

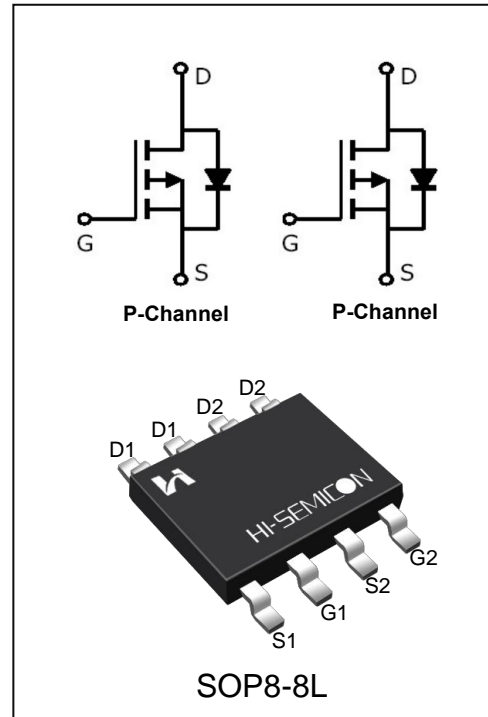
**-40V, -8A P-Channel Power MOSFET**

**GENERAL DESCRIPTION**

The Power MOSFET has extremely low on resistance, making it especially suitable for applications which require superior power density and outstanding efficiency.

**Features**

- ◆  $V_{DS} = -40V, I_D = -8A$
- ◆  $R_{DS(ON)}$   
 $R_{DS(ON)} = 26m\Omega$  (TYP@ $V_{GS} = -10V$ )  
 $R_{DS(ON)} = 33m\Omega$  (TYP@ $V_{GS} = -4.5V$ )



**ORDERING INFORMATION**

Part No.	Package	Marking	Material	Packing
SFS4000DPT8	SOP8-8L	SFS4000DPT8	Pb Free	Reel

ABSOLUTE MAXIMUM RATINGS (T<sub>J</sub>=25°C unless otherwise noted)

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V <sub>DS</sub>	-40	V
Gate-Source Voltage		V <sub>GS</sub>	±20	
Drain Current	T <sub>C</sub> = 25°C	I <sub>D</sub>	-8	A
	T <sub>C</sub> = 75°C		-5.6	
Drain Current Pulsed(Note 1)		I <sub>DM</sub>	-32	
Power Dissipation(T <sub>C</sub> =25°C) -Derate above 25°C		P <sub>D</sub>	2.5	W
Operation Junction Temperature Range		T <sub>J</sub>	-55~+150	°C
Storage Temperature Range		T <sub>stg</sub>	-55~+150	
Maximum lead temperature for soldering purposes,1/8" from case for 5 seconds		TL	300	

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B <sub>VDSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA	-40	--	--	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> = -40V, V <sub>GS</sub> = 0V	--	--	1.0	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = 20V, V <sub>DS</sub> = 0V	--	--	100	nA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = -20V, V <sub>DS</sub> = 0V	--	--	-100	
On Characteristics						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = -250μA	-1.0	-1.5	-2.0	V
Static Drain- Source On State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -4.0A	--	26	32	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4.0A	--	33	40	
Dynamic Characteristics						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -20V V <sub>GS</sub> = 0V f=1.0MHZ	--	897	--	pF
Output Capacitance	C <sub>oss</sub>		--	84	--	
Reverse Transfer Capacitance	C <sub>rss</sub>		--	73	--	
Switching Characteristics						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = -20V, V <sub>GS</sub> = -10V R <sub>G</sub> = 3Ω, I <sub>D</sub> =-4A (Note 2.3)	--	7.6	--	nS
Turn-on Rise Time	t <sub>r</sub>		--	12.3	--	
Turn-off Delay Time	t <sub>d(off)</sub>		--	31.2	--	
Turn-off Fall Time	t <sub>f</sub>		--	17.5	--	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-20V, I <sub>D</sub> =-4A V <sub>GS</sub> =-10V	--	16.5	--	nC
Gate-Source Charge	Q <sub>gs</sub>		--	3.6	--	
Gate-Drain Charge	Q <sub>gd</sub>		--	4.7	--	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	$I_S$	Integral Reverse P-N Junction Diode in the MOSFET	--	--	-8	A
Pulsed Source Current	$I_{SM}$		--	--	-32	
Diode Forward Voltage	$V_{SD}$	$I_S = -2A, V_{GS} = 0V$	--	-0.87	-1.3	V

