

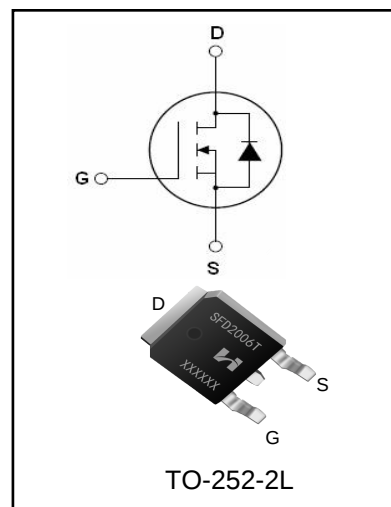
60A, 20V N-CHANNEL MOSFET

GENERAL DESCRIPTION

The SFD2006T 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.

FEATURES

- ◆ 60A, 20V, $R_{DS(on)(typ.)}=5.6m\Omega@V_{GS}=4.5V$
- ◆ Excellent package for good heat dissipation
- ◆ Fully characterized avalanche voltage and current
- ◆ Good stability and uniformity with high EAS
- ◆ High density cell design for ultra low R_{dson}
- ◆ Special process technology for high ESD capability



ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SFD2006T	TO-252-2L	SFD2006T	Pb free	Reel

ABSOLUTE MAXIMUM RATINGS $T_C = 25^\circ\text{C}$ unless otherwise noted

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 12	V
Drain Current	$T_C = 25^\circ\text{C}$	I_D	60	A
	$T_C = 100^\circ\text{C}$		42	
Drain Current Pulsed (Note 1)		I_{DM}	220	A
Maximum Power Dissipation		PD	65	W
Operation Junction Temperature Range		T_J	$-55\sim+150$	$^\circ\text{C}$
Storage Temperature Range		T_{stg}	$-55\sim+150$	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.82	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	0.48	$^\circ\text{C}/\text{W}$

Electrical Characteristics TC = 25°C unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA,	20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =16V, V _{GS} = 0V	-	-	10	μA
I _{GSS}	Gate-Body Leakage Current, Forward	V _{GS} = ±12V, V _{DS} = 0V	-	-	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 1mA	0.5	0.7	1.0	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = 4.5V, I _D = 20A	-	5.6	8.0	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} = 0V, f =1.0MHz	-	1850	-	pF
C _{oss}	Output Capacitance		-	473	-	pF
C _{rss}	Reverse Transfer Capacitance		-	200	-	pF
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DD} = 10V, I _D =1A,V _{GS} = 5V R _{GEN} =3.3Ω	-	9.8	-	ns
t _r	Turn-On Rise Time		-	20	-	ns
t _{d(off)}	Turn-Off Delay Time		-	35	-	ns
t _f	Turn-Off Fall Time		-	17.5	-	ns
Q _g	Total Gate Charge	V _{DS} = 10V, I _D =20.0A, V _{GS} =4.5V	-	29.3	-	nC
Q _{gs}	Gate-Source Charge		-	5.8	-	nC
Q _{gd}	Gate-Drain Charge		-	6.3	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain-Source Diode Forward Current		-	-	60	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0V, I _S = 2.5A	-	-	1.2	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0V, I _S = 20A, dI _F /dt=100A/μs	-	35	-	ns
Q _{rr}	Reverse Recovery Charge		-	29	-	μC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. E_{AS} condition : T_j = 25°C, V_{DD} = 10V, V_G = 10V, L = 0.5mH, R_g = 25Ω,

Typical Electrical and Thermal Characteristics (Curves)

