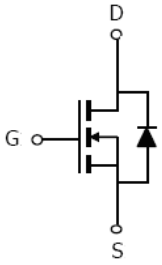
V_{DS}	700	V
$R_{DS(on),TYP}$@ V_{GS}=10V	520	mΩ
I_D	8	A

Features

- Extremely low gate charge
- 100% avalanche tested
- Super Junction Technology
- Pb-free lead plating; RoHS compliant; Halogen free

TO-220SF

Pb-Free RoHS HF Halogen-Free



Part ID	Package Type	Marking	Tube Information
VSF600N70HS3	TO-220SF	600N70H	50pcs/Tube

Maximum ratings, at T_A=25°C, unless otherwise specified

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		700	V
V_{GS}	Gate-Source voltage		±30	V
I_S	Diode continuous forward current	T_C=25°C	8	A
I_D	Continuous drain current @VGS=10V	T_C=25°C	8	A
		T_C=100°C	5	A
I_{DM}	Pulse drain current tested ①	T_C=25°C	32	A
EAS	Avalanche energy, single pulsed ②		175	mJ
P_D	Maximum power dissipation	T_C=25°C	25	W
T_{STG}, T_J	Storage and Junction Temperature Range		-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typical	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	°C/W

Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	700	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=700V,V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current(Tj=125℃)	V_{DS}=560V,V_{GS}=0V	--	--	50	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±30V,V_{DS}=0V	--	--	±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	3.0	--	4.6	V
$R_{DS(ON)}$	Drain-Source On-State Resistance ③	V_{GS}=10V, I_D=4.0A	--	520	600	mΩ
		Tj=100℃	--	830	--	mΩ
Dynamic Electrical Characteristics @ T_j= 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=30V,V_{GS}=0V, f=1MHz	500	585	670	pF
C_{oss}	Output Capacitance		235	275	315	pF
C_{rss}	Reverse Transfer Capacitance		--	12	20	pF
Q_g	Total Gate Charge	V_{DS}=350V,I_D=7A, V_{GS}=10V	--	13	--	nC
Q_{gs}	Gate-Source Charge		--	4	--	nC
Q_{gd}	Gate-Drain Charge		--	4.4	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=350V, I_D=3.5A, R_G=10Ω, V_{GS}=10V	--	39	--	ns
t_r	Turn-on Rise Time		--	22	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	109	--	ns
t_f	Turn-Off Fall Time		--	29	--	ns
Source- Drain Diode Characteristics@ T_j = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	I_{SD}=8A,V_{GS}=0V	--	0.9	1.2	V
t_{rr}	Reverse Recovery Time	T_j=25℃,I_{sd}=3.5A, V_{GS}=0V di/dt=100A/μs	--	190	--	ns
Q_{rr}	Reverse Recovery Charge		--	1.4	--	μC

NOTE: ① Repetitive rating; pulse width limited by max junction temperature.

② Limited by T_{Jmax}, starting T_J = 25°C, L = 14mH, R_G = 25Ω, I_{AS} = 5A, V_{GS} =10V. Part not recommended for use above this value.

③ Pulse width ≤ 380μs; duty cycle≤ 2%.

