

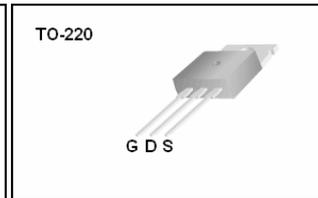
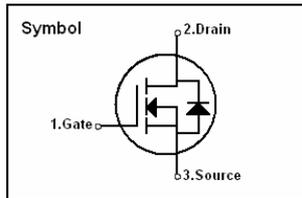


SSP5N60/SSF5N60C

600V N-Channel MOSFET

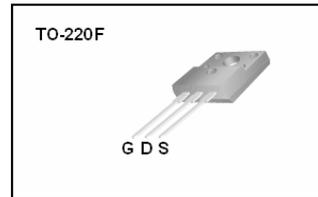
Features

- 4.5A,600v,RDS(on)=2.5Ω@VGS=10V
- Gate charge (Typical 27nC)
- High ruggedness
- Fast switching
- 100% AvalancheTested
- Improved dv/dt capability



General Description

This Power MOSFET is produced using Sourcesemi's advanced planar stripe, DMOS technology. This latest technology has been especially designed to minimize on-state resistance, have a high rugged avalanche characteristics, such as fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics. This power MOSFET is usually used at AC adaptors, on the battery charger and SMPS



Absolute Maximum Ratings

Symbol	Parameter	SSP5N60C	SSF5N60C	Units
VDSS	Drain to Source Voltage	600		V
ID	Continuous Drain Current(@TC = 25°C)	4.5	4.5*	A
	Continuous Drain Current(@TC = 100°C)	2.5	2.5*	A
IDM	Drain Current Pulsed (Note 1)	16	16*	A
VGS	Gate to Source Voltage	±30		V
EAS	Single Pulsed Avalanche Energy (Note 2)	240		mJ
EAR	Repetitive Avalanche Energy (Note 1)	10		mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	5.0		V/ns
PD	Total Power Dissipation(@TC = 25 °C)	100	33	W
	Derating Factor above 25 °C	0.8	0.26	W/ °C
TSTG, TJ	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	SSP5N60C	SSF5N60C	Units
RθJC	Thermal Resistance, Junction-to-Case	1.25	3.79	°C/W
RθCS	Thermal Resistance, Case-to-Sink Typ	0.5	0.5	°C/W
RθJA	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						
BVDSS	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250uA	600	--	--	V
$\Delta BVDSS / \Delta T_J$	Breakdown Voltage Temperature coefficient	I _D = 250uA, referenced to 25 °C	--	0.65	--	V/°C
IDSS	Drain-Source Leakage Current	V _{DS} = 600V, V _{GS} = 0V	--	--	10	uA
		V _{DS} = 480V, T _C = 125 °C	--	--	100	uA
IGSS	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 = 2.A	--	2.0	2.5	Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 25V, f = 1MHz	--	710	920	pF
C _{oss}	Output Capacitance		--	65	85	
C _{rss}	Reverse Transfer Capacitance		--	14	19	
Dynamic Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} = 300V, I _D = 4.5A, R _G = 25Ω (Note 4, 5)	--	20	50	ns
t _r	Rise Time		--	55	120	
t _{d(off)}	Turn-off Delay Time		--	70	150	
t _f	Fall Time		--	55	120	
Q _g	Total Gate Charge	V _{DS} = 480V, V _{GS} = 10V, I _D = 4.5A (Note 4, 5)	--	27	30	nC
Q _{gs}	Gate-Source Charge		--	3.6	--	
Q _{gd}	Gate-Drain Charge(Miller Charge)		--	13.1	--	

Source-Drain Diode Ratings and Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit.
I _S	Continuous Source Current	Integral Reverse p-n Junction	--	--	4.5	A
I _{SM}	Pulsed Source Current	Diode in the MOSFET	--	--	16	
V _{SD}	Diode Forward Voltage	I _S = 4.5A, V _{GS} = 0V	--	--	1.4	V
t _{rr}	Reverse Recovery Time	I _S = 4.5A, V _{GS} = 0V, di/dt = 100A/us	--	330	--	ns
Q _{rr}	Reverse Recovery Charge	I _S = 4.5A, V _{GS} = 0V, di/dt = 100A/us	--	2.67	--	uC