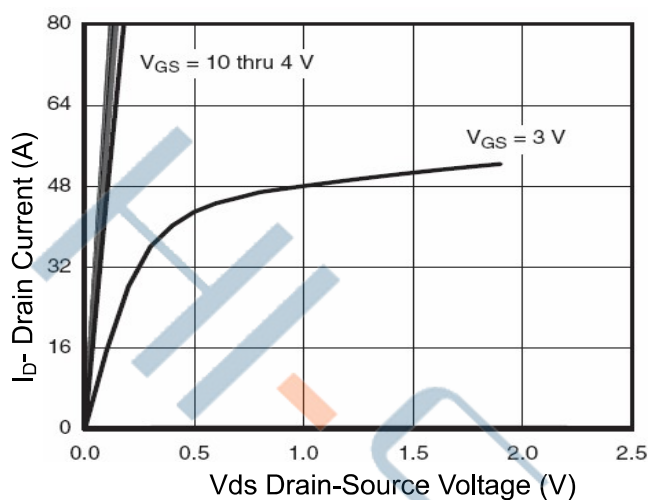


Figure 1 Output Characteristics

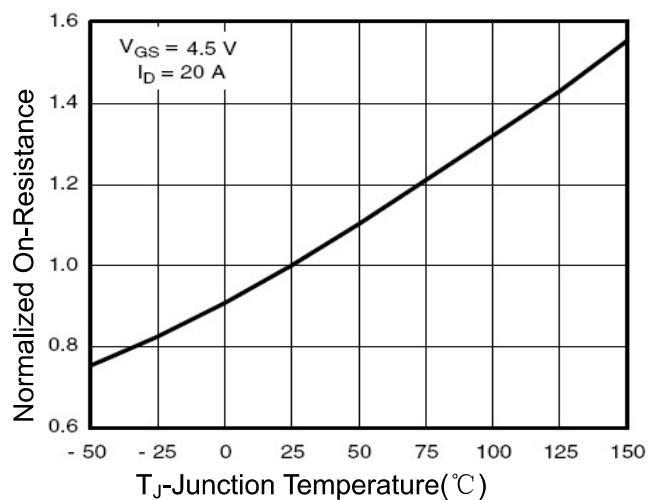


Figure 4 $R_{DS(on)}$ -Junction Temperature

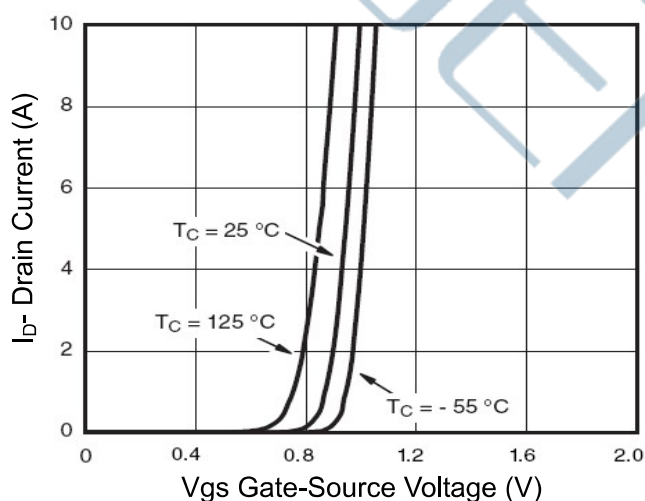


Figure 2 Transfer Characteristics