NOTE:

1. Pulse width limited by maximum junction temperature
2. Pulse Test: Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$
3. Essentially independent of operating temperature

Typical Performance Characteristics

Figure 1. On-Region Characteristics

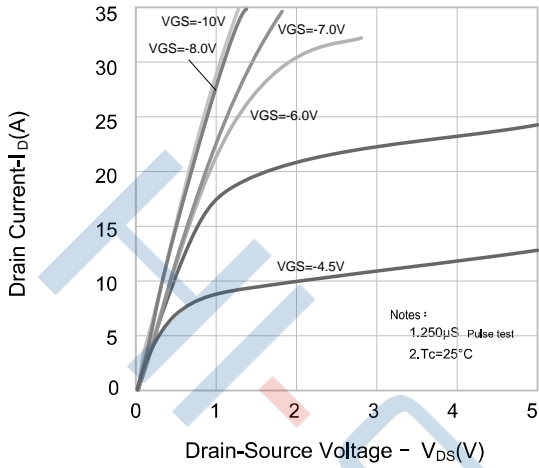


Figure 2. Transfer Characteristics

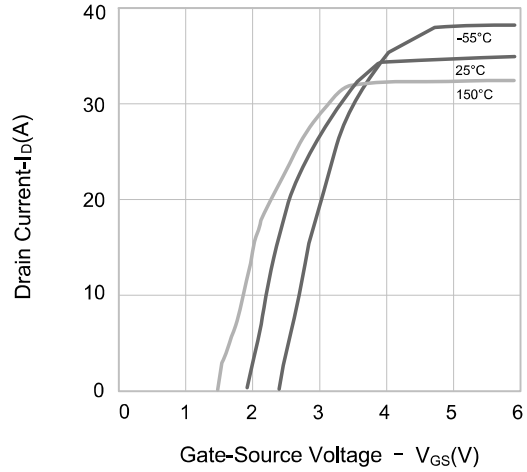


Figure 3. On-Resistance Variation vs. Drain-Current, Gate Voltage

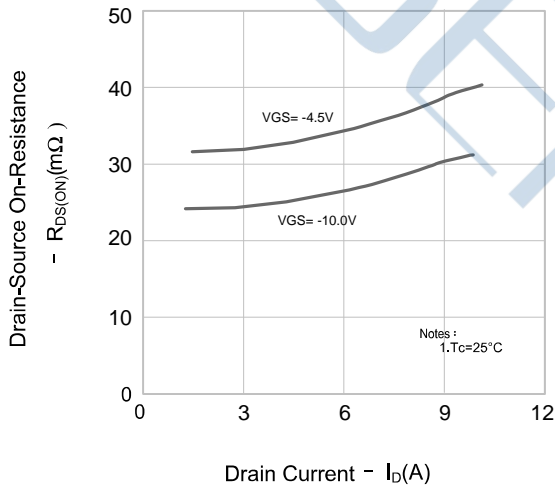


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

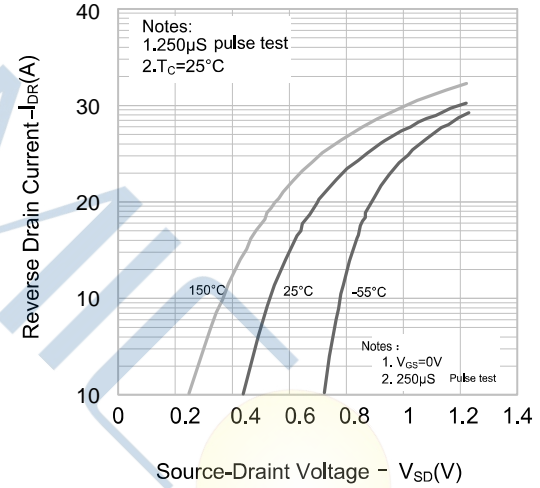


Figure 5. Capacitance Characteristics

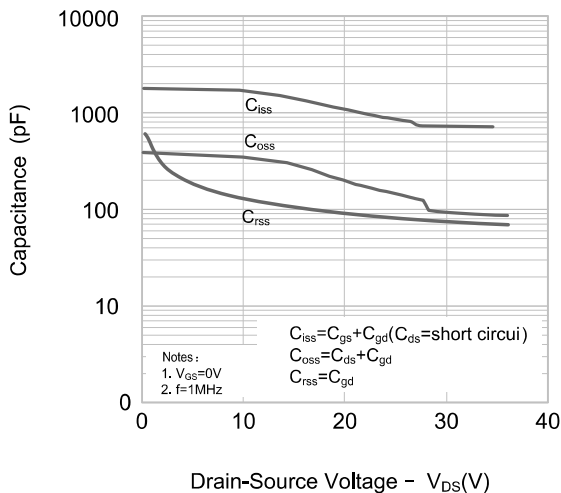
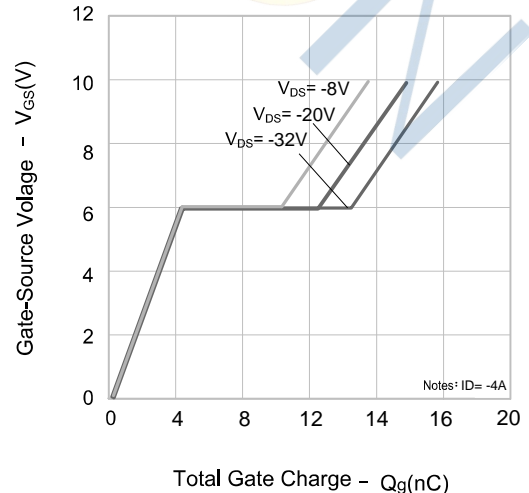


