

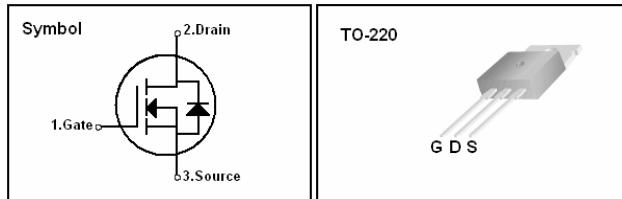


TO-220F/TO-220 Plastic-Encapsulate Transistors

600V N-Channel MOSFET

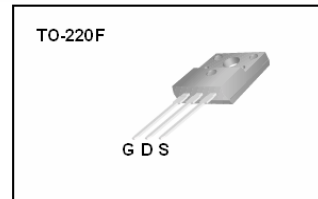
Features

- 7.5A,600v,RDS(on)=1.2Ω@VGS=10V
- Gate charge (Typical 30nC)
- High ruggedness
- Fast switching
- 100% Avalanche Tested
- Improved dv/dt capability



General Description

This Power MOSFET is produced using Truesemi's advanced planar stripe, DMOS technology. This latest technology has been especially designed to minimize on-state resistance, have a high rugged avalanche characteristics. These devices are well suited for high efficiency switch mode power supplies, active power factor correction, electronic lamp ballasts based on half bridge topology.



Absolute Maximum Ratings

Symbol	Parameter	HP8N60	HF8N60	Units
V _{DSS}	Drain to Source Voltage	600		V
I _D	Continuous Drain Current(@TC = 25°C)	7.5	7.5*	A
	Continuous Drain Current(@TC = 100°C)	4.5	4.5*	A
I _{DM}	Drain Current Pulsed (Note 1)	30	30*	A
V _{GS}	Gate to Source Voltage	±30		V
E _{AS}	Single Pulsed Avalanche Energy (Note 2)	285		mJ
E _{AR}	Repetitive Avalanche Energy (Note 1)	15.5		mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.5		V/ns
P _D	Total Power Dissipation(@TC = 25 °C)	165	55	W
	Derating Factor above 25 °C	1.21	0.4	W/°C
T _{STG, T_J}	Operating Junction Temperature & Storage Temperature	-55 ~ 150		°C
TL	Maximum Lead Temperature for soldering purpose, 1/8 from Case for 5 seconds.	300		°C

Thermal Characteristics

Symbol	Parameter	HP8N60M	HF8N60	Units
R _{θJC}	Thermal Resistance, Junction-to-Case	0.85	2.2	°C/W
R _{θCS}	Thermal Resistance, Case-to-Sink Typ	0.5	--	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	62.5	62.5	°C/W

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Electrical Characteristics (TC = 25 °C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250uA	600	--	--	V
Δ BV _{DSS} / Δ T _J	Breakdown Voltage Temperature coefficient	I _D = 250uA, referenced to 25 °C	--	0.57	--	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} = 600V, V _{GS} = 0V	--	--	10	uA
		V _{DS} = 480V, T _C = 125 °C	--	--	100	uA
I _{GSS}	Gate-Source Leakage, Forward	V _{GS} = 30V, V _{DS} = 0V	--	--	100	nA
	Gate-source Leakage, Reverse	V _{GS} = -30V, V _{DS} = 0V	--	--	-100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250uA	2.0	--	4.0	V
R _{DS(ON)}	Static Drain-Source On-state Resistance	V _{GS} = 10 V, I _D = 3.75A	--	0.85	1.2	Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 25V, f = 1MHz	--	1255	--	pF
C _{oss}	Output Capacitance		--	115	--	
C _{rss}	Reverse Transfer Capacitance		--	14.2	--	
Dynamic Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} = 300V, I _D = 7.5A, R _G = 25Ω (Note 4, 5)	--	22	--	ns
t _r	Rise Time		--	90	--	
t _{d(off)}	Turn-off Delay Time		--	76	--	
t _f	Fall Time		--	44	--	
Q _g	Total Gate Charge	V _{DS} = 480V, V _{GS} = 10V, I _D = 7.5A (Note 4, 5)	--	30	--	nC
Q _{gs}	Gate-Source Charge		--	5.2	--	
Q _{gd}	Gate-Drain Charge(Miller Charge)		--	16.3	--	

Source-Drain Diode Ratings and Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit.
I _S	Continuous Source Current	Integral Reverse p-n Junction	--	--	7.5	A
I _{SM}	Pulsed Source Current	Diode in the MOSFET	--	--	30	
V _{SD}	Diode Forward Voltage	I _S = 7.5A, V _{GS} = 0V	--	--	1.5	V
t _{rr}	Reverse Recovery Time	I _S = 7.5A, V _{GS} = 0V, di/dt = 100A/us	--	390	--	ns
Q _{rr}	Reverse Recovery Charge	I _S = 7.5A, V _{GS} = 0V, di/dt = 100A/us	--	3.3	--	uC

