

**-60V, -3.0A P-Channel Power MOSFET**

**GENERAL DESCRIPTION**

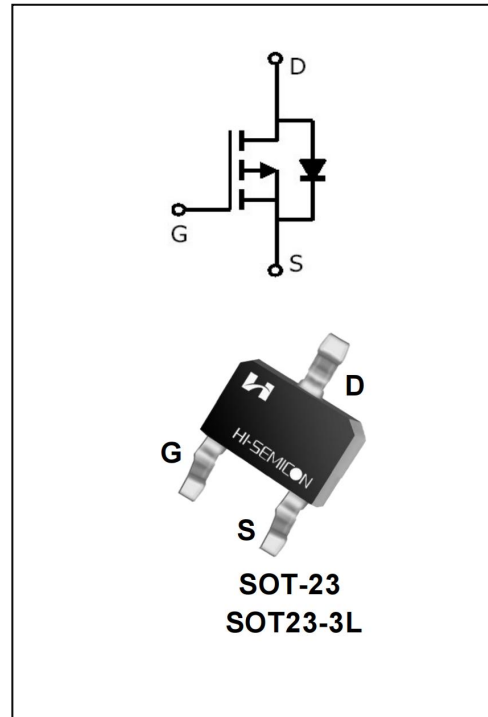
The Power MOSFET has extremely low on resistance, making it especially suitable for applications which require superior power density and outstanding efficiency.

**Features**

- ◆  $V_{DS} = -60V$ ,  $I_D = -3.0A$
- ◆  $R_{DS(ON)}$   
TYP:  $150m\Omega @ V_{GS} = -10V$

**Applications**

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



**ORDERING INFORMATION**

Part No.	Package	Marking	Material	Packing
SFS6003PT	SOT-23 SOT-23-3L	6003PT	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>	-60	V
Gate-Source Voltage		V <sub>GS</sub>	±20	
Drain Current	T <sub>C</sub> = 25°C	I <sub>D</sub>	-3.0	A
	T <sub>C</sub> = 75°C		-1.7	
Drain Current Pulsed(Note 1)		I <sub>DM</sub>	-10	
Power Dissipation(T <sub>C</sub> =25°C) -Derate above 25°C		P <sub>D</sub>	1.8	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	-60	--	--	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> = -60V, V <sub>GS</sub> = 0V	--	--	1	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	-1.2	-1.8	-2.4	V
Static Drain- Source On State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -2.0A	--	150	180	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2.0A	--	191	210	
Dynamic Characteristics						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -25V V <sub>GS</sub> = 0V f=1.0MHZ	--	787	--	pF
Output Capacitance	C <sub>oss</sub>		--	42	--	
Reverse Transfer Capacitance	C <sub>rss</sub>		--	31	--	
Switching Characteristics						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = -30V, V <sub>GS</sub> = -10V R <sub>G</sub> = 3Ω, I <sub>D</sub> =-2A (Note 2.3)	--	43	--	nS
Turn-on Rise Time	t <sub>r</sub>		--	32	--	
Turn-off Delay Time	t <sub>d(off)</sub>		--	14	--	
Turn-off Fall Time	t <sub>f</sub>		--	9	--	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-30V, I <sub>D</sub> =-2A V <sub>GS</sub> =-10V	--	9.6	--	nC
Gate-Source Charge	Q <sub>gs</sub>		--	1.8	--	
Gate-Drain Charge	Q <sub>gd</sub>		--	5.0	--	