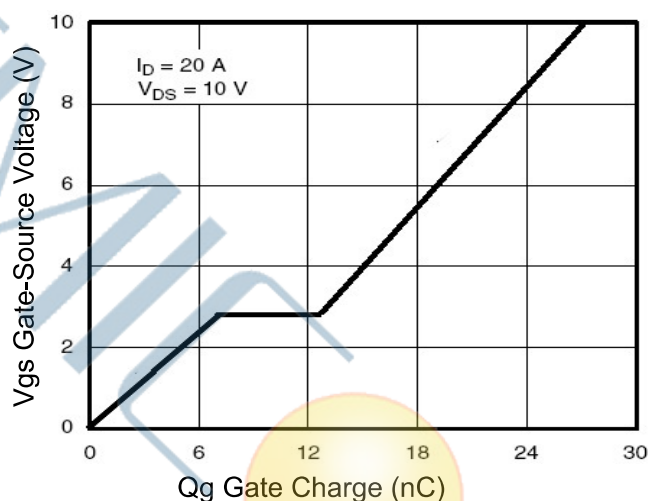


Figure 5 Gate Charge

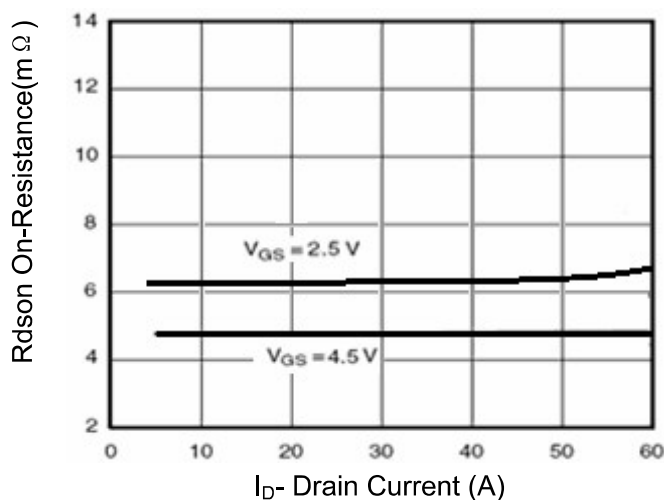


Figure 3 $R_{DS(on)}$ - Drain Current

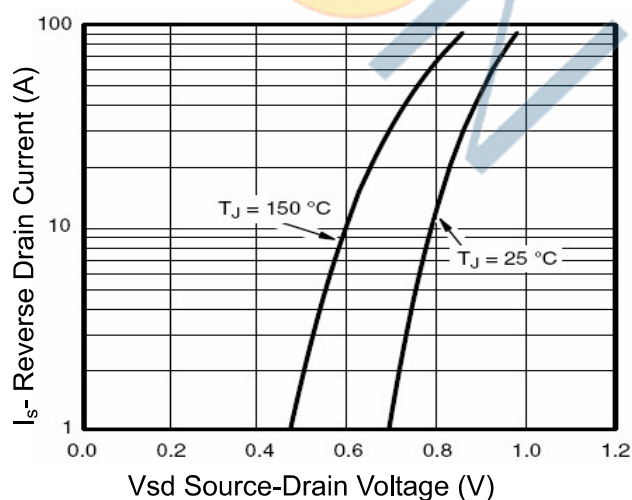


Figure 6 Source- Drain Diode Forward

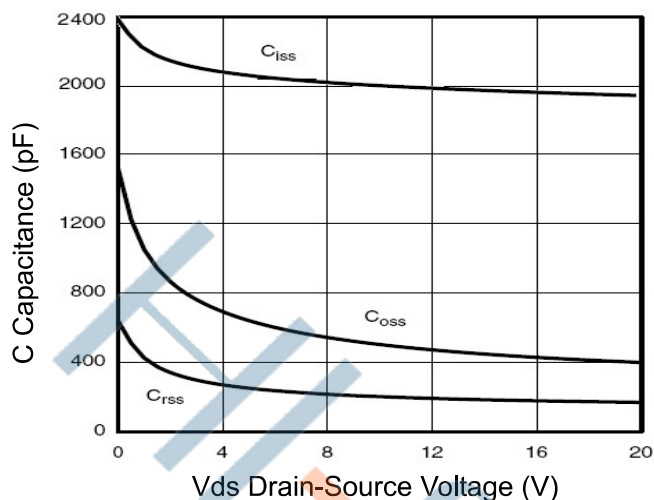