※ NOTES

1. Repeativity rating : pulse width limited by junction temperature
2. L = 20mH, I_{AS} = 7.5A, V_{DD} = 50V, R_G = 50Ω , Starting T_J = 25°C
3. I_{SD} ≤ 7.5A, di/dt ≤ 200A/us, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
4. Pulse Test : Pulse Width ≤ 300us, Duty Cycle ≤ 2%
5. Essentially independent of operating temperature

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Fig 1. On-State Characteristics

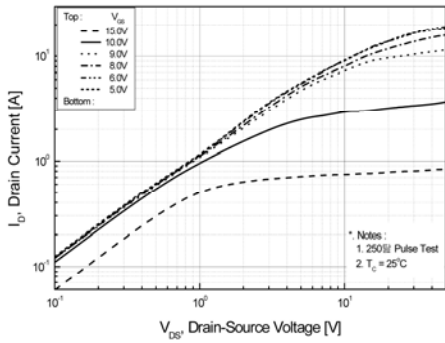


Fig 2. Transfer Characteristics

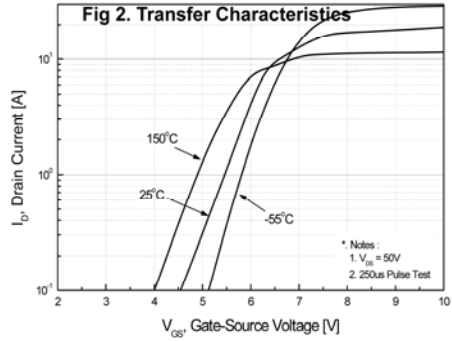


Fig 3. On Resistance Variation vs. Drain Current and Gate Voltage

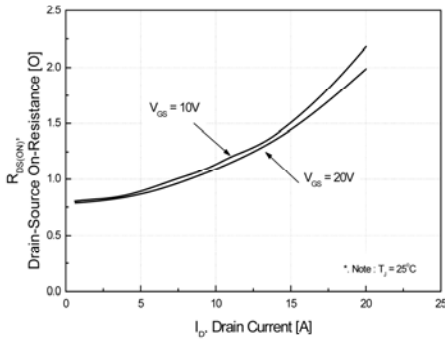


Fig 4. On State Current vs. Source-Drain voltage

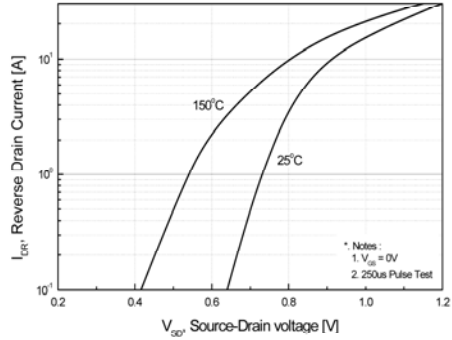


Fig 5. Capacitance Characteristics (Non-Repetitive)

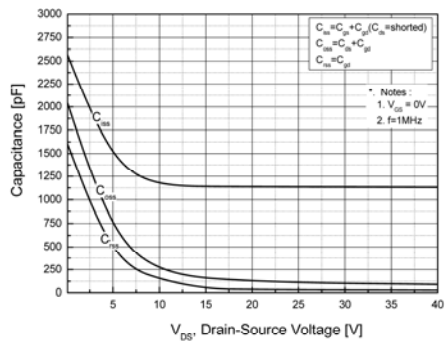
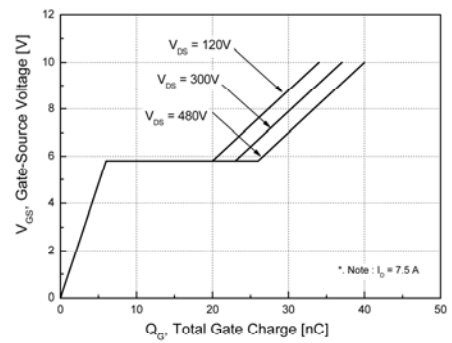


Fig 6. Gate Charge Characteristics



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Fig 7. Breakdown Voltage Variation vs. Junction Temperature

