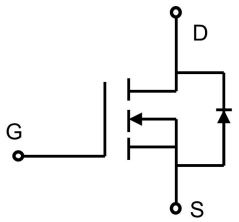
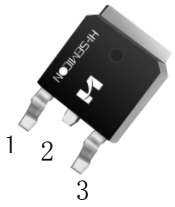
120A, 30V N-CHANNEL MOSFET

GENERAL DESCRIPTION

The SFD3012T uses advanced trench technology and design to provide excellent $R_{DS(pn)}$ with low gate charge.
It can be used in a wide variety applications.





1:Gate 2:Darin 3:Source

Features

- ◆V_{DS}=30V,I_D=120A
- ◆$R_{DS(on)}$

  TYP:3.8mΩ@V_{GS}=10V I_D=40A

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
SFD3012T	TO-252-2L	SFD3012T	Pb Free	Reel

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

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current	T_C = 25°C	I_D	120	A
	T_C = 100°C		72	
Drain Current Pulsed(Note 1)		I_{DM}	320	A
Power Dissipation(T_C=25°C) -Derate above 25°C		P_D	90	W
Single Pulsed Avalanche Energy (Note 2)		E_{AS}	614	mJ
Operation Junction Temperature Range		T_J	-55～+150	°C
Storage Temperature Range		T_{stg}	-55～+150	°C
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	$R_{\theta JC}$	2.4	°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	30	33	--	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V	--	8.5	100	nA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=20V, V_{DS}=0V	--	1.5	100	nA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=-20V, V_{DS}=0V	--	-1.6	-100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}= V_{DS}, I_D=250μA	1.0	1.6	2.0	V
Static Drain- Source On State Resistance	$R_{DS(on)}$	V_{GS}=5.0V, I_D=20A	--	5.0	7.3	mΩ
		V_{GS}=10V, I_D=40A	--	3.8	4.8	mΩ
Dynamic Characteristics						
Gate Resistance	Rg	V_{GS}=0V; f=1.0MHZ	1	2.7	10	Ω
Input Capacitance	C_{iss}	V_{DS}=25V V_{GS}=0V f=1.0MHZ	--	2075	--	pF
Output Capacitance	C_{oss}		--	243	--	
Reverse Transfer Capacitance	C_{rss}		--	217	--	
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=15V R_G=3.3Ω; I_D=30A (Note 3.4)	--	8.6	--	ns
Turn-on Rise Time	t_r		--	75.6	--	
Turn-off Delay Time	$t_{d(off)}$		--	22.1	--	
Turn-off Fall Time	t_f		--	12.5	--	

Total Gate Charge	Q_g	V_{DS}=15V, I_D=30A	--	19.5	--	nc
Gate-Source Charge	Q_{gs}	V_{GS}=5V	--	3.6	--	
Gate-Drain Charge	Q_{gd}	(Note 3.4)	--	13	--	

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	--	--	120	A
Pulsed Source Current	I_{SM}		--	--	320	
Diode Forward Voltage	V_{SD}	I_S=30A,V_{GS}=0V	--	0.82	1.2	V
Reverse Recovery Time	T_{rr}	I_F=10A,V_R=15V, dIF/dt=100A/μS	--	135	--	ns
Reverse Recovery Charge	Q_{rr}		--	28	--	μC

1.Pluse width limited by maximum junction temperature

2.L=0.5mH, I_{AS}=32A, V_{DD}=25V, 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 Performance Characteristics