Figure 7 Capacitance vs Vds

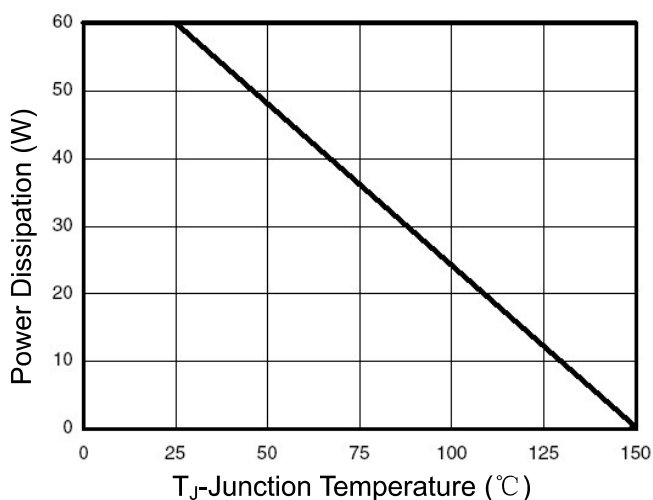


Figure 9 Power De-rating

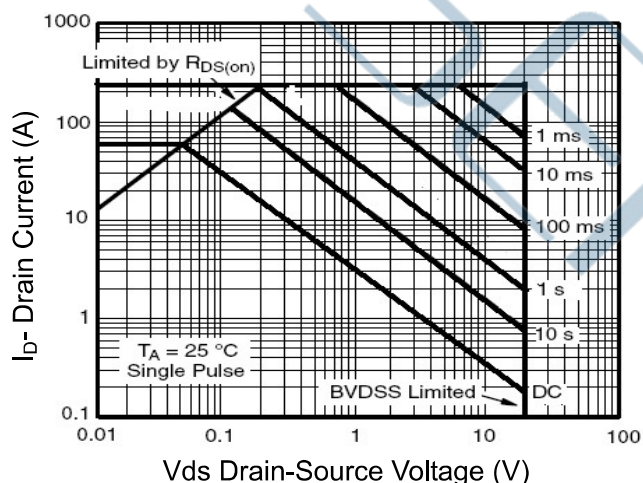


Figure 8 Safe Operation Area

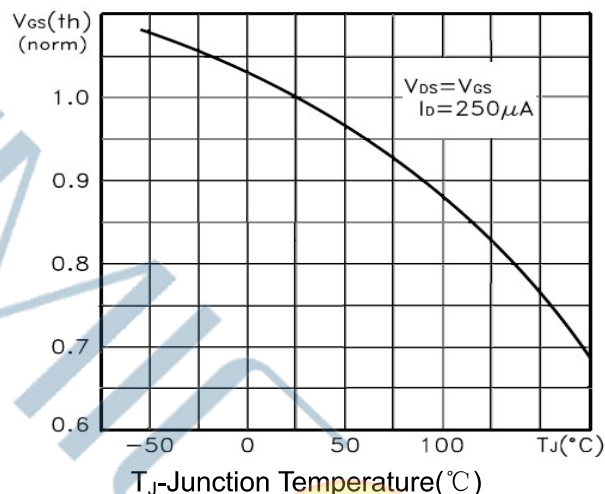


Figure 10 VGS(th) vs Junction Temperature