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics

Figure 7. Breakdown Voltage Variation vs. Temperature

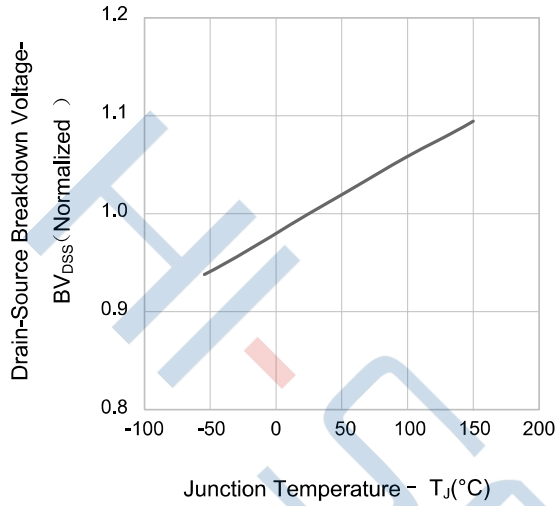


Figure 8. On-resistance Variation vs. Temperature

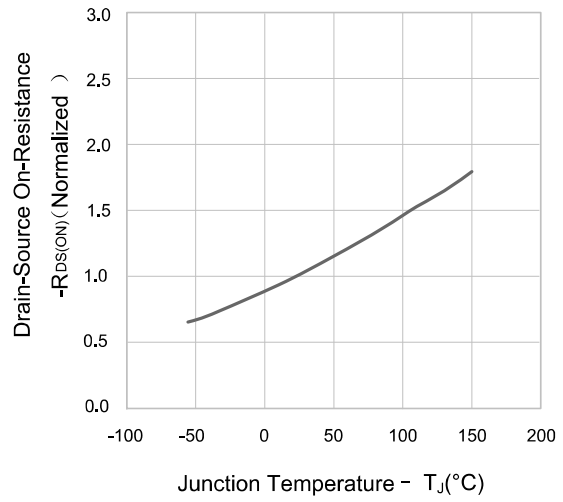
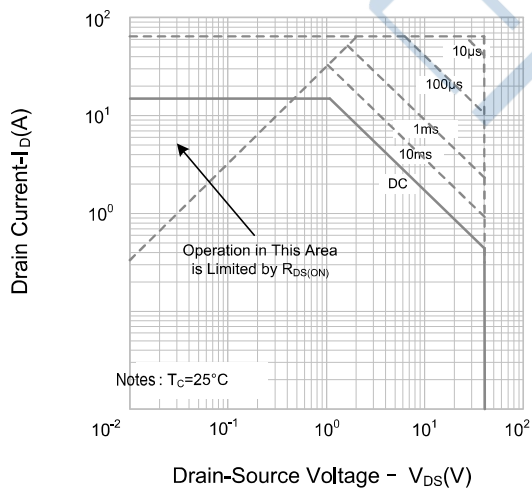
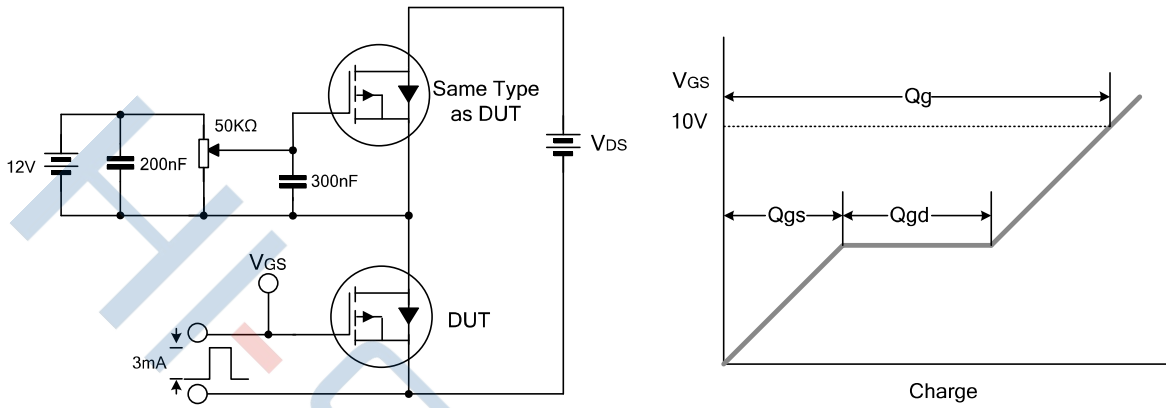