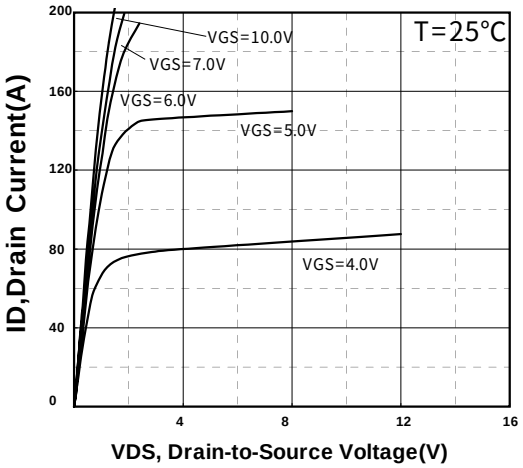


Fig 1. Typical Output Characteristics

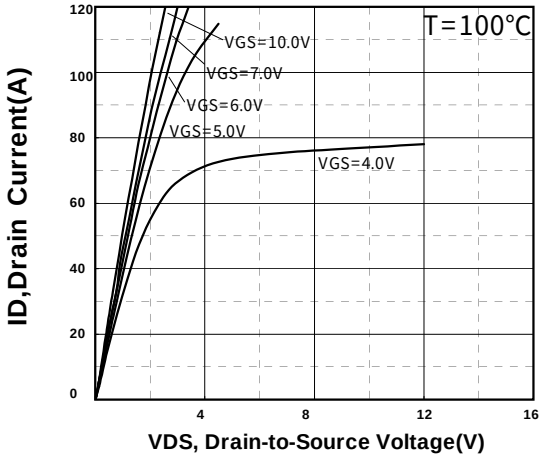


Fig 2. Typical Output Characteristics

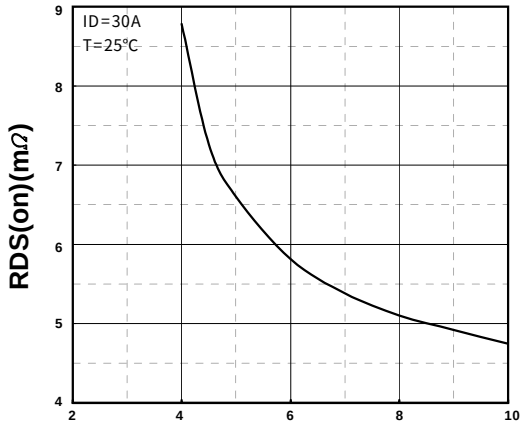


Fig 3. On-Resistance v.s. Gate Voltage

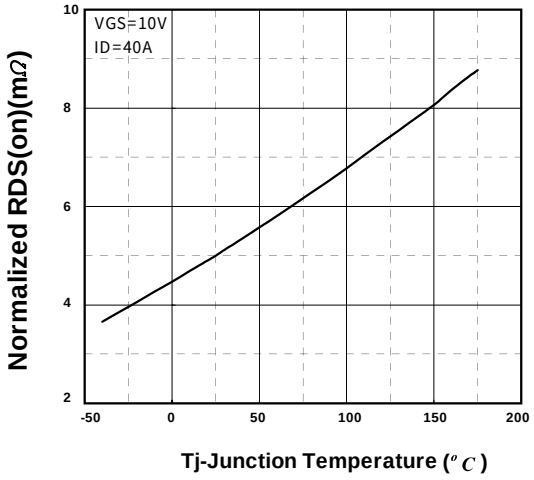


Fig 4. Normalized On-Resistance v.s. Junction Temperature

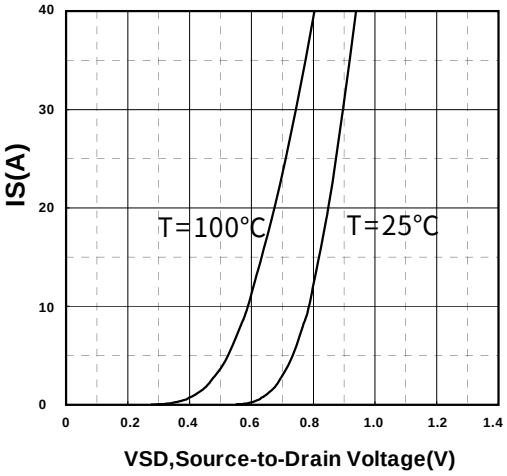


Fig 5. Forward Characteristic of Reverse Diode