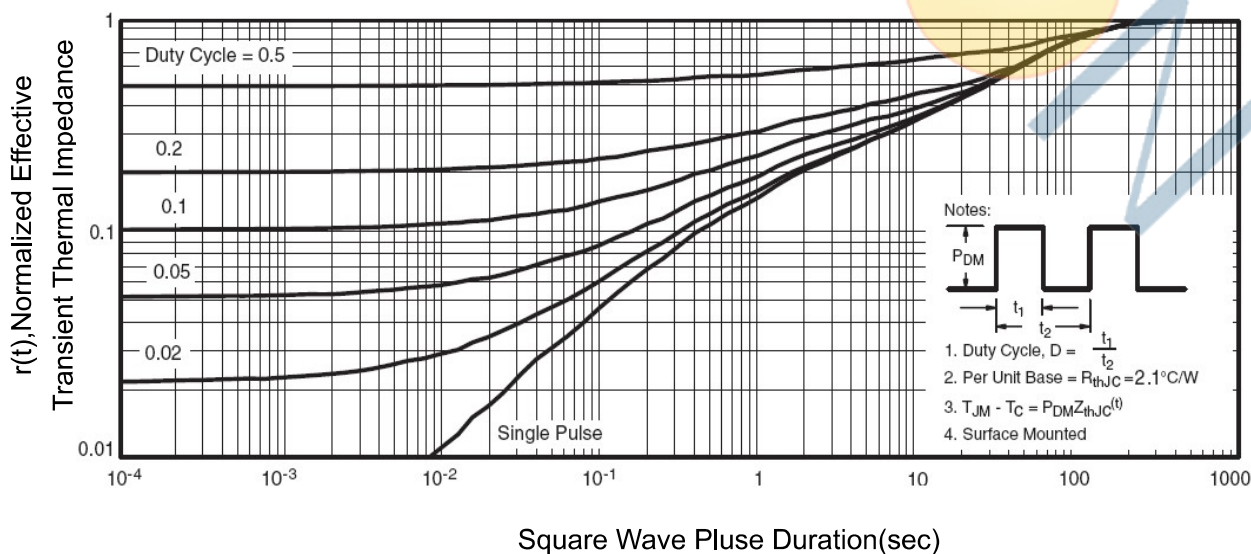
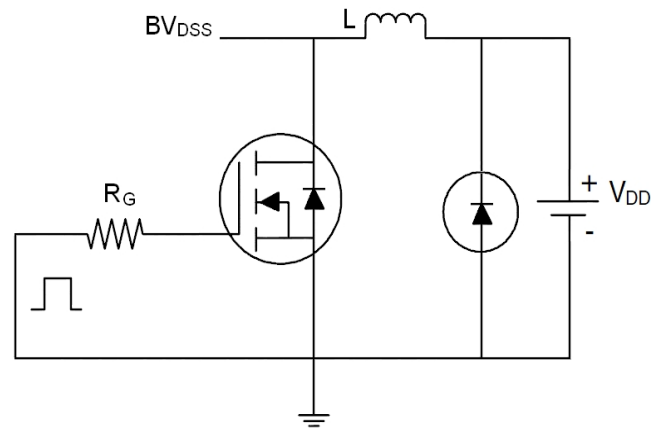
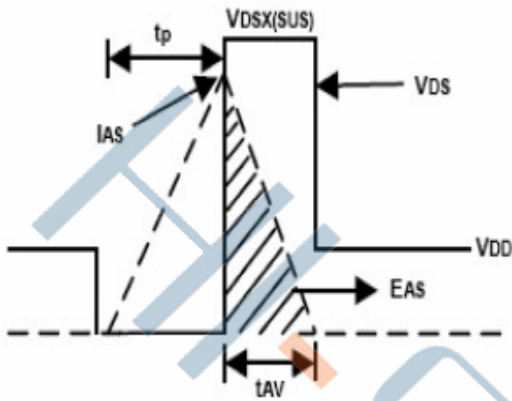


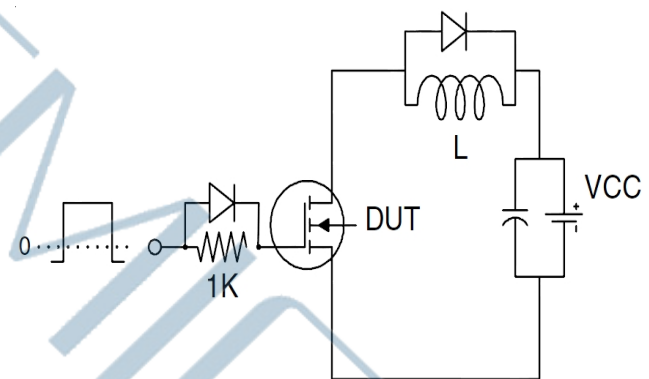
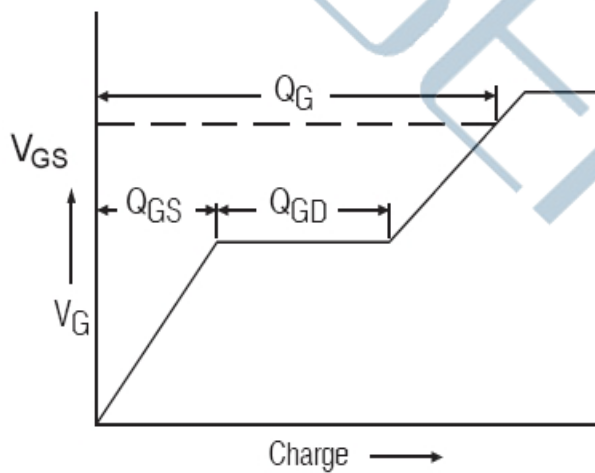
Figure 11 Normalized Maximum Transient Thermal Impedance