Typical Characteristics

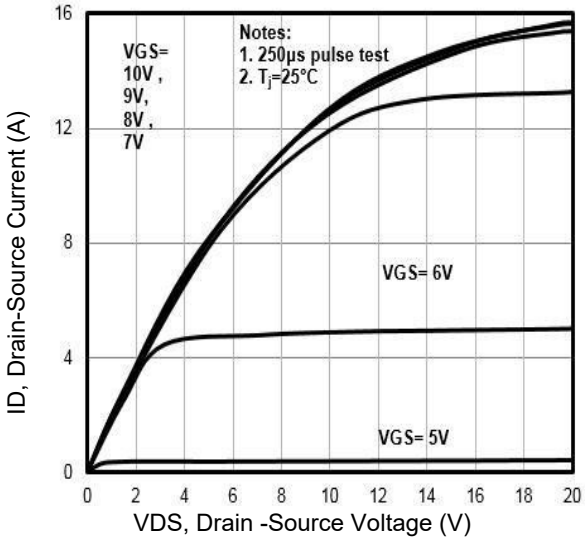


Fig1. Typical Output Characteristics

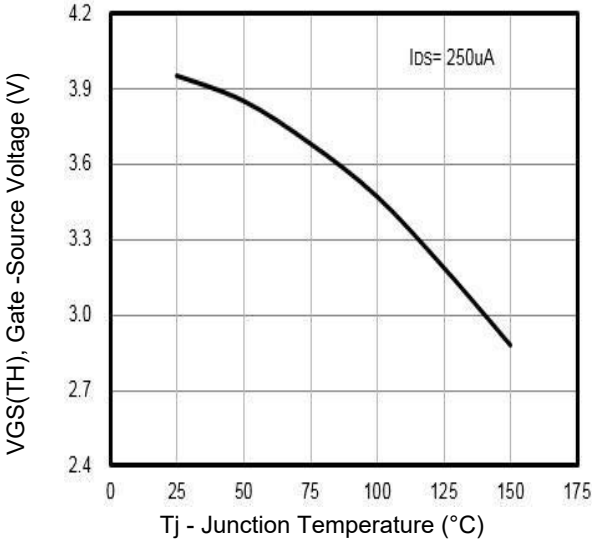


Fig2. $V_{GS(TH)}$ Gate -Source Voltage Vs. Tj

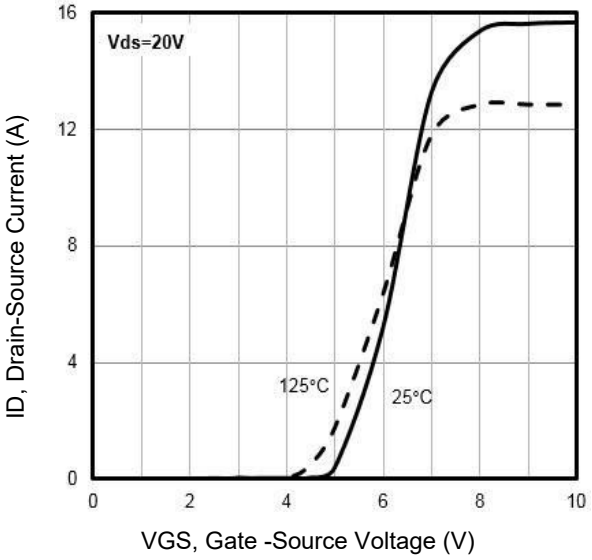


Fig3. Typical Transfer Characteristics

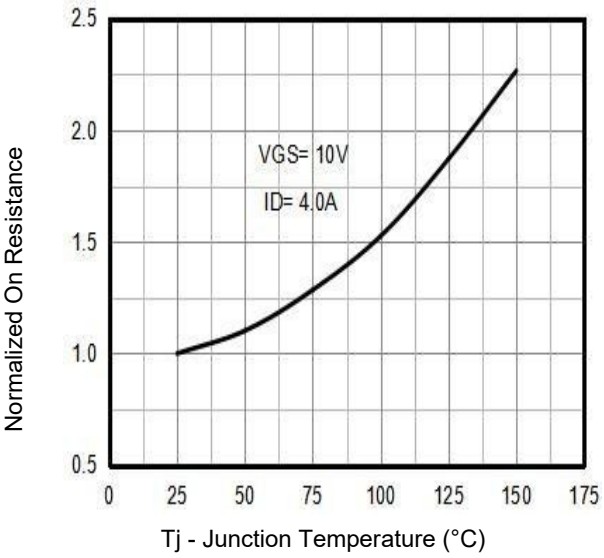


