1.0	μA
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=-15A	--	24	31	mΩ
		V_{GS}=-4.5V, I_D=-10A	--	26	38	
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=-25V	--	2385	--	pF
Output Capacitance	C_{oss}	V_{GS}=0V	--	256	--	
Reverse Transfer Capacitance	C_{rss}	f=1.0MHZ	--	201	--	
Total Gate Charge	Q_g	V_{DS}=-30V	--	51	--	nC
Gate-Source Charge	Q_{gs}	I_D=-15A	--	9	--	
Gate-Drain Charge	Q_{gd}	V_{GS}=-10V	--	11	--	
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=-30V	--	17	--	ns
Turn-on Rise Time	t_r	V_{GS}=-10V	--	118	--	
Turn-off Delay Time	$t_{d(off)}$	R_G=2.5Ω	--	230	--	
Turn-off Fall Time	t_f	I_D=-30A	--	202	--	

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	--	--	-30	A
Pulsed Source Current	I_{SM}		--	--	-120	
Diode Forward Voltage	V_{SD}	I_S=-30A,V_{GS}=0V	--	--	1.2	V

Notes:

1.Pluse width limited by maximum junction temperature

2.L=0.5mH, I_{AS}=-19A, V_{DD}=-50V, V_G=-10V, R_G=25Ω, starting T_J=25°C

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

Typical Performance Characteristics

Figure1: Output Characteristics

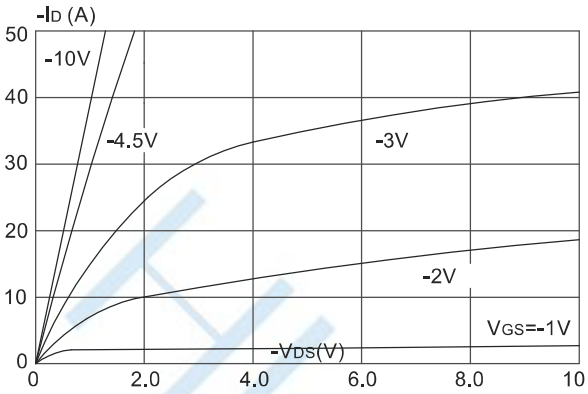


Figure 2: Typical Transfer Characteristics

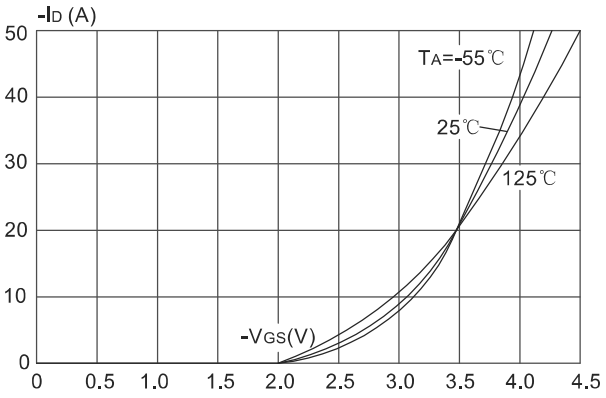


Figure 3: On-resistance vs. Drain Current

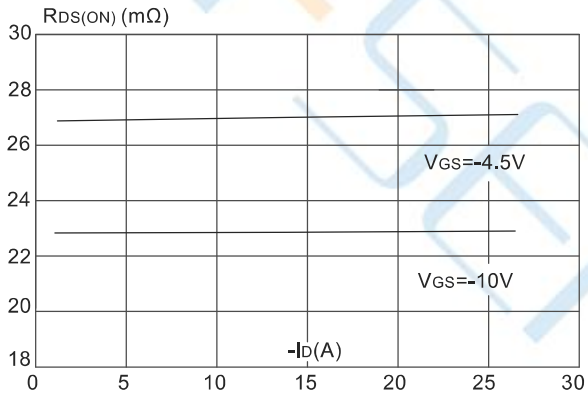


Figure 4: Body Diode Characteristics

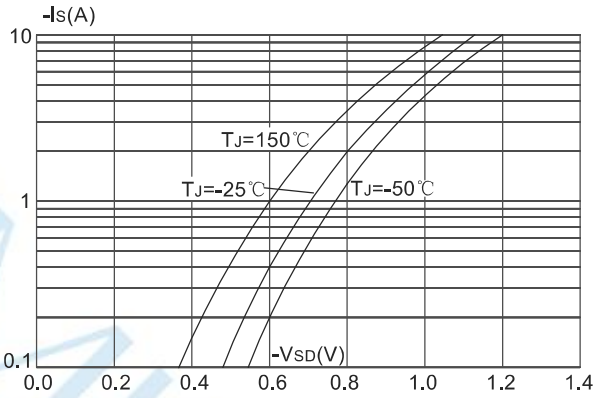


Figure 5: Gate Charge Characteristics

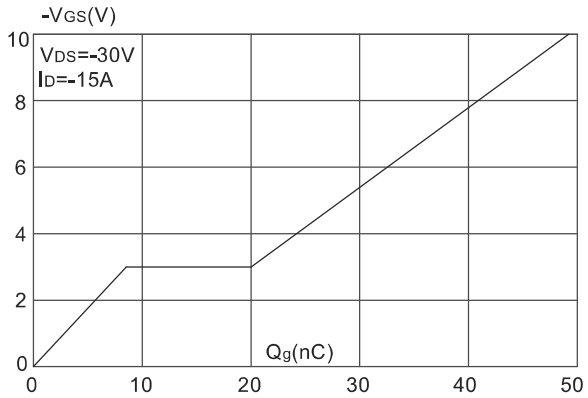
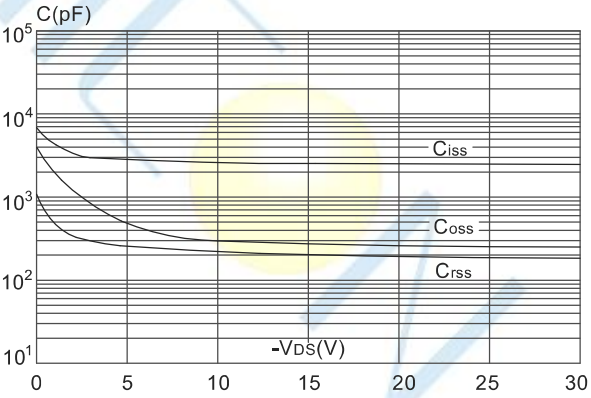