TYPICAL TEST CIRCUIT

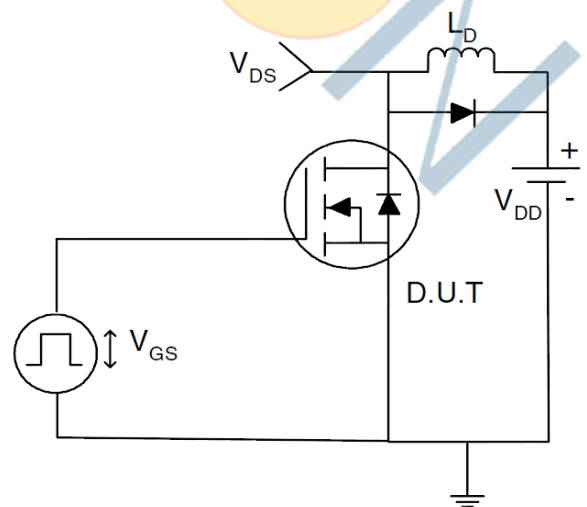
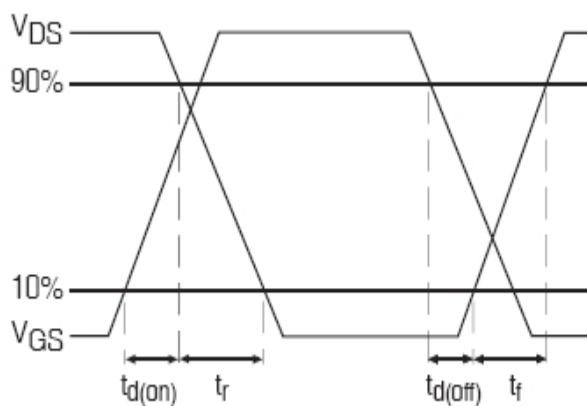
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit:

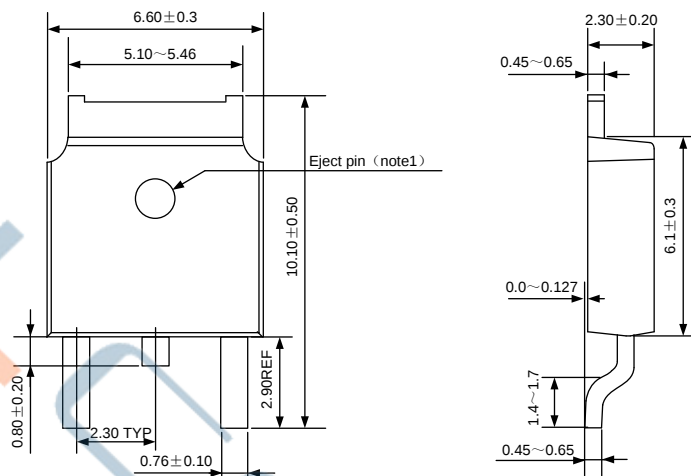


3) Switch Time Test Circuit:



TO-252-2L

UNIT: mm



NOTE1 There are two conditions for this position: has an eject pin or has no eject pin.