

-20V, -12A P-Channel Power MOSFET

GENERAL DESCRIPTION

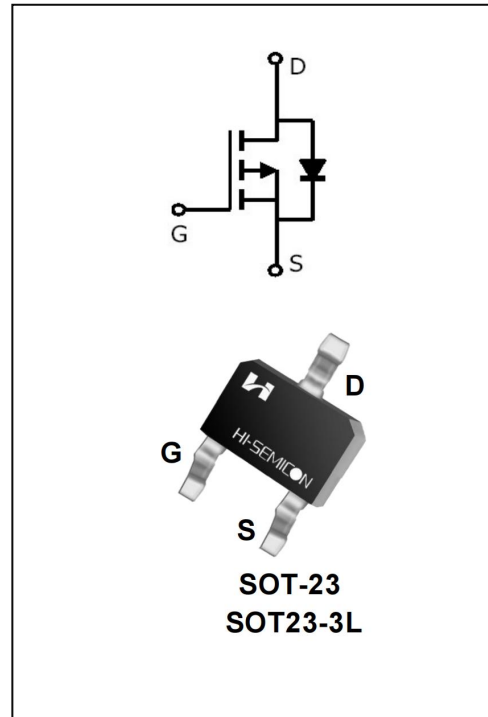
The Power MOSFET has extremely low on resistance, making it especially suitable for applications which require superior power density and outstanding efficiency.

Features

- ◆ $V_{DS}=-20V, I_D=-12A$
- ◆ $R_{DS(ON)}$
TYP:15.2mΩ@ $V_{GS}= -4.5V$

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
SFS2012PT	SOT-23 SOT-23-3L	2012PT	Pb Free	Reel

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

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V _{DS}	-20	V
Gate-Source Voltage		V _{GS}	±12	V
Drain Current	T _C = 25°C	I _D	-12	A
	T _C = 75°C		-7.8	
Drain Current Pulsed(Note 1)		I _{DM}	-36	A
Power Dissipation(T _C =25°C) -Derate above 25°C		P _D	2.2	W
Operation Junction Temperature Range		T _J	-55~+150	°C
Storage Temperature Range		T _{stg}	-55~+150	°C
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		TL	300	°C

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B _{VDS}	V _{GS} = 0V, I _D = -250μA	-20	--	--	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} = -20V, V _{GS} = 0V	--	--	1	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = 12V, V _{DS} = 0V	--	--	100	nA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = -12V, V _{DS} = 0V	--	--	-100	
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{GS} = V _{DS} , I _D = -250μA	-0.4	0.65	-0.9	V
Static Drain- Source On State Resistance	R _{DS(on)}	V _{GS} = -4.5V, I _D = -6.0A	--	15.2	17.5	mΩ
		V _{GS} = -2.5V, I _D = -3.0A	--	17.8	21.5	
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = -10V V _{GS} = 0V f=1.0MHZ	--	1820	--	pF
Output Capacitance	C _{oss}		--	210	--	
Reverse Transfer Capacitance	C _{rss}		--	190	--	
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} = -10V, V _{GS} = -4.5V R _G = 6Ω, I _D =-4A (Note 2.3)	--	8.2	--	nS
Turn-on Rise Time	t _r		--	17.5	--	
Turn-off Delay Time	t _{d(off)}		--	42.3	--	
Turn-off Fall Time	t _f		--	6.9	--	
Total Gate Charge	Q _g	V _{DS} =-10V, I _D =-4A V _{GS} =-4.5V	--	23.5	--	nC
Gate-Source Charge	Q _{gs}		--	7.0	--	
Gate-Drain Charge	Q _{gd}		--	4.8	--	

