

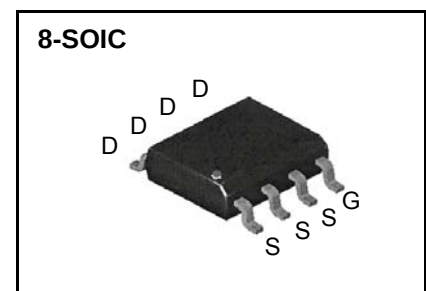
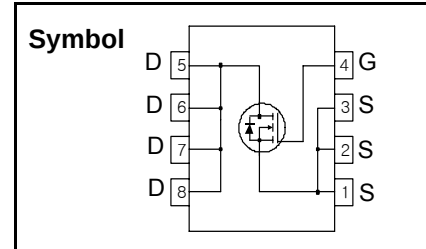
Logic N-Channel MOSFET

Features

- Low $R_{DS(on)}$ (Max 0.018 Ω)@ $V_{GS}=10V$
Low $R_{DS(on)}$ (Max 0.028 Ω)@ $V_{GS}=4.5V$
- Gate Charge (Typical 16nC)
- Maximum Junction Temperature Range (150°C)
- Available in Tape and Reel

General Description

This Power MOSFET is produced using Semiwell's advanced planar stripe, DMOS technology. This latest technology has been especially designed to minimize on-state resistance, have a low gate charge with superior switching performance, and rugged avalanche characteristics. This Power MOSFET is well suited for power management circuit or DC-DC converter.



Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{DSS}	Drain to Source Voltage	30	V
I_D	Continuous Drain Current(@ $T_A = 25^\circ\text{C}$)	9	A
I_{DM}	Drain Current Pulsed (Note 1)	50	A
V_{GS}	Gate to Source Voltage	± 20	V
P_D	Total Power Dissipation Single Operation ($T_A=25^\circ\text{C}$)	2.5	W
	Total Power Dissipation Single Operation ($T_A=70^\circ\text{C}$)	1.6	W
T_{STG}, T_J	Operating Junction Temperature & Storage Temperature	- 55 ~ 150	$^\circ\text{C}$
T_L	Maximum Lead Temperature for soldering purpose, 1/8 from Case for 10 seconds.	300	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min.	Typ.	Max.	
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 4)	-	-	50	$^\circ\text{C/W}$

Electrical Characteristics ($T_J = 25\text{ }^{\circ}\text{C}$ 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	30	-	-	V
Δ BV _{DSS} / Δ T _J	Breakdown Voltage Temperature coefficient	I _D = 250uA, referenced to 25 °C	-	15	-	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} = 24V, V _{GS} = 0V V _{DS} = 24V, V _{GS} = 0V, T _J = 55 °C	-	-	1 25	uA
I _{GSS}	Gate-Source Leakage, Forward	V _{GS} = 20V, V _{DS} = 0V			100	nA
	Gate-Source Leakage, Reverse	V _{GS} = -20V, V _{DS} = 0V	-	-	-100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250uA	1.0	-	-	V
R _{DS(ON)}	Static Drain-Source On-state Resistance	V _{GS} = 10 V, I _D = 9A V _{GS} = 4.5 V, I _D = 7.3A	- -	0.013 0.018	0.018 0.028	Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} =0 V, V _{DS} =15V, f = 1MHz	-	920	-	pF
C _{oss}	Output Capacitance		-	490	-	
C _{rss}	Reverse Transfer Capacitance		-	150	-	
Dynamic Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} = 15V, I _D = 1A, R _G = 50Ω V _{GS} = 10 V (Note 2,3)	-	13	20	ns
t _r	Rise Time		-	23	50	
t _{d(off)}	Turn-off Delay Time		-	130	150	
t _f	Fall Time		-	65	100	
Q _g	Total Gate Charge	V _{DS} = 15V, V _{GS} = 5V, I _D = 9A (Note 2,3)	-	16	20	nC
Q _{gs}	Gate-Source Charge		-	4	-	
Q _{gd}	Gate-Drain Charge(Miller Charge)		-	7.5	-	

Source-Drain Diode Ratings and Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit.
I_S	Continuous Source Diode Forward Current		-	-	2.1	A
V_{SD}	Diode Forward Voltage	$I_S = 2.1A, V_{GS} = 0V$ (Note 2)	-	-	1.2	V

※ NOTES

1. Repeativity rating : pulse width limited by junction temperature
2. Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$
3. Essentially independent of operating temperature.
4. Surface mounted on 1 inch² Cu board.