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

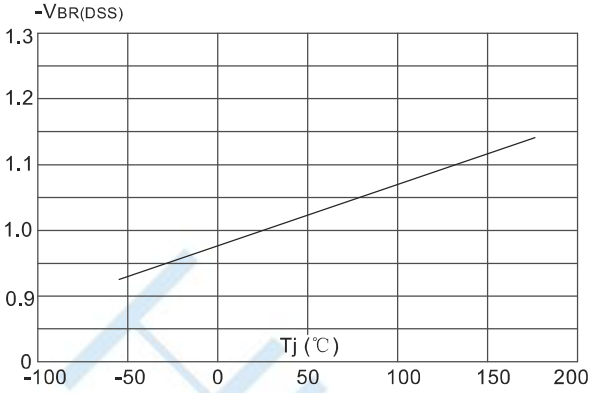


Figure 8: Normalized on Resistance vs. Junction Temperature

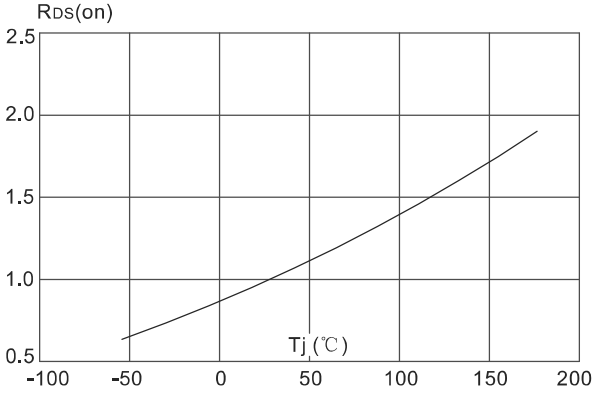


Figure 9: Maximum Safe Operating Area

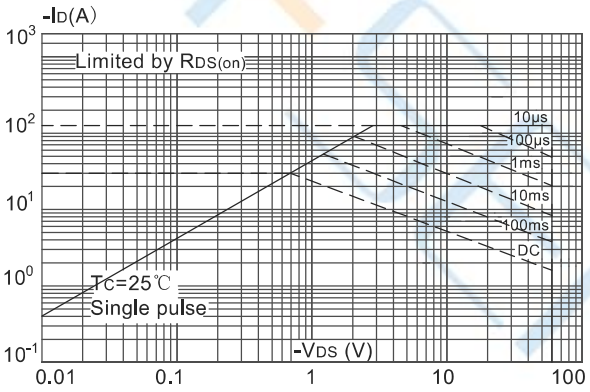


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

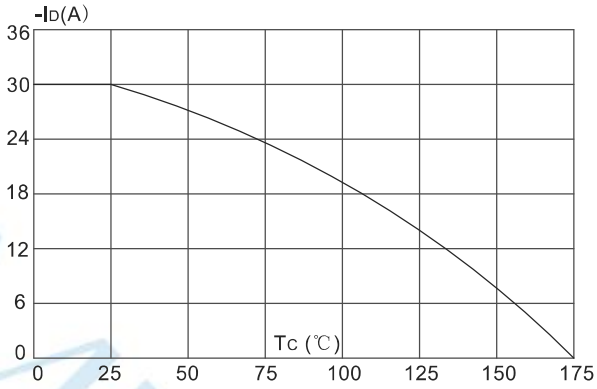
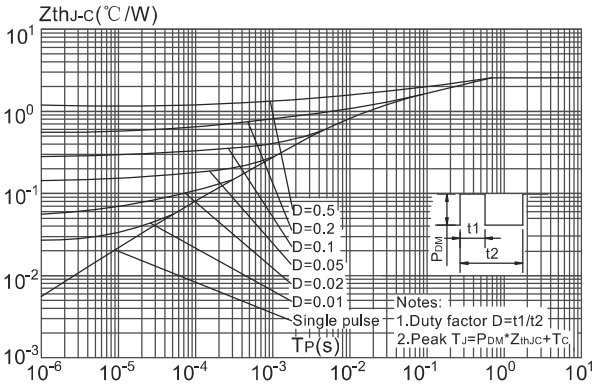
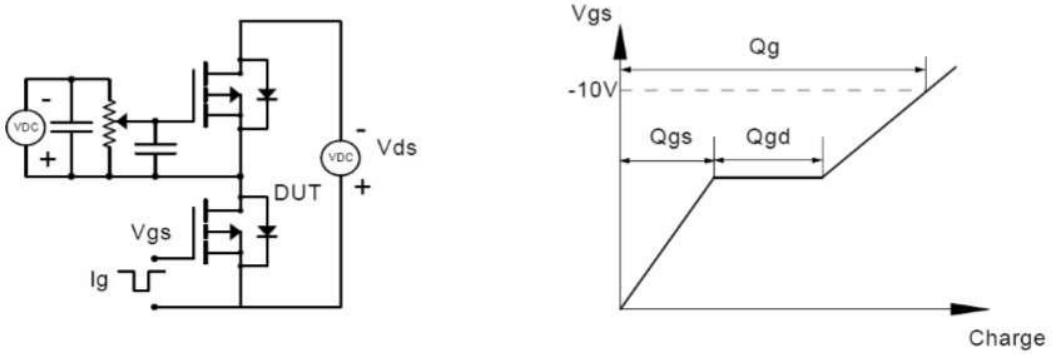