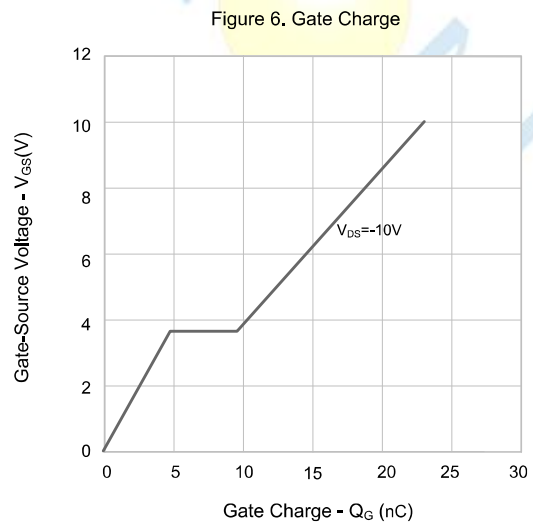
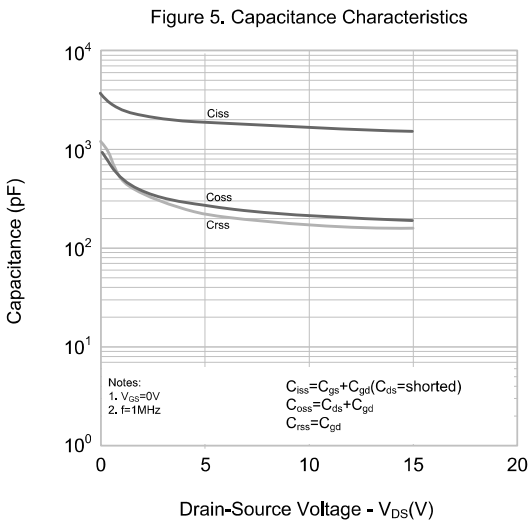
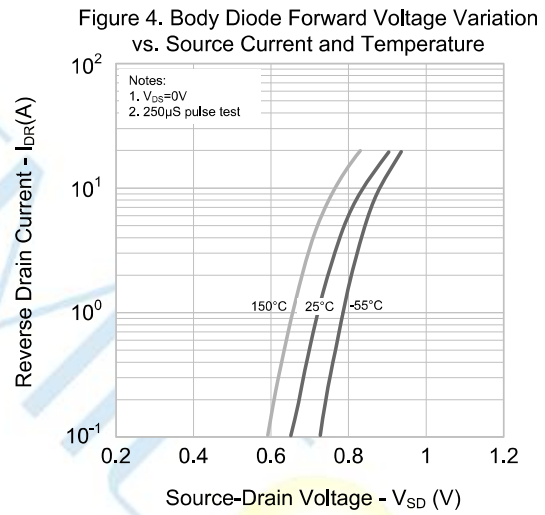
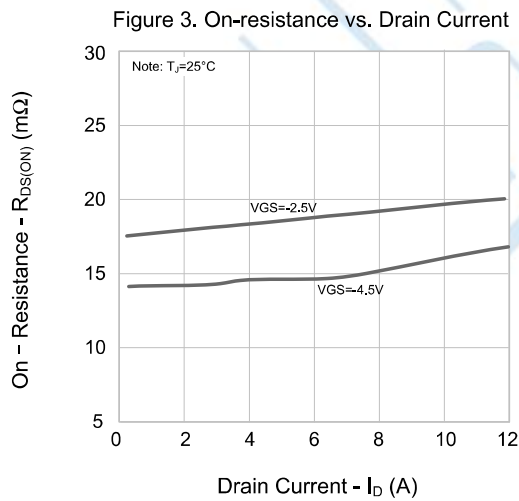
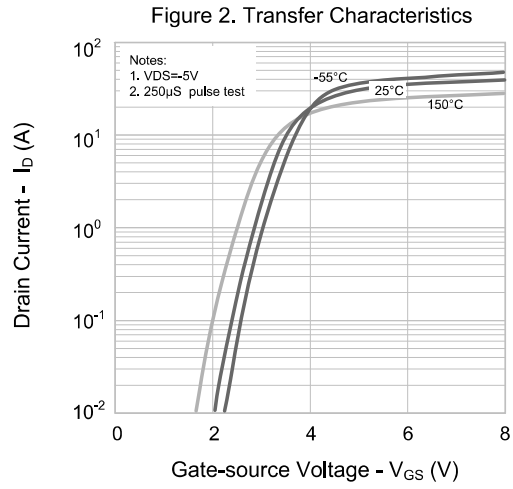
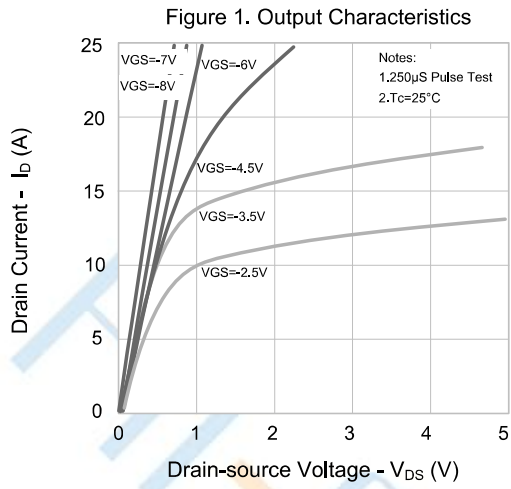
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	--	--	-12	A
Pulsed Source Current	I_{SM}		--	--	-36	
Diode Forward Voltage	V_{SD}	$I_S = -6A, V_{GS} = 0V$	--	-0.81	-1.2	V