Fig4. Normalized On-Resistance Vs. Temperature

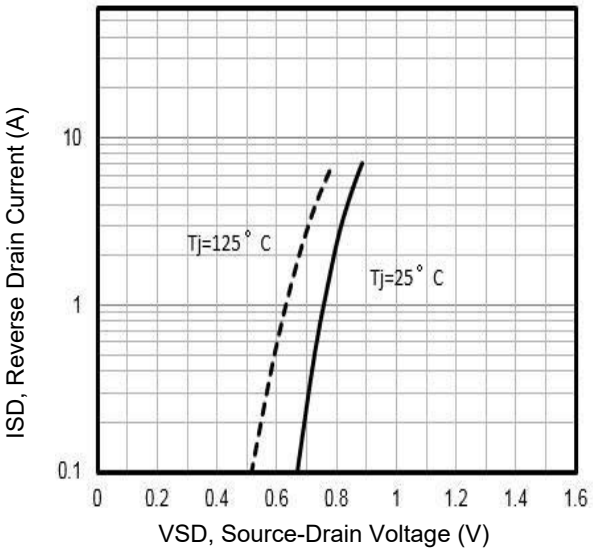


Fig5. Typical Source-Drain Diode Forward Voltage

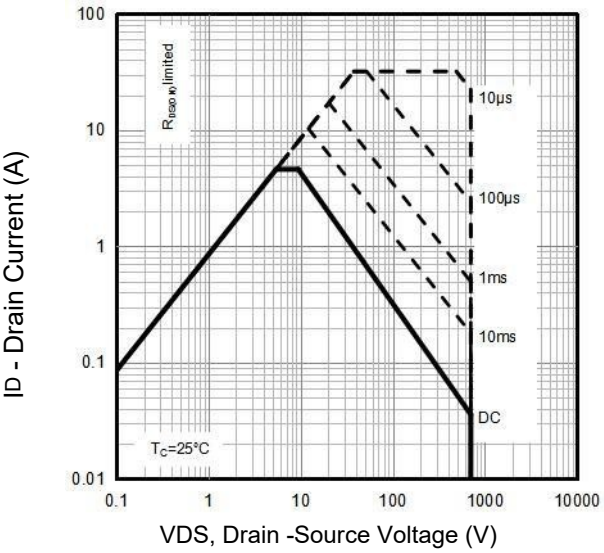


Fig6. Maximum Safe Operating Area

Typical Characteristics

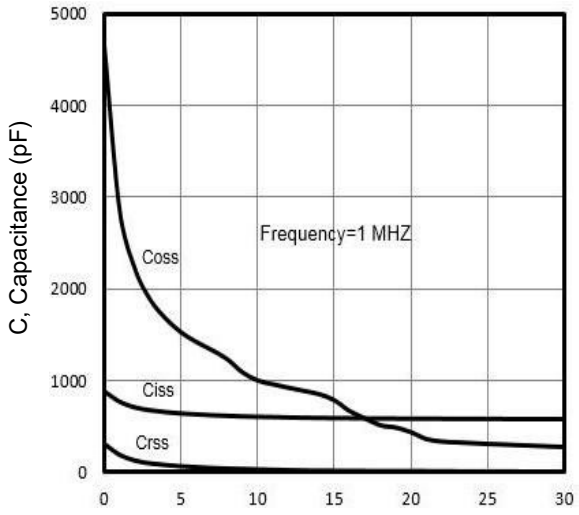


Fig7. Typical Capacitance Vs. Drain-Source Voltage

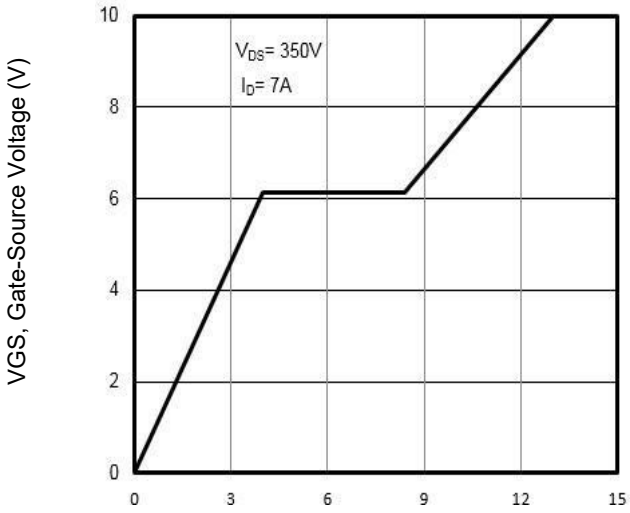