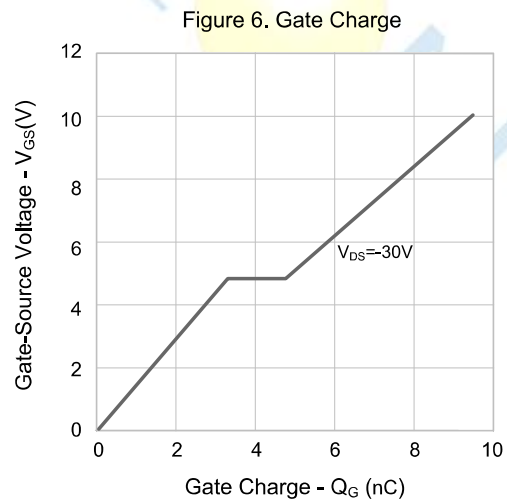
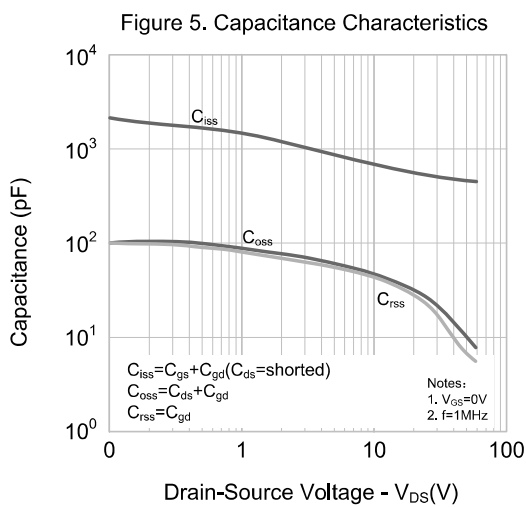
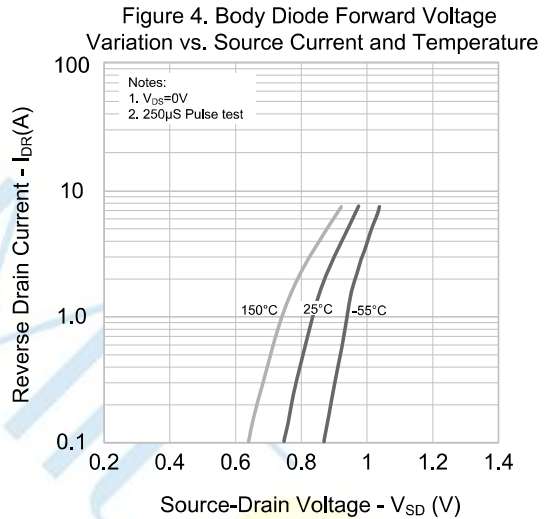
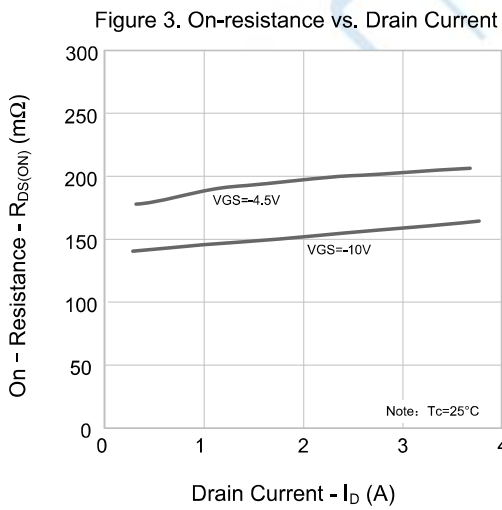
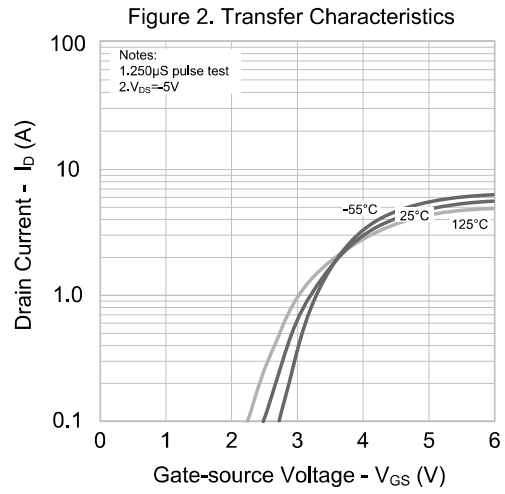
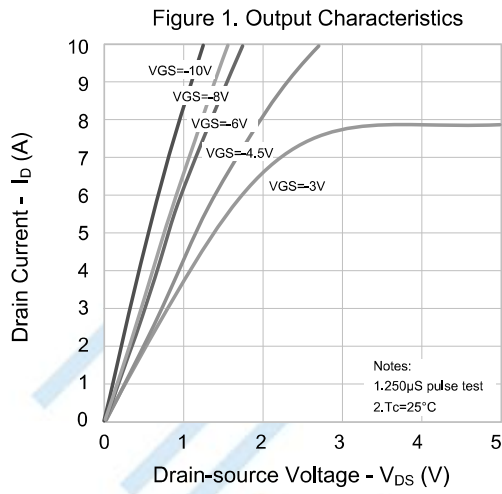
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	$I_S$	Integral Reverse P-N Junction Diode in the MOSFET	--	--	-2.5	A
Pulsed Source Current	$I_{SM}$		--	--	-10	
Diode Forward Voltage	$V_{SD}$	$I_S = -2A, V_{GS} = 0V$	--	-0.87	-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