※ NOTES

1. Repeatability rating : pulse width limited by junction temperature
2. L = 25.0mH, I_{AS} = 4.0A, V_{DD} = 50V, R_G = 25Ω , Starting T_J = 25°C
3. I_{SD} ≤ 4.0A, di/dt ≤ 200A/us, V_{DD} ≤ BVDSS, 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

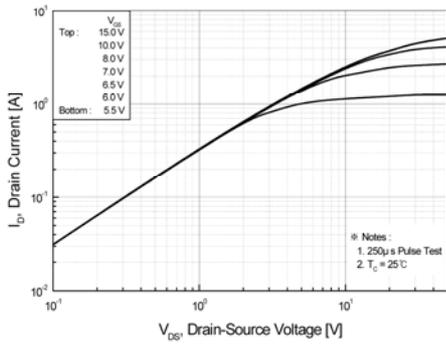


Fig 2. Transfer Characteristics

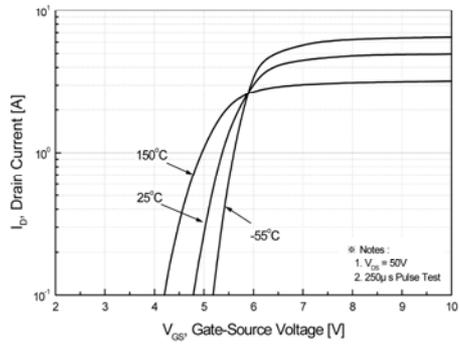


Fig 3. On Resistance Variation vs. Drain Current and Gate Voltage

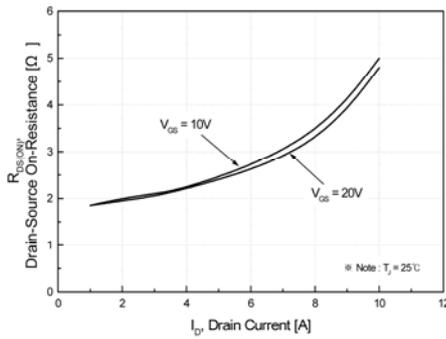


Fig 4. On State Current vs. Allowable Case Temperature

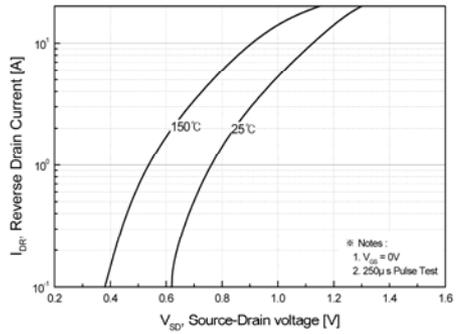


Fig 5. Capacitance Characteristics (Non-Repetitive)

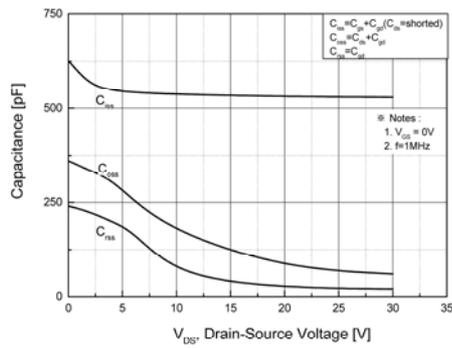
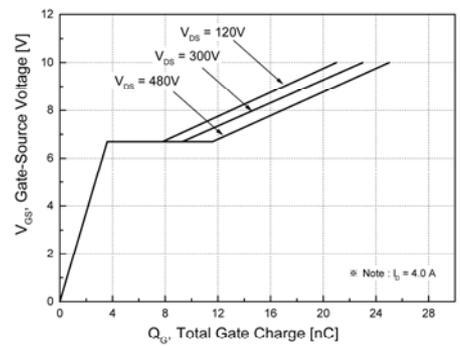


Fig 6. Gate Charge Characteristics



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Fig 7. Breakdown Voltage Variation vs. Junction Temperature