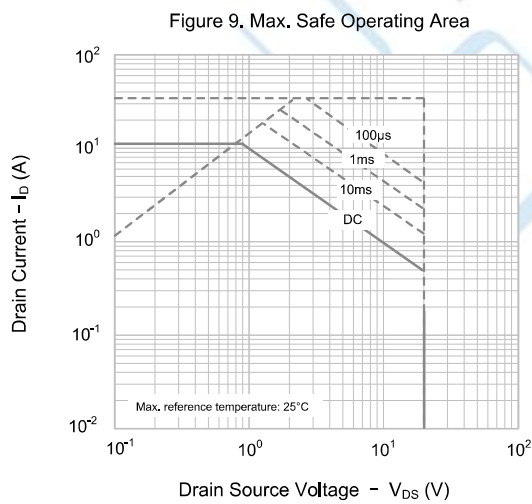
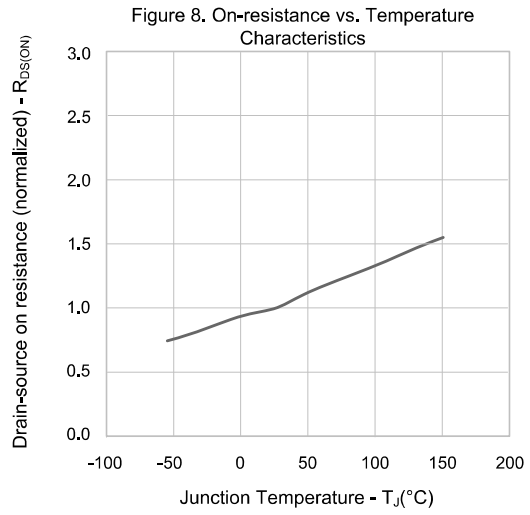
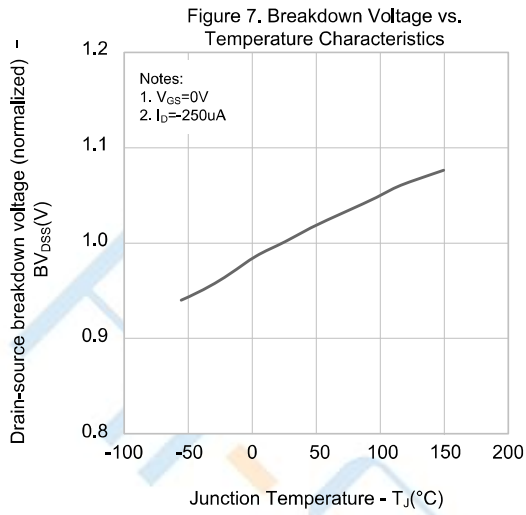
NOTE:

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

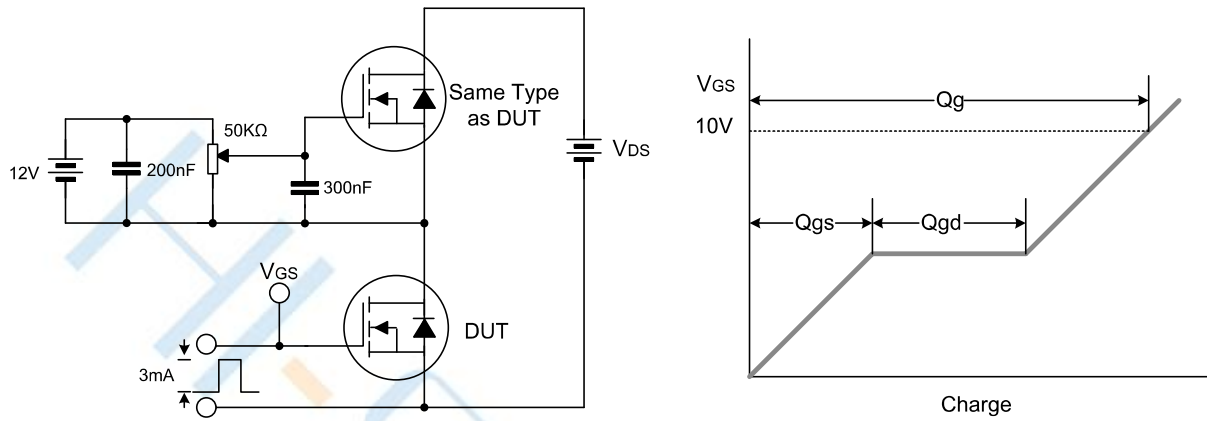


Typical Performance Characteristics

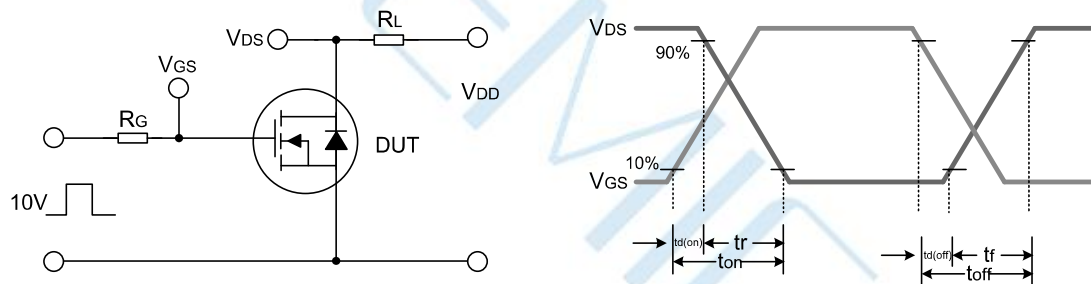


Test Circuit

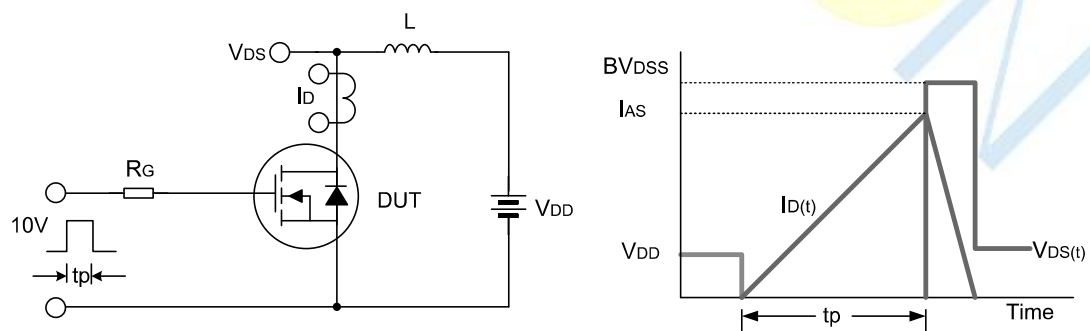
Gate Charge Test Circuit & Waveform



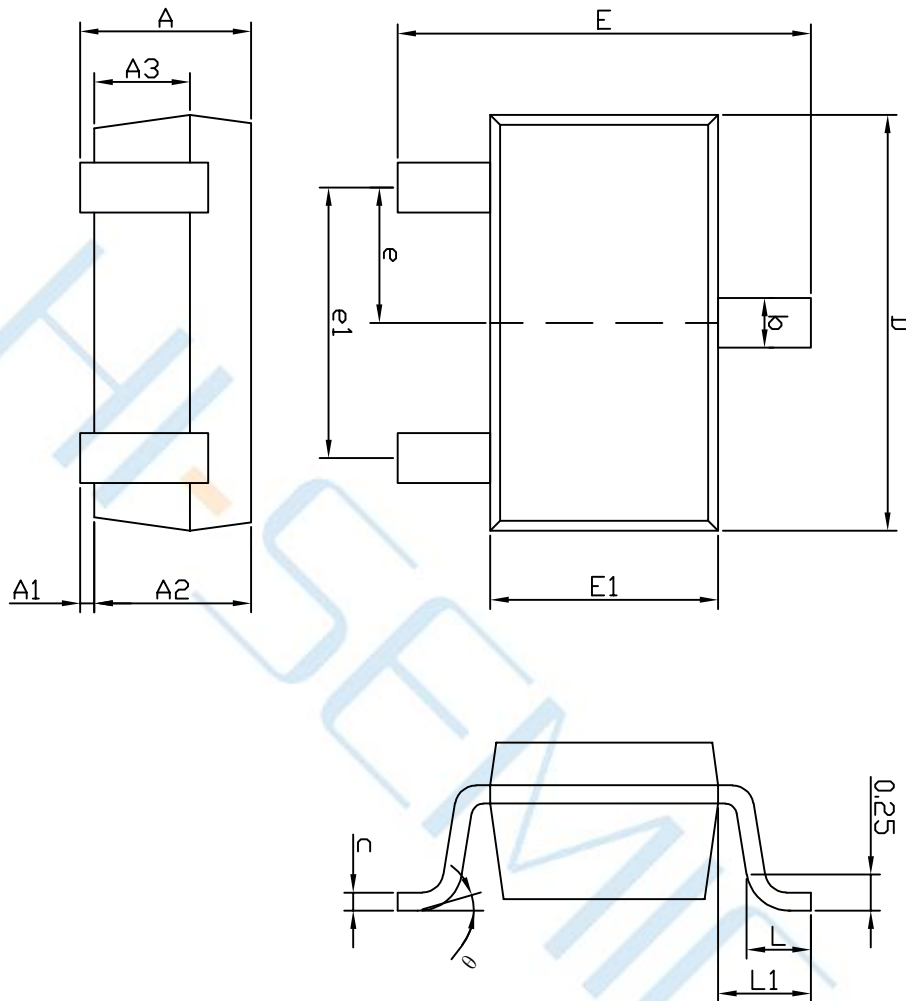