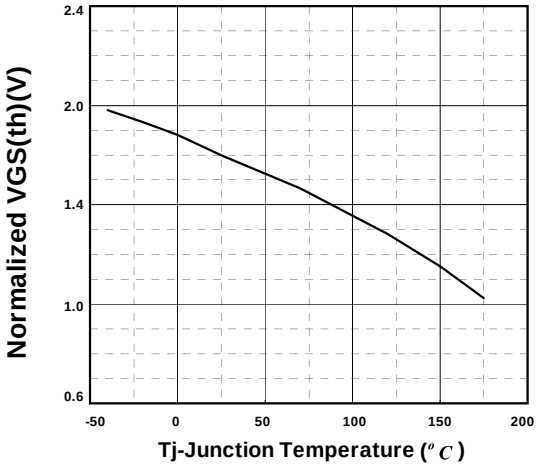


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

Typical Performance Characteristics

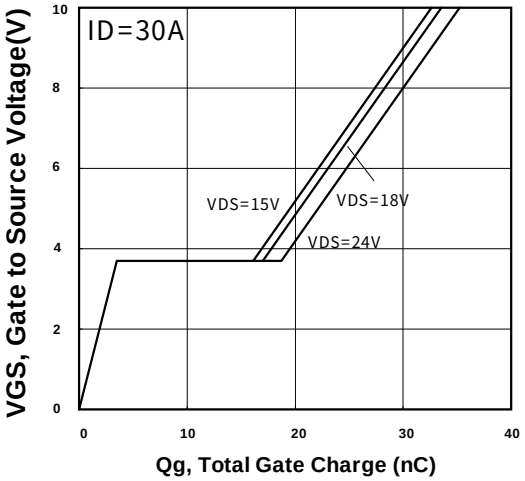


Fig 7. Gate Charge Characteristics

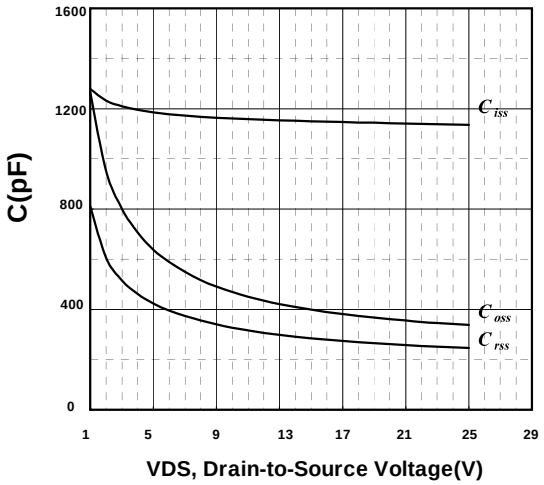


Fig 8. Typical Capacitance Characteristics

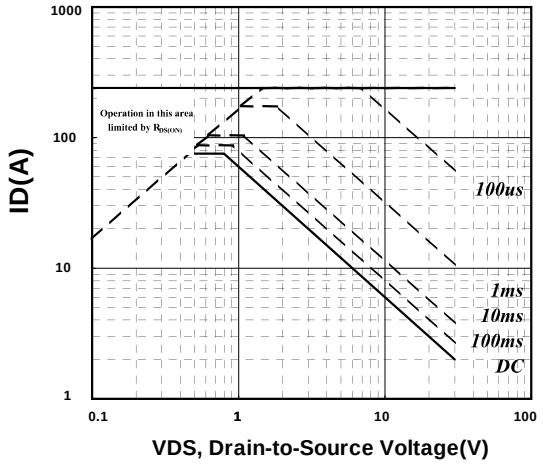


Fig 9. Maximum Safe Operating Area

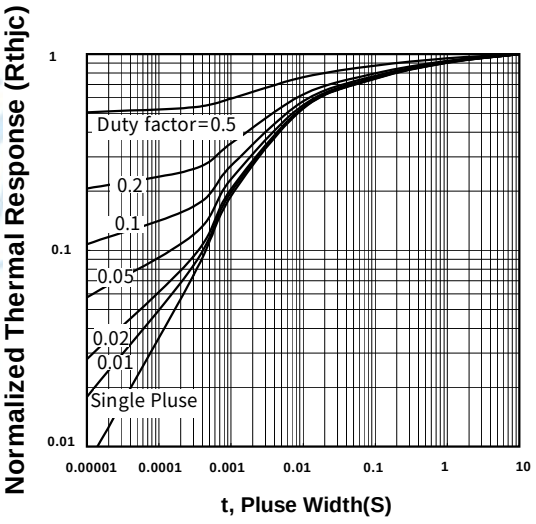
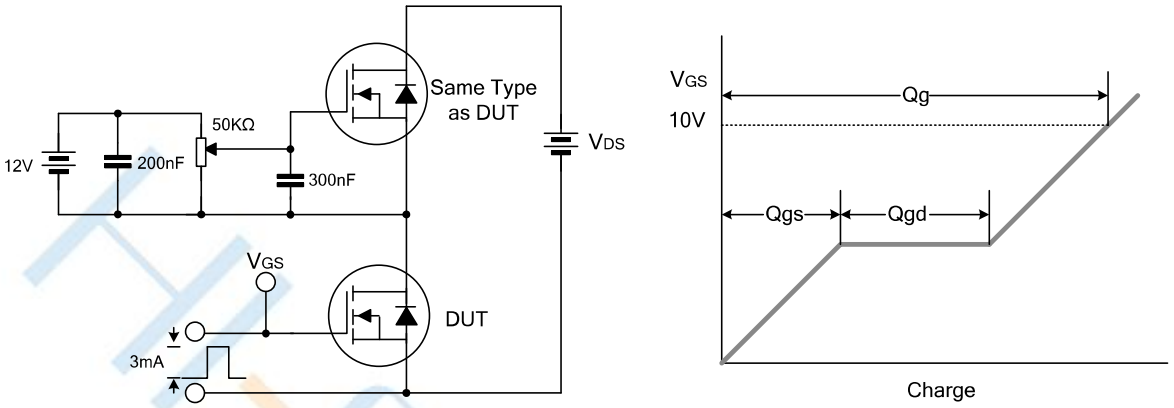