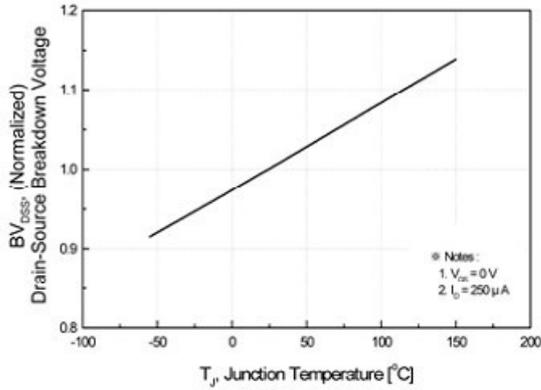


Fig 8. On-Resistance Variation vs. Junction Temperature

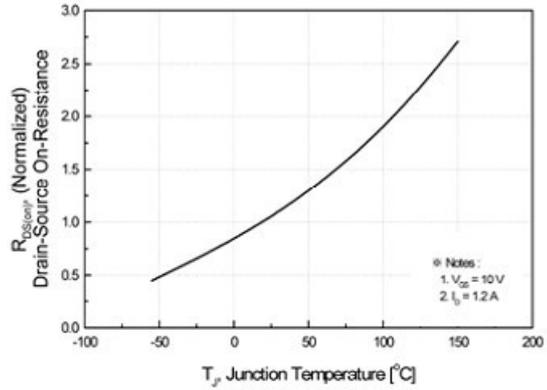


Fig 9-1. Maximum Safe Operating Area for SSP5N60C

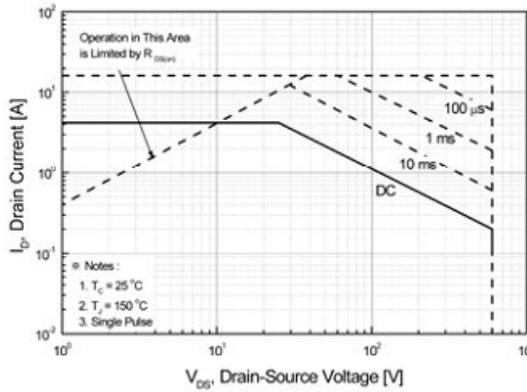


Fig 9-2. Maximum Safe Operating Area for SSF5N60C

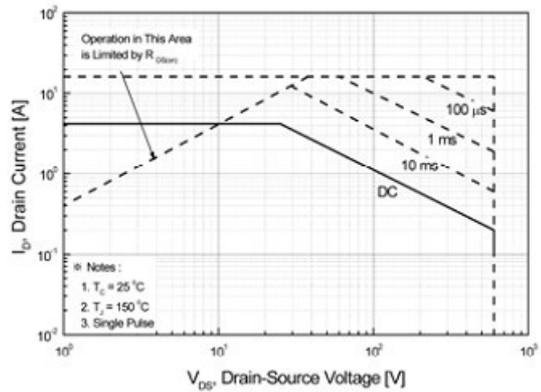
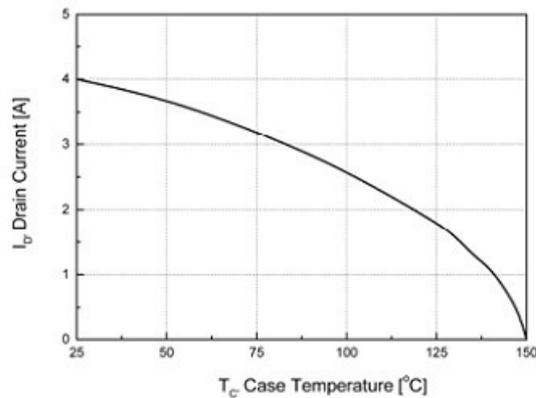


Fig 10. Maximum Drain Current vs. Case Temperature



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Fig 11-1. Transient Thermal Response Curve for SSP5N60C