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

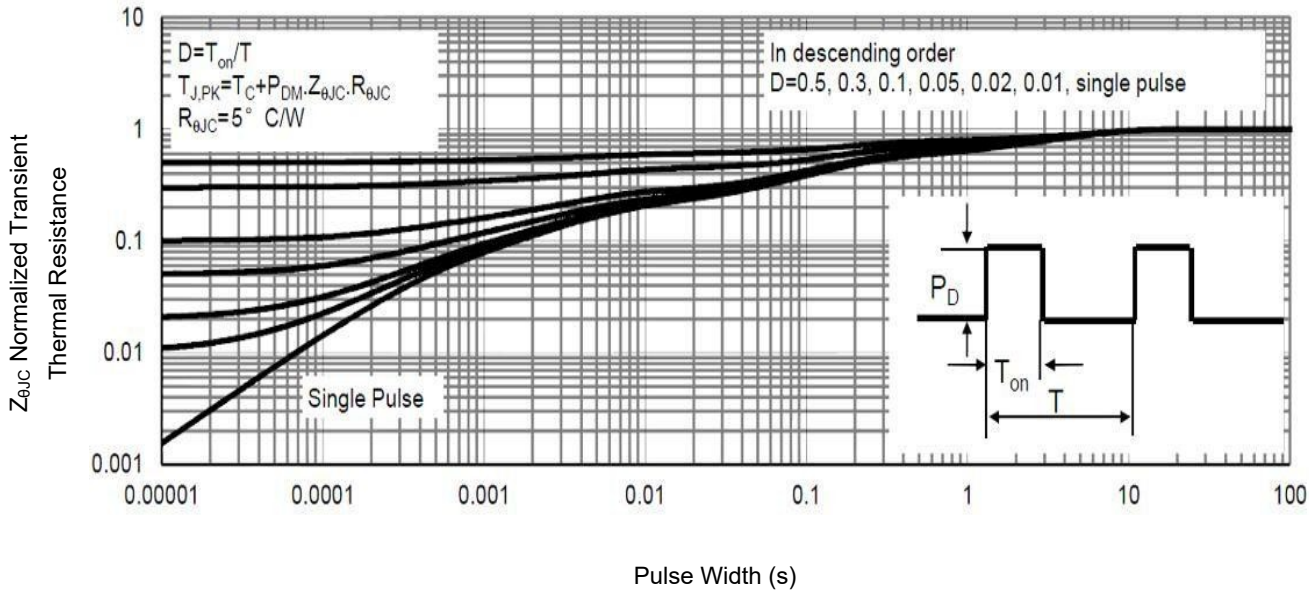


Fig9. Normalized Maximum Transient Thermal Impedance

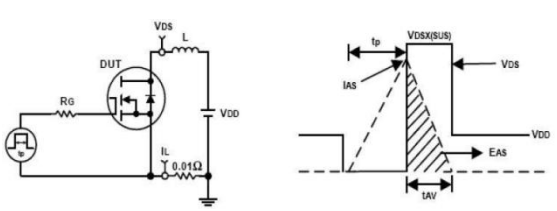


Fig10. Unclamped Inductive Test Circuit and waveforms

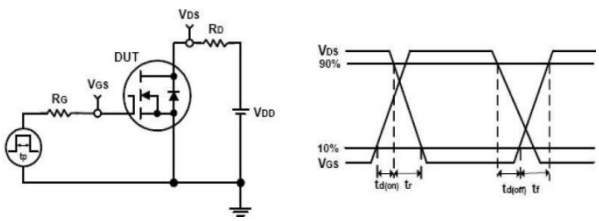
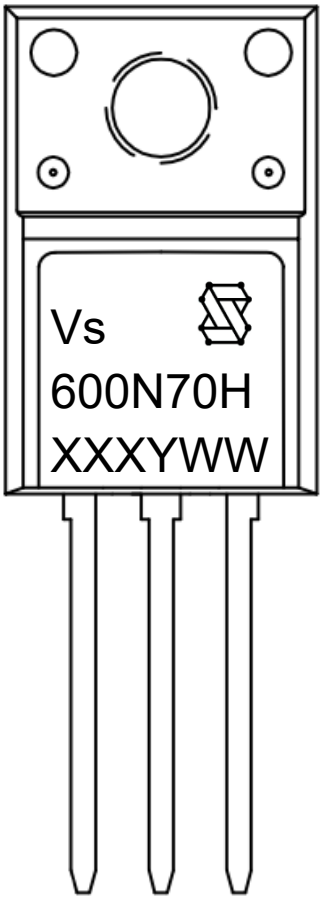


