

-60V,-4.0A P-Channel Power MOSFET

GENERAL DESCRIPTION

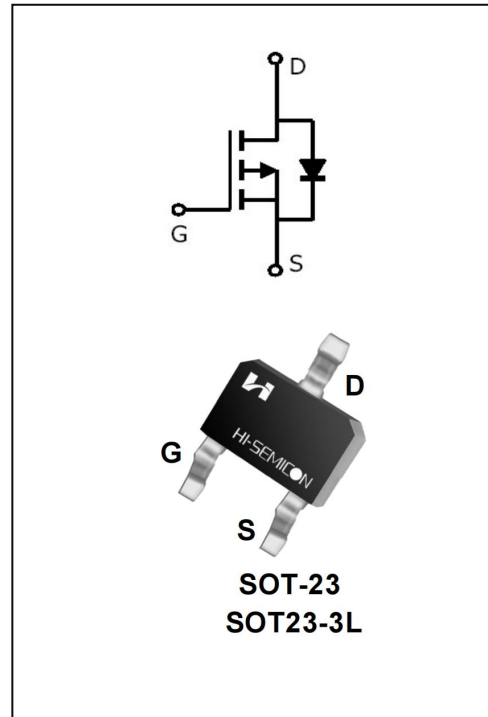
The Power MOSFET has extremely low on resistance, making it especially suitable for applications which require superior power density and outstanding efficiency.

Features

- ◆ $V_{DS}=-60V, I_D=-4.0A$
- ◆ $R_{DS(ON)}$
 TYP:85mΩ@ $V_{GS}=-10V$
 TYP:110mΩ@ $V_{GS}=-4.5V$

Applications

- ◆ Power faction correction (PFC)
- ◆ Switched mode power supplies (SMPS)
- ◆ Uninterruptible power supply (UPS)
- ◆ LED lighting power



ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SFS6000PT4	SOT-23 SOT-23-3L	60PT4	Pb Free	Reel

ABSOLUTE MAXIMUM RATINGS (T_J=25°C unless otherwise noted)

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V _{DS}	-60	V
Gate-Source Voltage		V _{GS}	±20	
Drain Current	T _C = 25°C	I _D	-4.0	A
	T _C = 75°C		-2.8	
Drain Current Pulsed(Note 1)		I _{DM}	-16	
Power Dissipation(T _C =25°C)		P _D	2.3	W
Operation Junction Temperature Range		T _J	-55~+150	°C
Storage Temperature Range		T _{stg}	-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 _{VDS}	V _{GS} = 0V, I _D = -250μA	-60	--	--	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} = -60V, V _{GS} = 0V	--	--	1	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = 20V, V _{DS} = 0V	--	--	100	nA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = -20V, V _{DS} = 0V	--	--	-100	
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{GS} = V _{DS} , I _D = -250μA	-1.2	-1.8	-2.4	V
Static Drain- Source On State Resistance	R _{DS(on)}	V _{GS} = -10V, I _D = -2.0A	--	85	105	mΩ
		V _{GS} = -4.5V, I _D = -1.0A	--	110	130	
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = -25V V _{GS} = 0V f=1.0MHZ	--	654	--	pF
Output Capacitance	C _{oss}		--	48	--	
Reverse Transfer Capacitance	C _{rss}		--	37	--	
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} = -30V, V _{GS} = -10V R _G = 3Ω, I _D =-2A (Note 2.3)	--	43	--	nS
Turn-on Rise Time	t _r		--	32	--	
Turn-off Delay Time	t _{d(off)}		--	14	--	
Turn-off Fall Time	t _f		--	9	--	
Total Gate Charge	Q _g	V _{DS} =-30V, I _D =-2A V _{GS} =-10V	--	9.6	--	nC
Gate-Source Charge	Q _{gs}		--	1.8	--	
Gate-Drain Charge	Q _{gd}		--	5.0	--	

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	--	--	-4.0	A
Pulsed Source Current	I_{SM}		--	--	-16	
Diode Forward Voltage	V_{SD}	$I_S = -2A, V_{GS} = 0V$	--	-0.9	-1.2	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. Output Characteristics