Typical Performance Characteristics

Figure 7. Breakdown Voltage vs. Temperature Characteristics

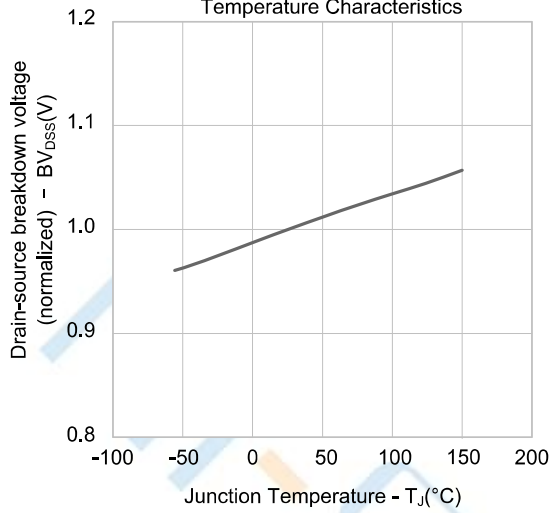


Figure 8. On-resistance vs. Temperature Characteristics

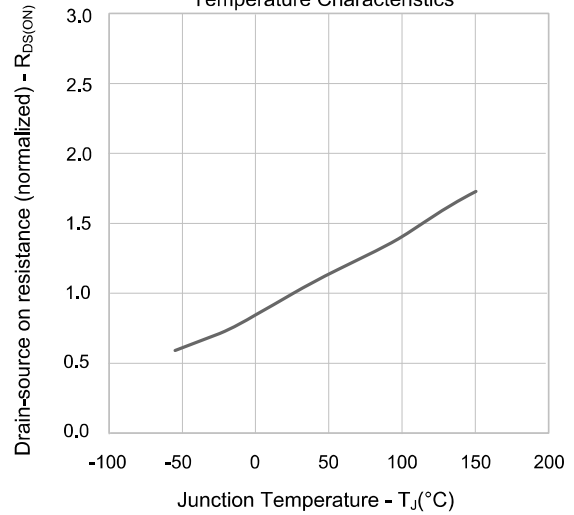
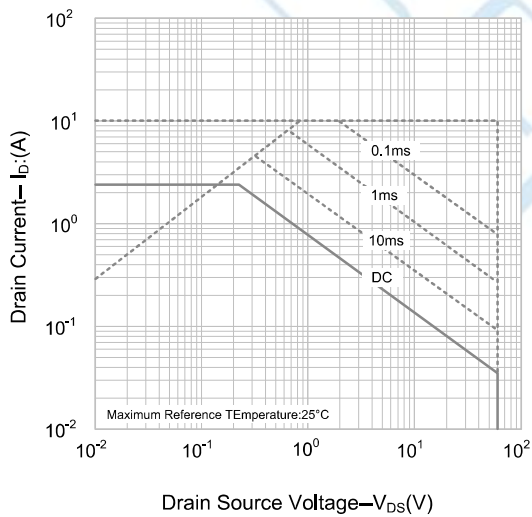
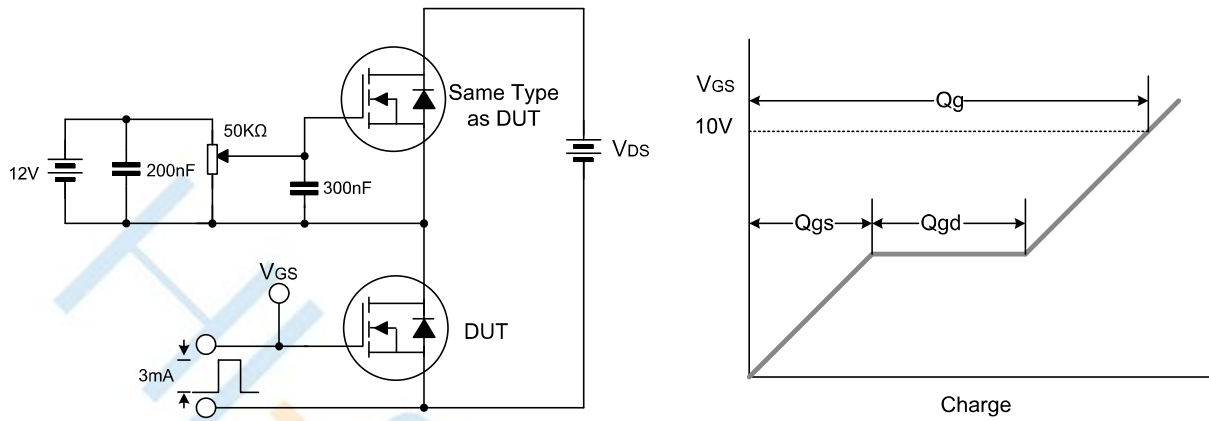