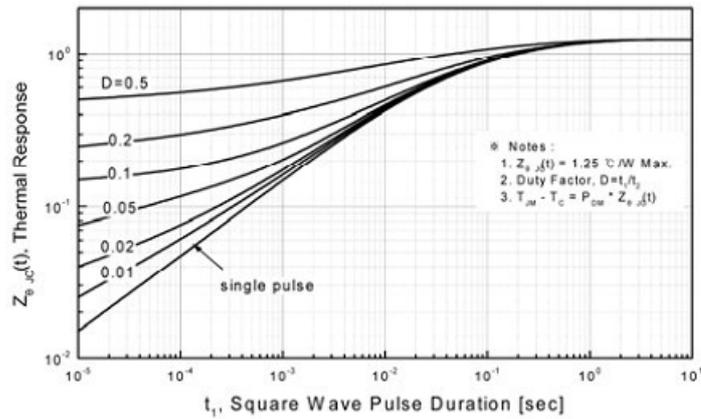
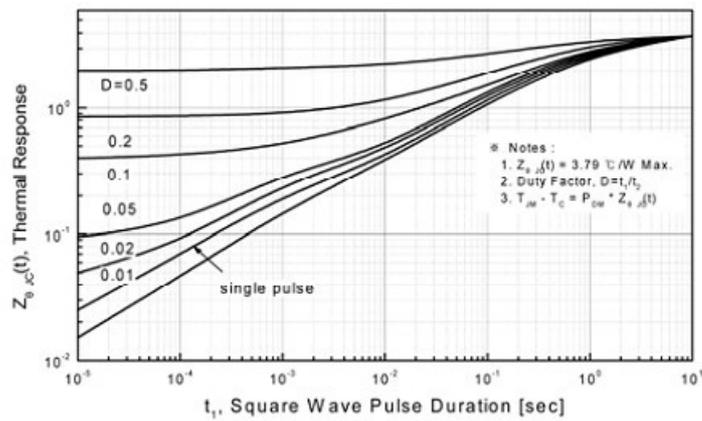


Fig 11-2. Transient Thermal Response Curve for SSF5N60C



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Fig. 12. Gate Charge Test Circuit & Waveforms

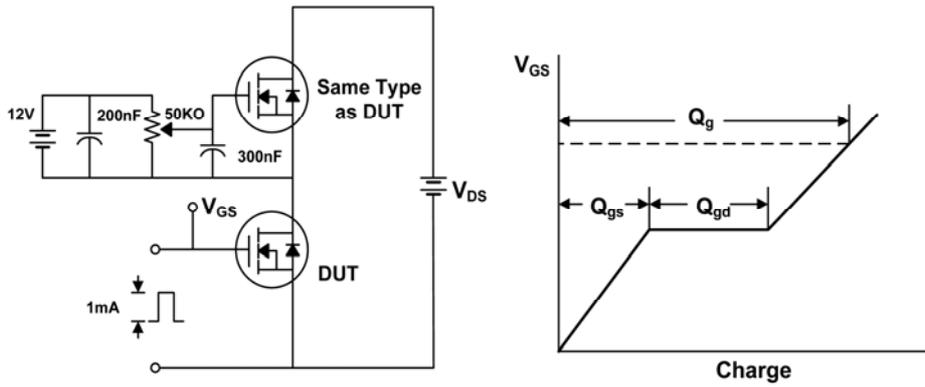


Fig. 13. Switching Time Test Circuit & Waveforms

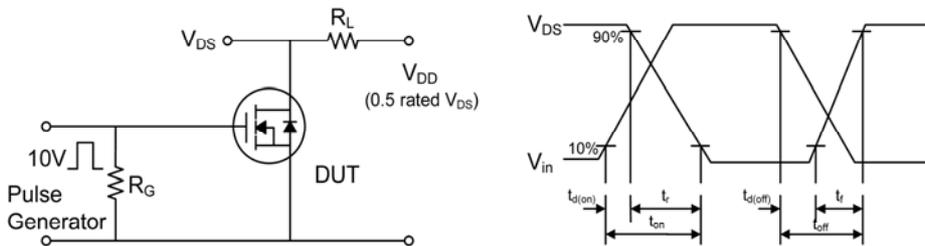
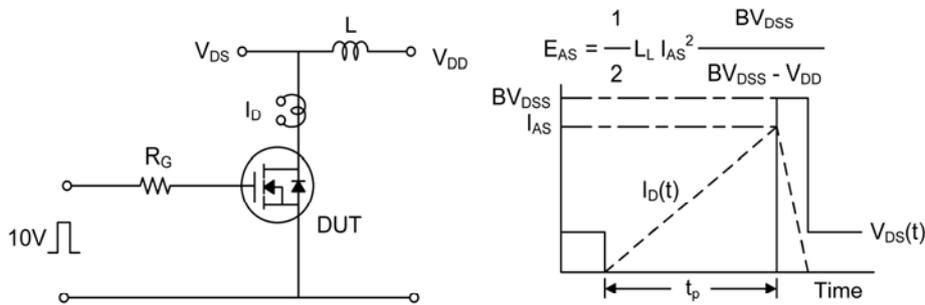


Fig. 14. Unclamped Inductive Switching Test Circuit & Waveforms



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