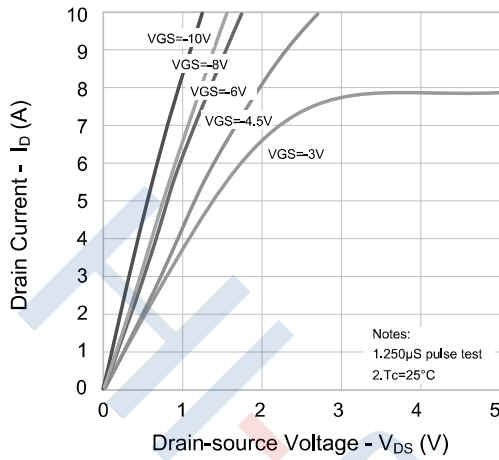


Figure 2. Transfer Characteristics

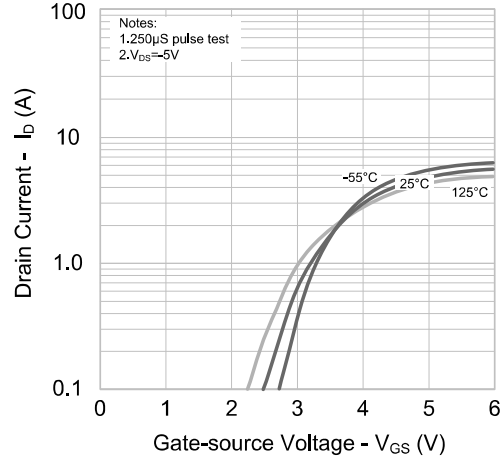


Figure 3. On-resistance vs. Drain Current

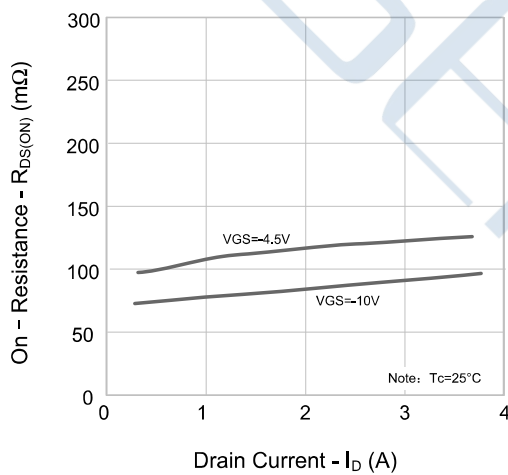


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