Resistive Switching Test Circuit & Waveform



Undamped Inductive Switching Test Circuit & Waveform



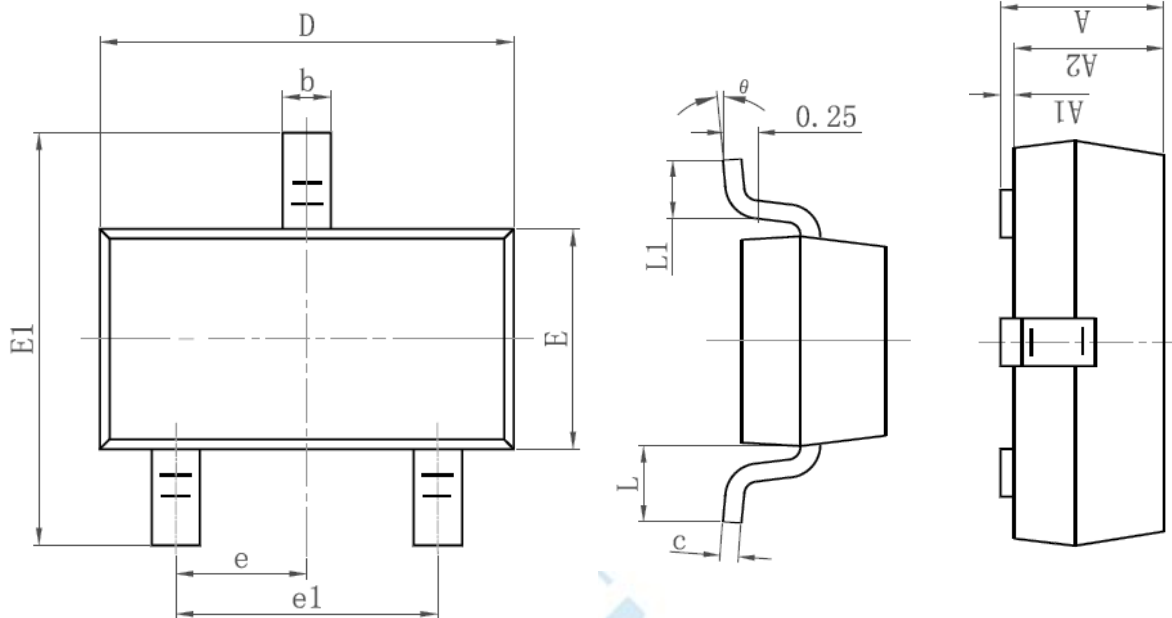
Package Dimensions of SOT-23-3L



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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