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

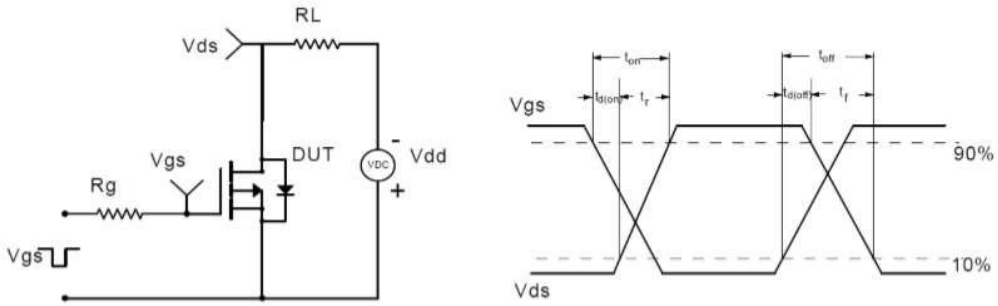


Test Circuit

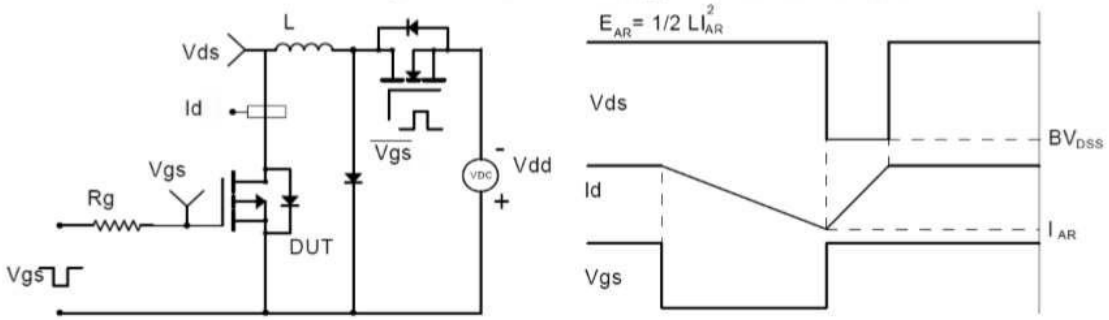
Gate Charge Test Circuit & Waveform



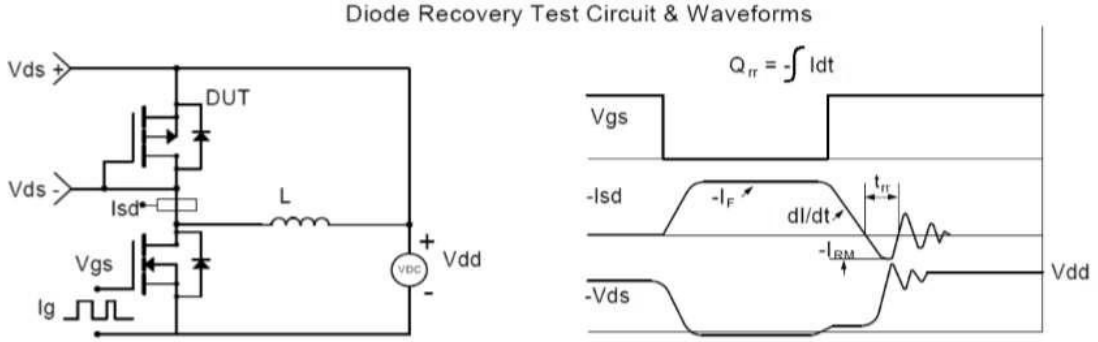
Resistive Switching Test Circuit & Waveforms



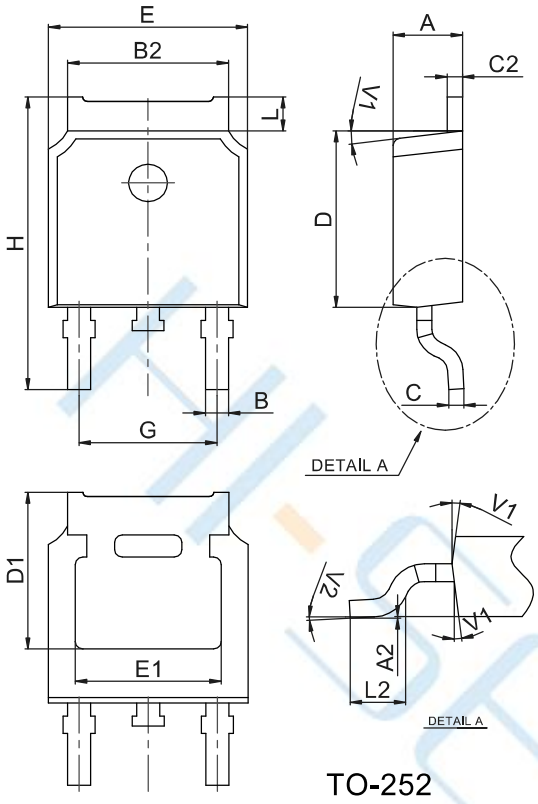
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

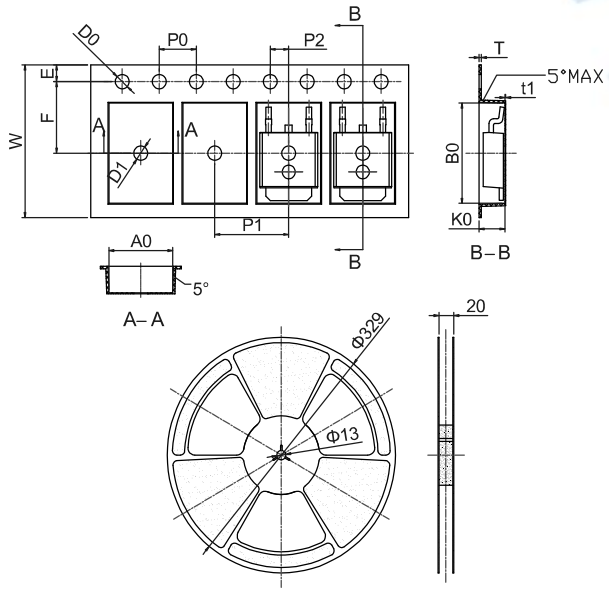


Package Mechanical Data-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Spectification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583