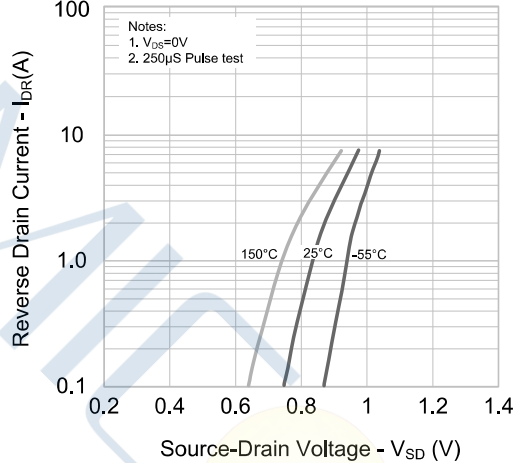


Figure 5. Capacitance Characteristics

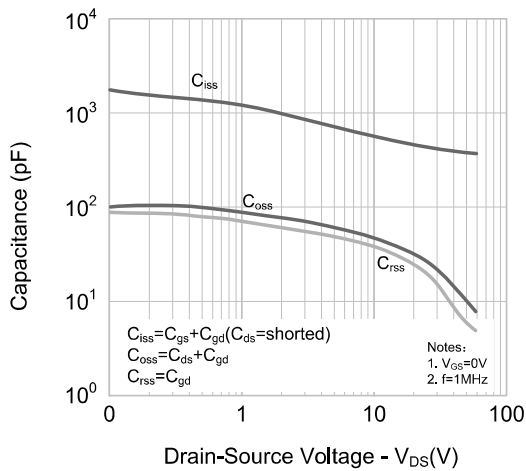
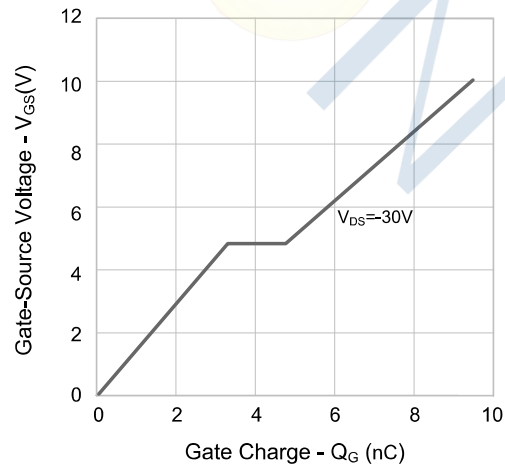
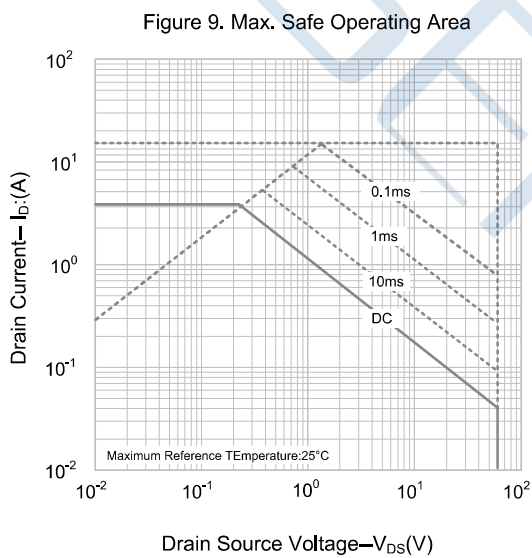
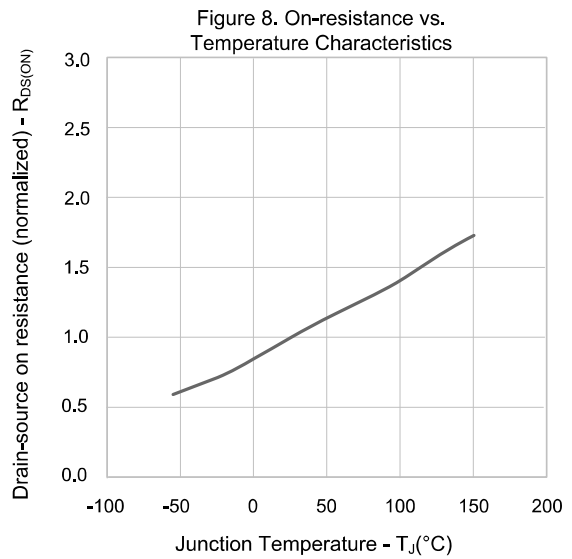
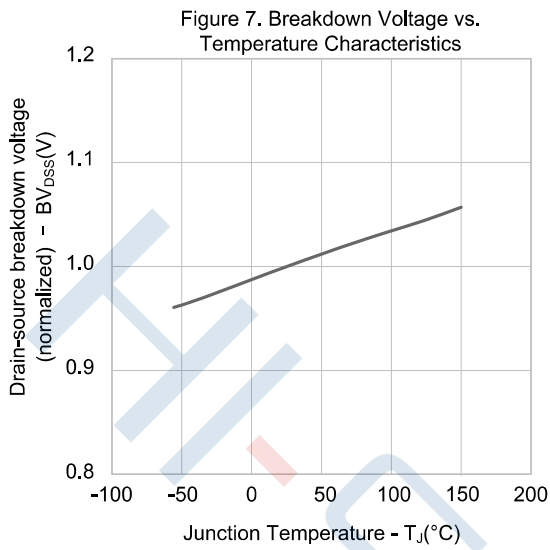