Fig 1. On-State Characteristics

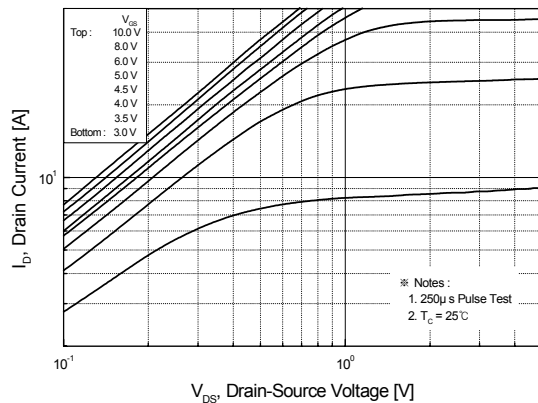


Fig 2. Transfer Characteristics

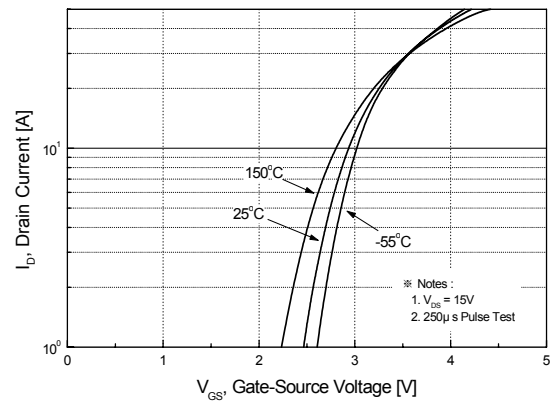


Fig 3. On Resistance Variation vs. Drain Current and Gate Voltage

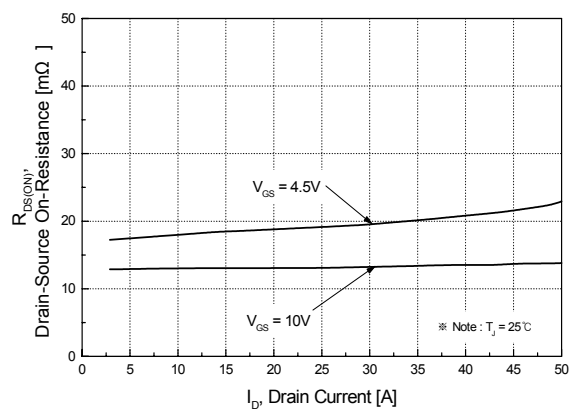


Fig 4. On State Current vs. Allowable Case Temperature

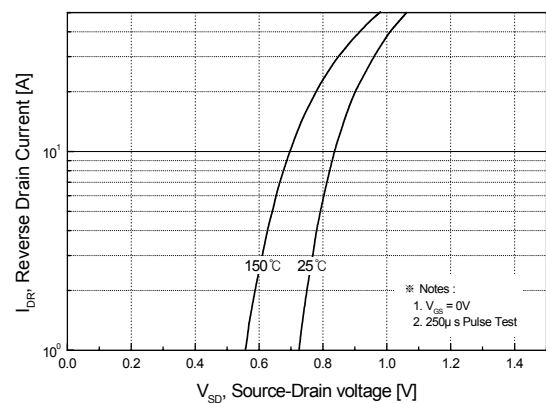


Fig 5. Capacitance Characteristics

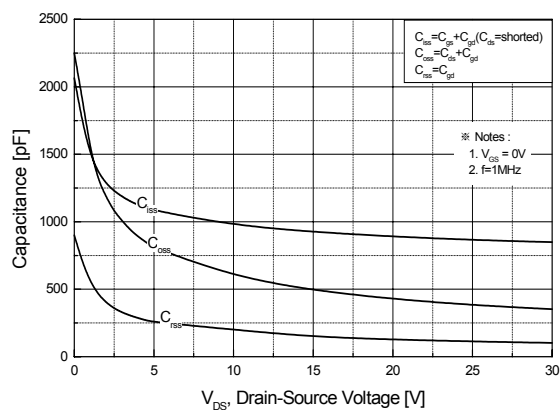
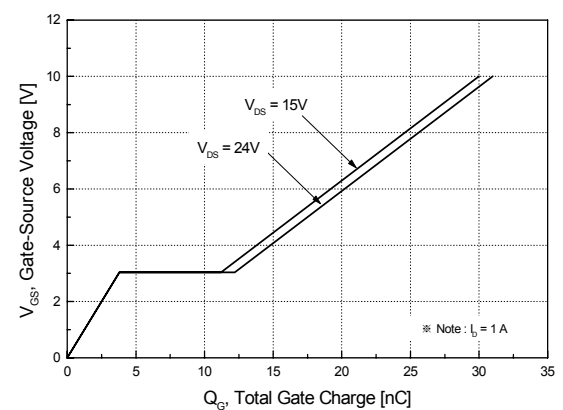


Fig 6. Gate Charge Characteristics



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Fig 7. Breakdown Voltage Variation
vs. Junction Temperature