Figure 9. Max. Safe Operating Area

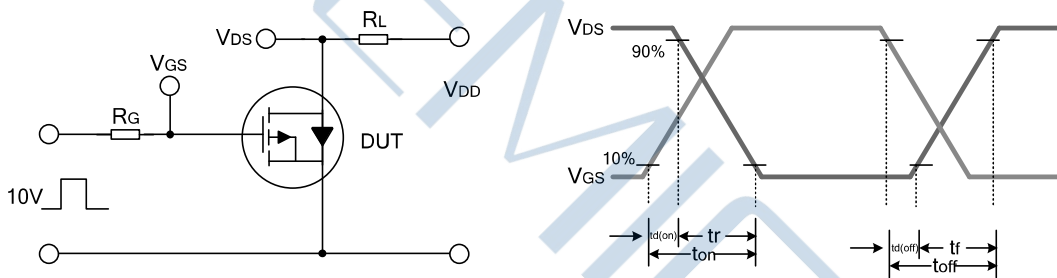


Test Circuit

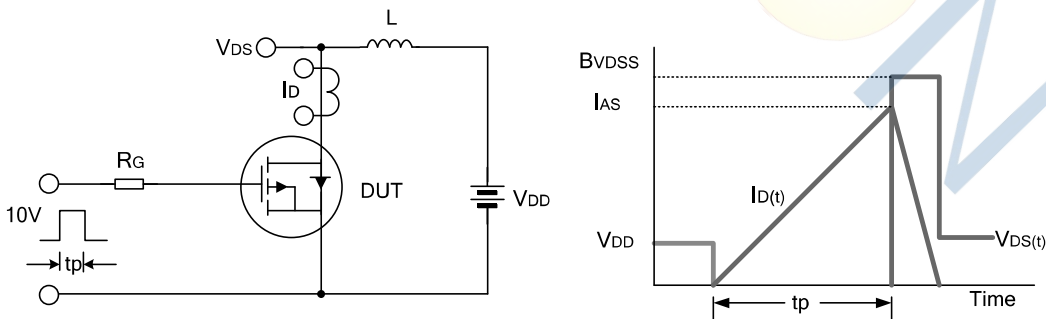
Gate Charge Test Circuit & Waveform



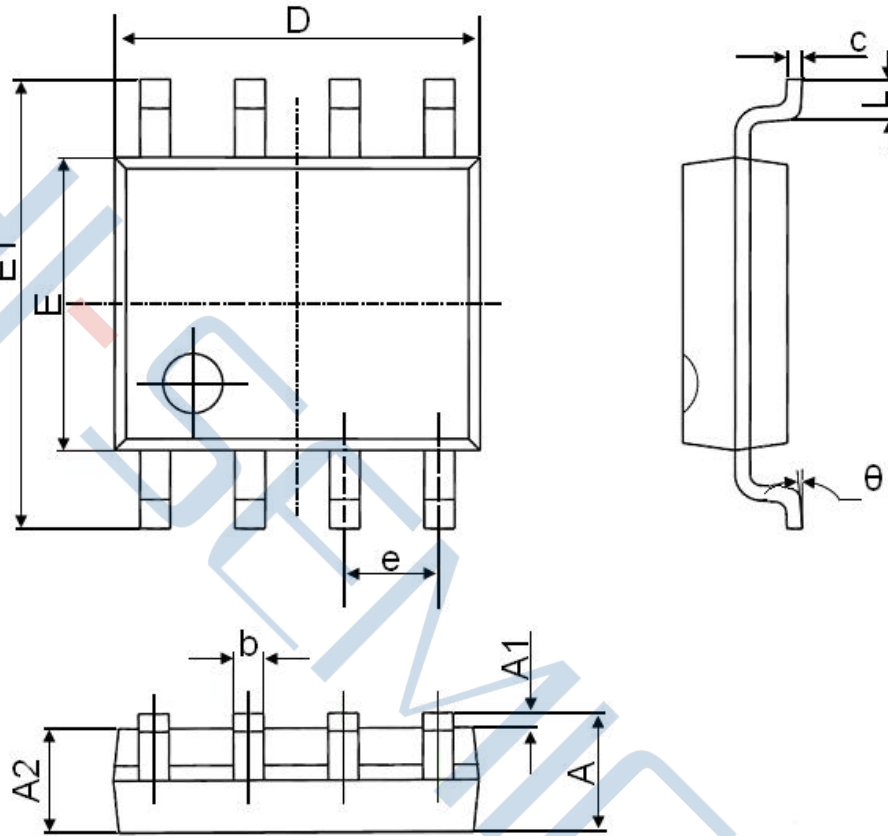
Resistive Switching Test Circuit & Waveform



Undamped Inductive Switching Test Circuit & Waveform



Package Dimensions of SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
theta	0°	8°	0°	8°

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