Figure 6. Gate Charge

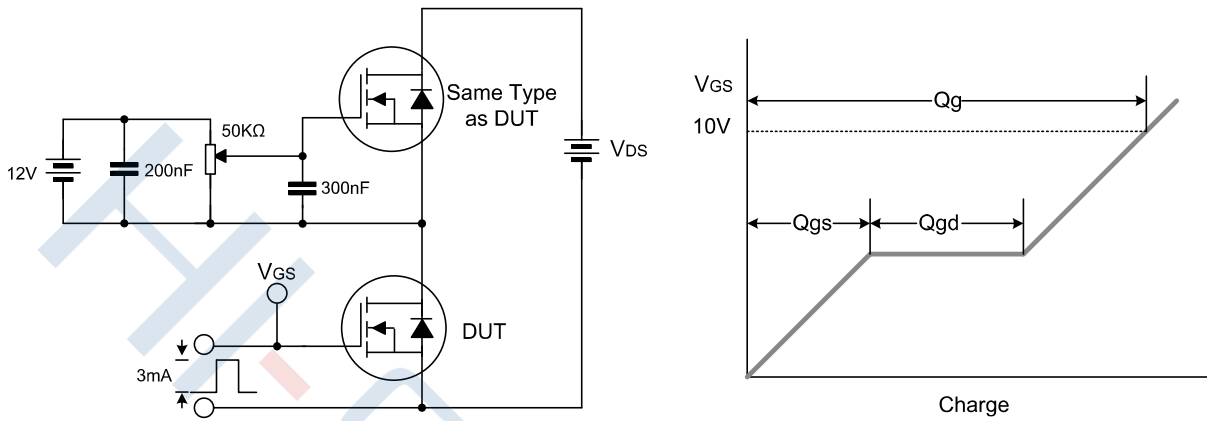


Typical Performance Characteristics

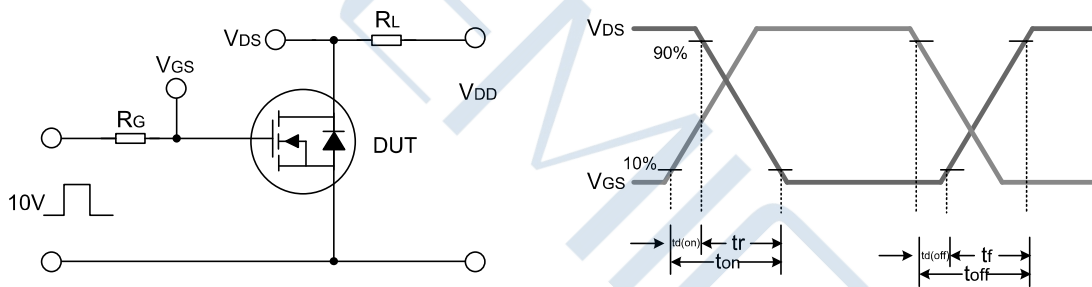


Test Circuit

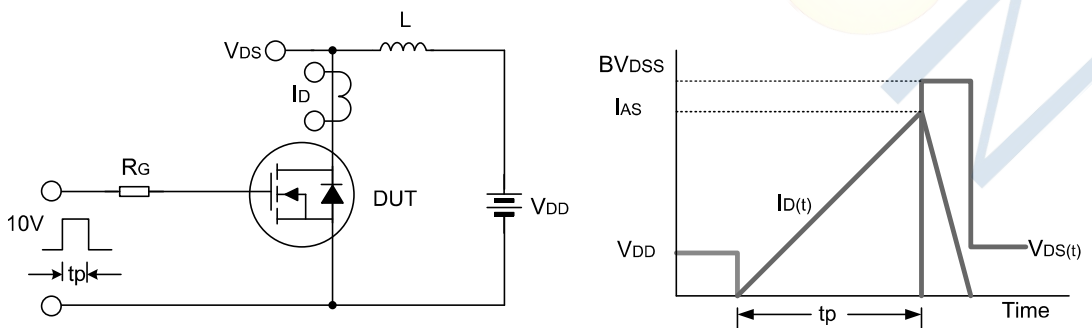
Gate Charge Test Circuit & Waveform



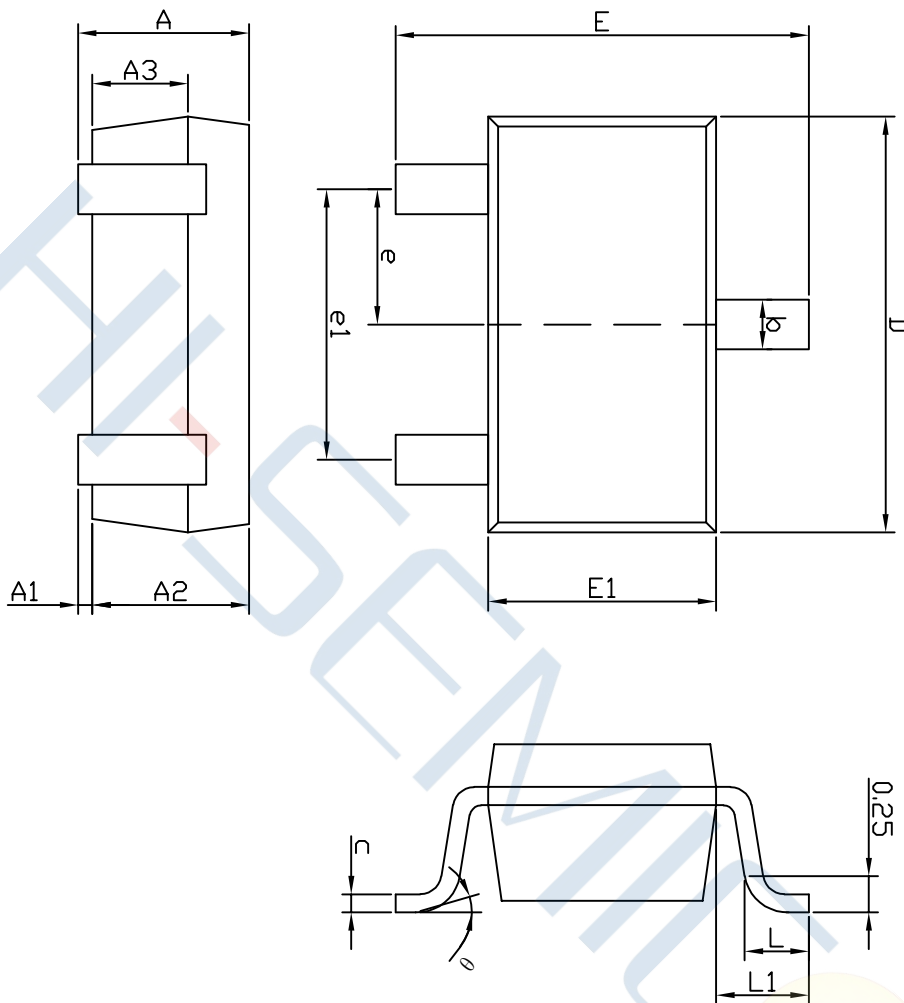
Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



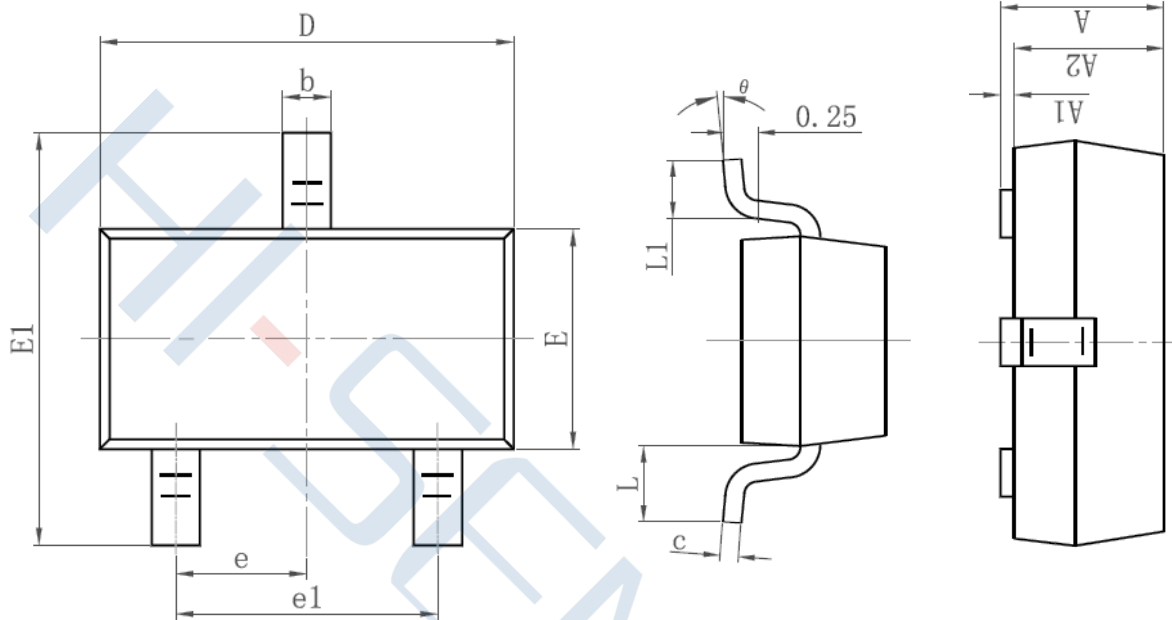
Package Dimensions of SOT-23-3L



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	-	-	1.25
A1	0.04	-	0.10
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.33	-	0.41
c	0.11	-	0.20
D	2.82	2.92	3.02
E	2.60	2.80	3.00
E1	1.50	1.60	1.70
e	0.95BSC		
e1	1.90BSC		
L	0.30	-	0.60
L1	0.60REF		
θ	0°	-	8°

Package Dimensions of SOT-23



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

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