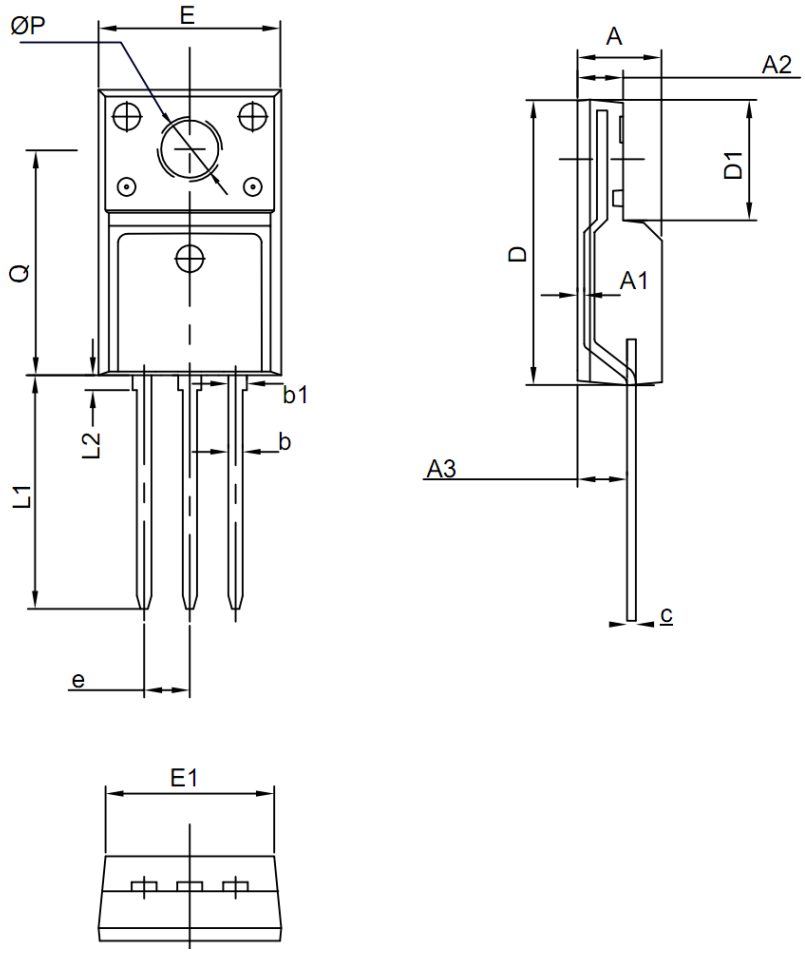
Fig11. Switching Time Test Circuit and waveforms

Marking Information



1st line: Vanguard Code（Vs），Vanguard Logo
2nd line: Part Number（600N70H）
3rd line: Date code （XXXYWW）
XXX: Wafer Lot Number Code , code changed with Lot Number
Y: Year Code，(e.g. E=2017, F=2018, G=2019, H=2020, etc)
WW: Week Code (01 to 53)

TO-220SF Package Outline Data



Symbol	Dimensions (unit: mm)		
	Min	Typ	Max
A	4.50	4.70	4.90
A1	--	0.43	--
A2	2.34	2.54	2.74
A3	2.66	2.76	2.86
b	0.59	0.69	0.79
b1	1.04	1.14	1.24
c	0.45	0.50	0.60
D	15.57	15.87	16.17
D1	6.50	6.70	6.90
e	2.44	2.54	2.64
E	9.96	10.16	10.36
E1	9.20	9.40	9.60
L1	12.70	13.00	13.30
L2	--	--	0.95
Q	12.27	12.57	12.87
ΦP	3.03	3.18	3.33

Note:
1. Dimensions do NOT include mold flash, protrusions or gate burrs.

Customer Service

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