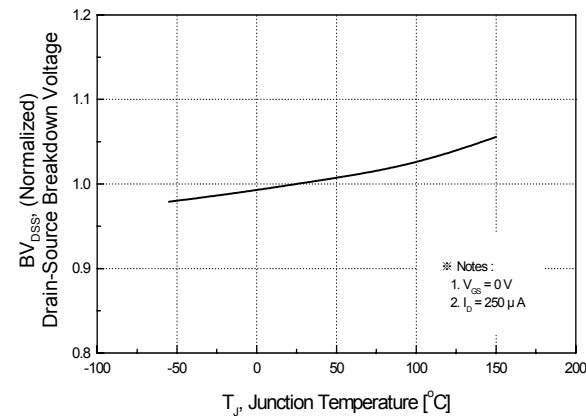


Fig 8. On-Resistance Variation
vs. Junction Temperature

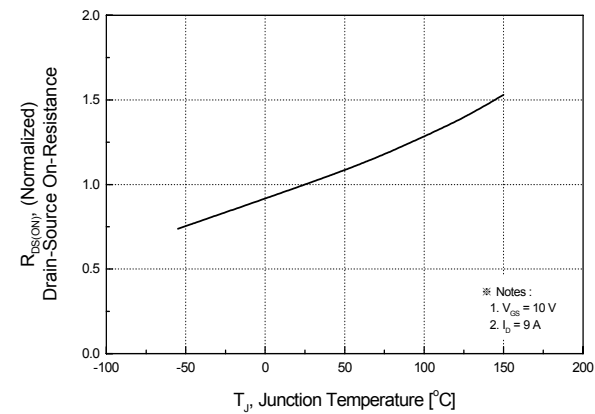


Fig 9. Normalized Transient Thermal Response Curve

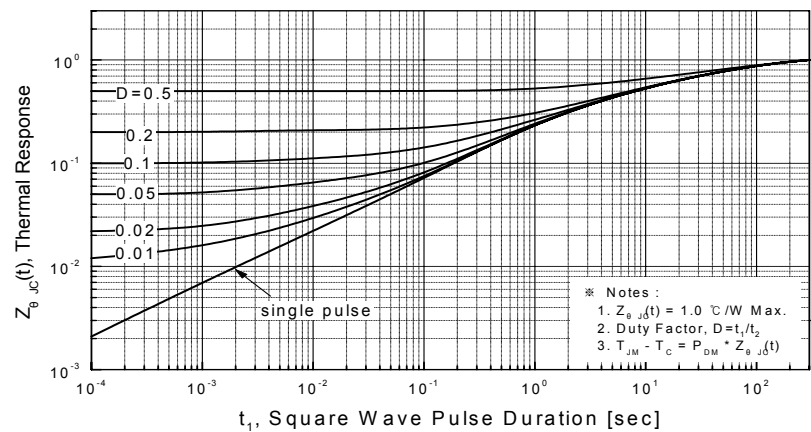


Fig. 10. Gate Charge Test Circuit & Waveforms

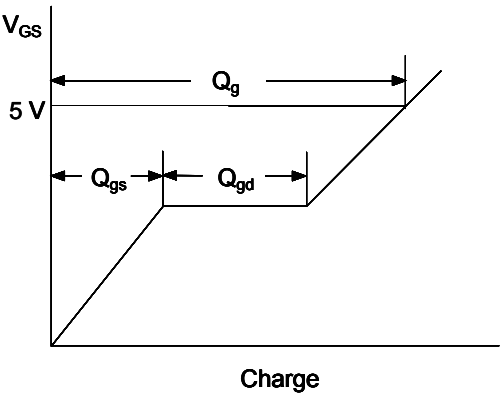
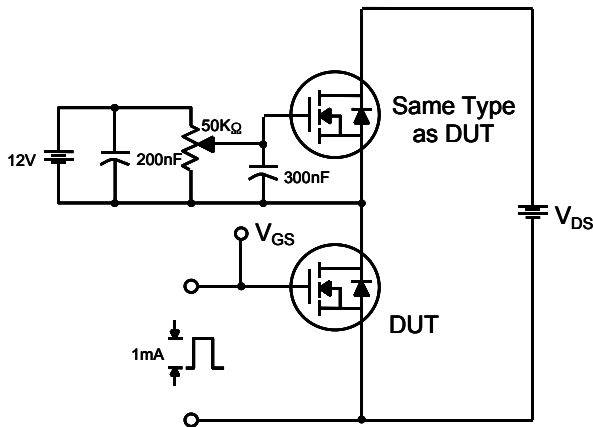
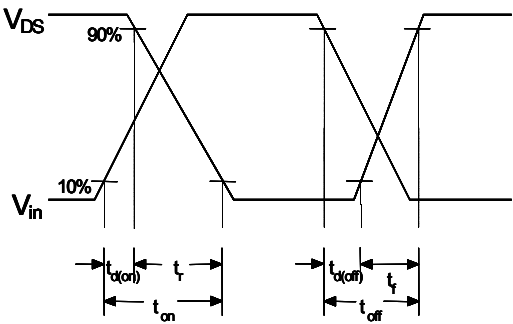
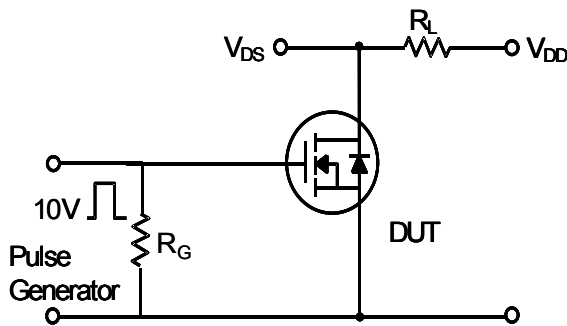


Fig. 11. Switching Time Test Circuit & Waveforms



SFS4416

8-SOIC Package Dimension

Dim.	mm			Inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	1.35	1.55	1.75	0.053	0.061	0.069
B	0.1	0.175	0.25	0.004	0.007	0.010
C	0.38	0.445	0.510	0.015	0.018	0.020
D	0.19	0.22	0.25	0.007	0.009	0.010
E	4.8	4.9	5	0.189	0.193	0.197
F	3.8	3.9	4	0.150	0.154	0.157
G	1.27 BSC					
H	5.8	6	6.2	0.228	0.236	0.244
I	0.5	0.715	0.93	0.020	0.028	0.037
J	0°	4°	8°	0°	4°	8°
K	0.250	0.375	0.05	0.010	0.015	0.020