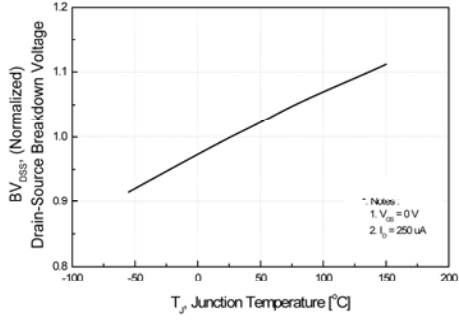


Fig 8. On-Resistance Variation vs. Junction Temperature

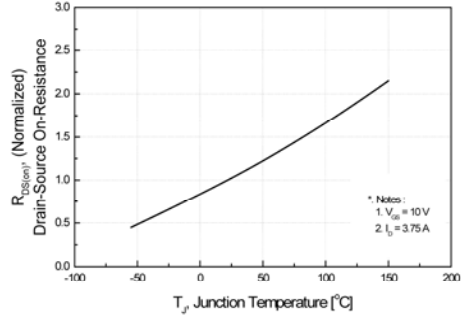


Fig 9-1. Maximum Safe Operating Area for TSP8N60M

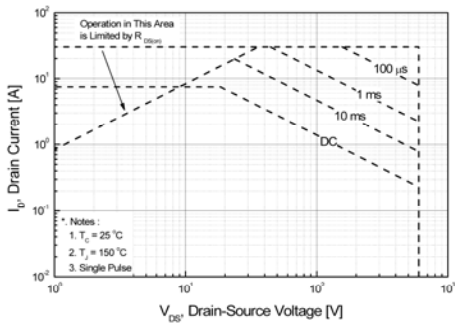


Fig 9-2. Maximum Safe Operating Area for TSF8N60M

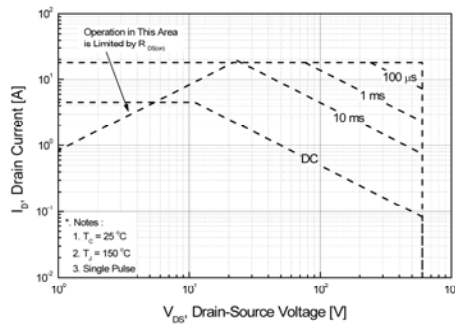
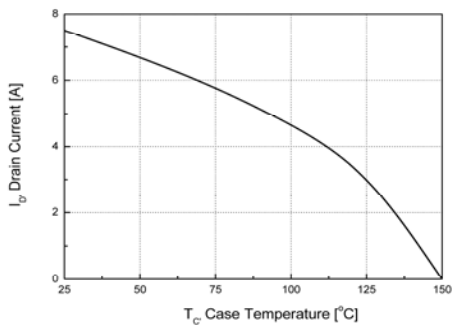


Fig 10. Maximum Drain Current vs. Case Temperature



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Fig 11-1 . Transient Thermal Response Curve for TSP8N60M

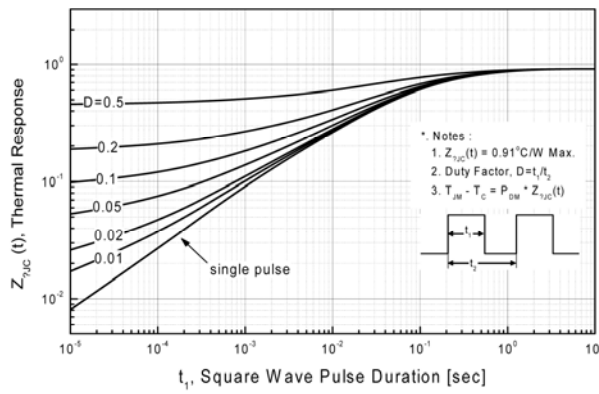
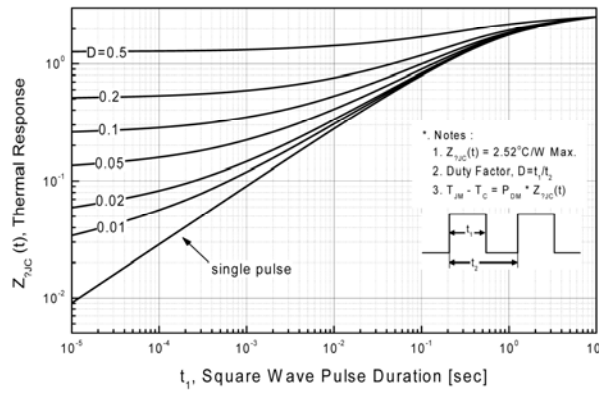


Fig 11-2 . Transient Thermal Response Curve for TSF8N60M



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Fig. 12. Gate Charge Test Circuit & Waveforms