Figure 9. Max. Safe Operating Area

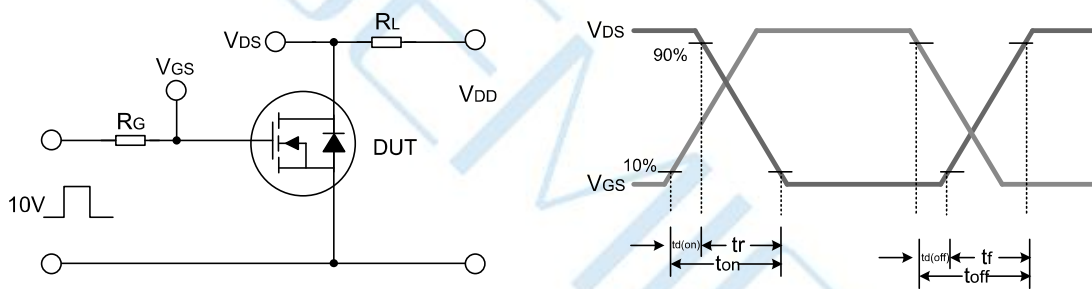


Test Circuit

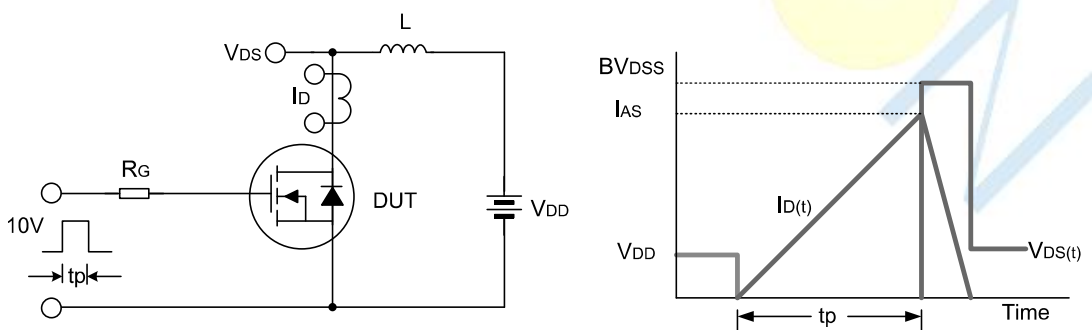
Gate Charge Test Circuit & Waveform



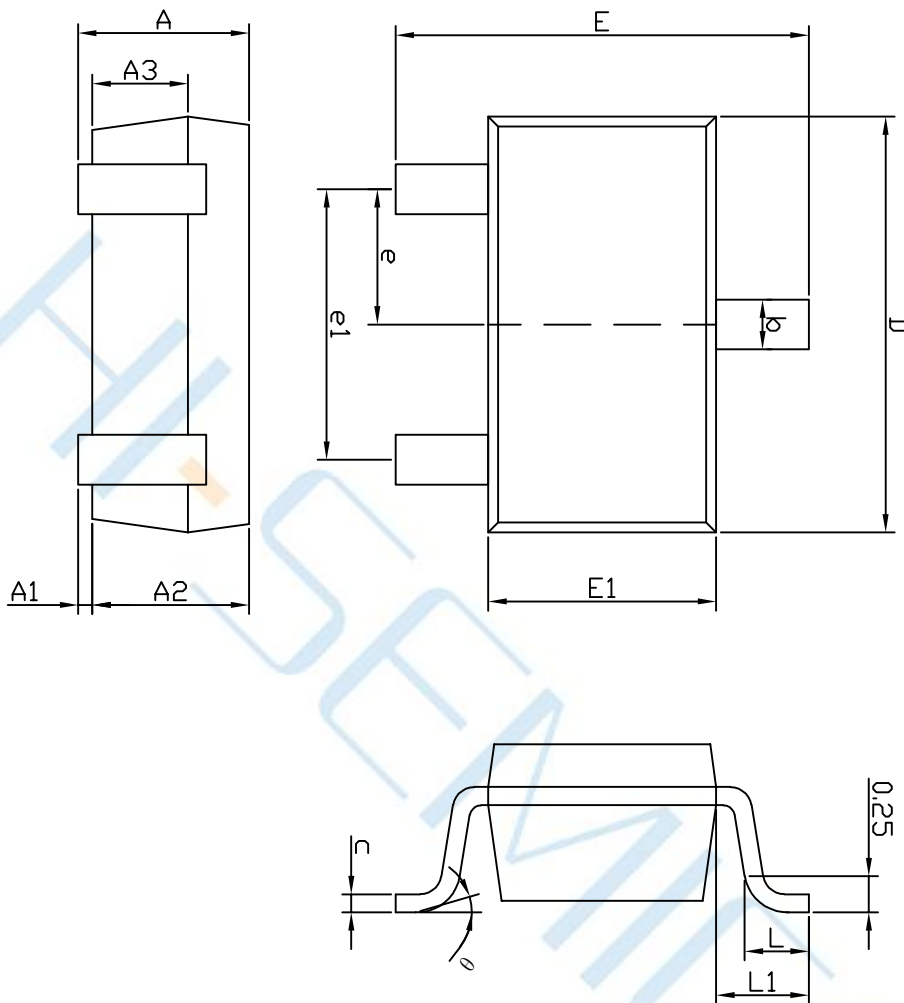
Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



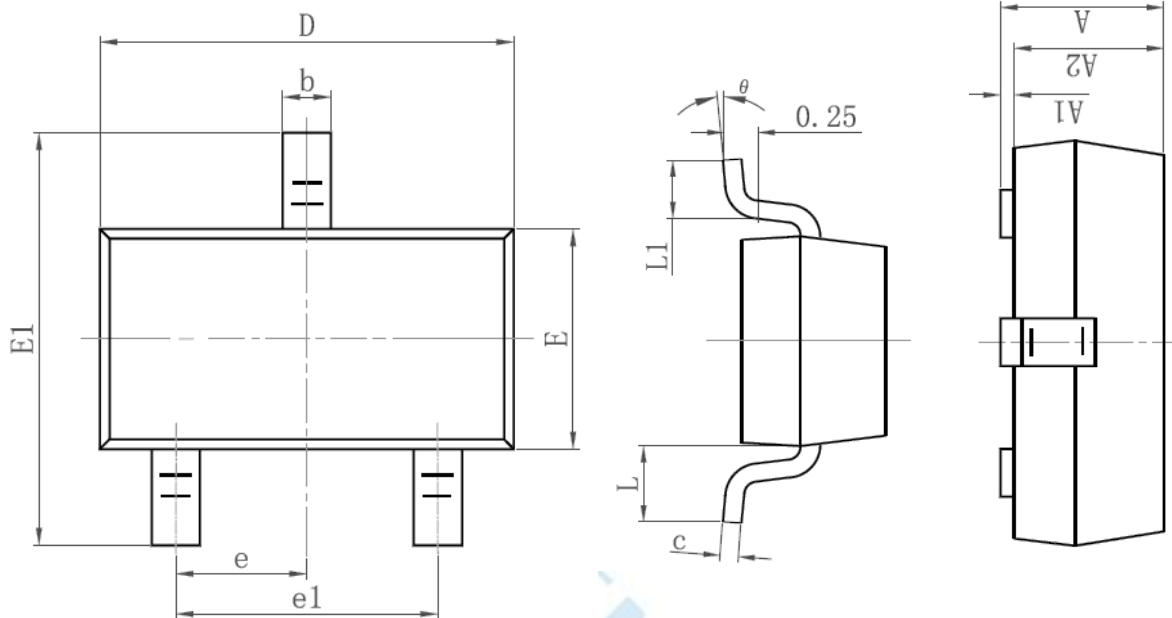
Package Dimensions of SOT-23-3L



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
$\theta$	0°	8°



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