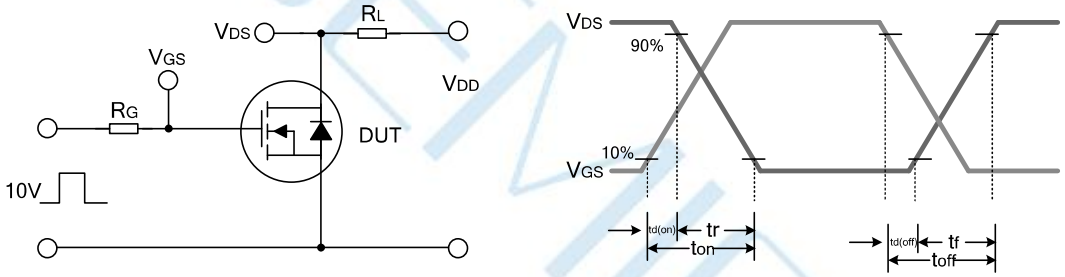
Fig 10. Effective Transient Thermal Impedance

Test Circuit

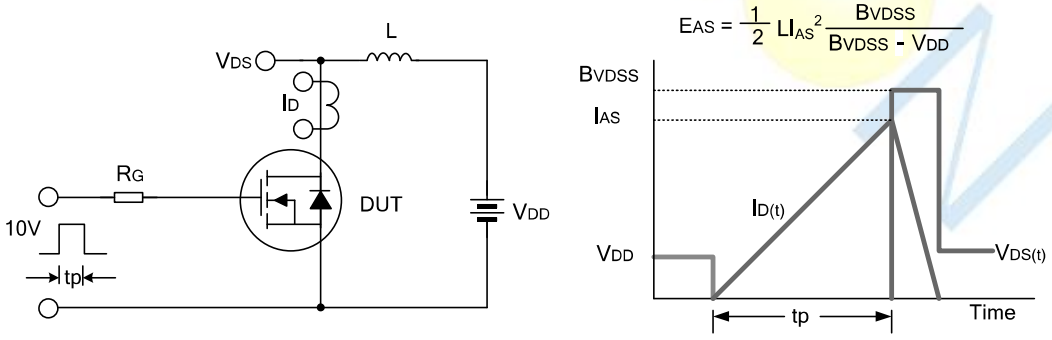
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform

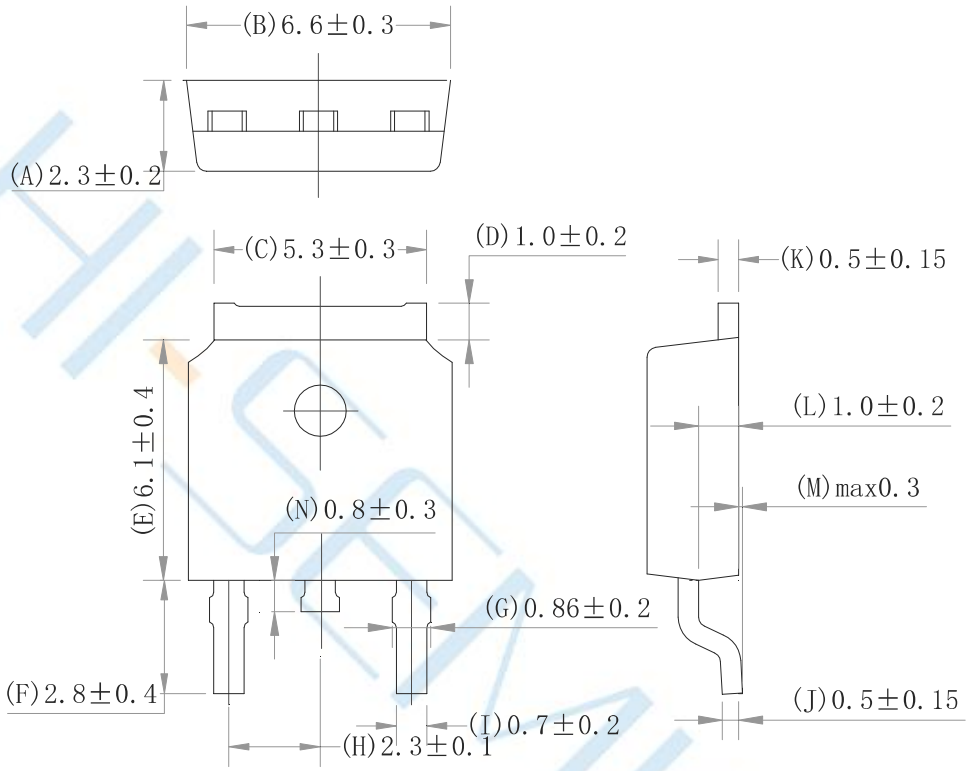


Unclamped Inductive Switching Test Circuit & Waveform



Package Dimensions of TO-252-2L

Unit:mm



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