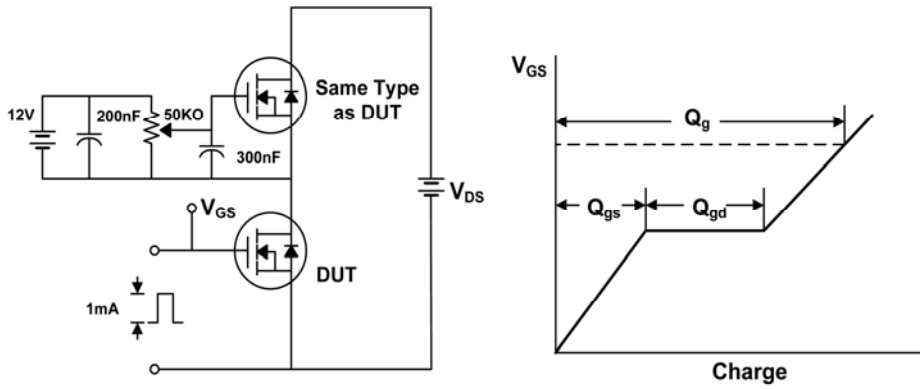


Fig. 13. Switching Time Test Circuit & Waveforms

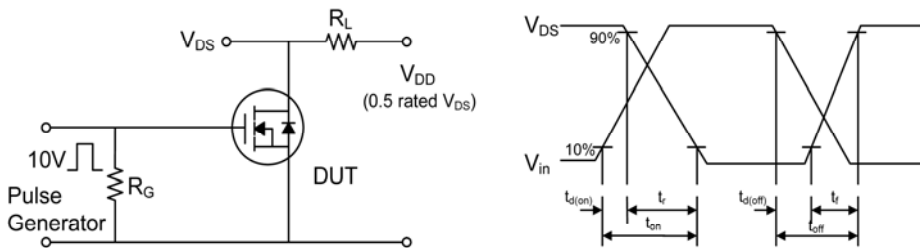
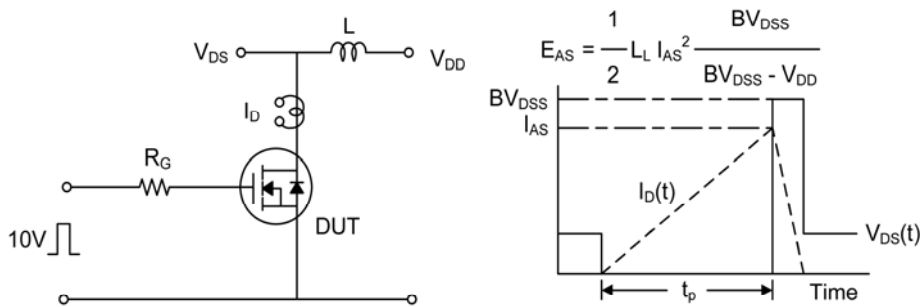
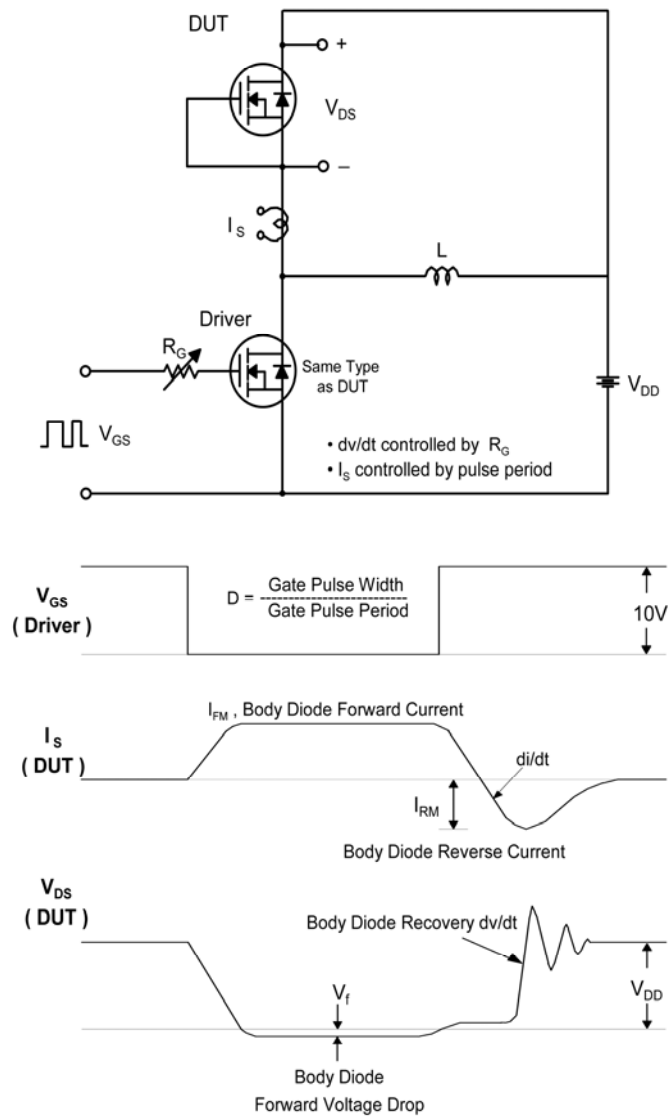


Fig. 14. Unclamped Inductive Switching Test Circuit & Waveforms



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Fig. 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms



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