

150V, 2.0A N-CHANNEL POWER MOSFET

GENERAL DESCRIPTION

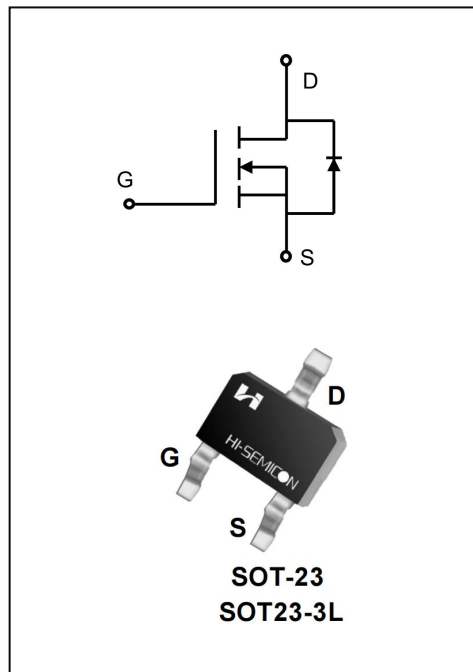
The SGS15HR430T uses advanced SGT technology and design to provide excellent  $R_{DS(on)}$  with low gate charge. It can be used in a wide variety applications.

Features

- ◆  $V_{DS}=150V, I_D=2.0A$
- ◆  $R_{DS(on)}$   
 TYP: 290mΩ @  $V_{GS}=10V$   
 TYP: 340mΩ @  $V_{GS}=4.5V$

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
SGS15HR430T	SOT-23 SOT23-3L	430T	Pb Free	Tube

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

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V <sub>DS</sub>	150	V
Gate-Source Voltage		V <sub>GS</sub>	±20	
Drain Current	T <sub>C</sub> = 25°C	I <sub>D</sub>	2.0	A
	T <sub>C</sub> = 100°C		1.4	
Drain Current Pulsed(Note 1)		I <sub>DM</sub>	8.0	
Power Dissipation(T <sub>C</sub> =25°C) -Derate above 25°C		P <sub>D</sub>	1.3	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	

## THERMAL CHARACTERISTICS

Characteristics	Symbol	MAX	Unit
Thermal Resistance, Junction-to-Case	R <sub>θJC</sub>	0.21	°C/W
Thermal Resistance, Junction-to-Ambient	R <sub>θJA</sub>	62.5	

## ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B <sub>VDS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	150	--	--	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =150V, 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	1.0	1.8	2.2	V
Static Drain- Source On State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =1A	--	290	430	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =1A	--	340	520	
Dynamic Characteristics						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =40V V <sub>GS</sub> =0V f=1.0MHZ	--	120	--	pF
Output Capacitance	C <sub>oss</sub>		--	60.5	--	
Reverse Transfer Capacitance	C <sub>rss</sub>		--	3.3	--	
Switching Characteristics						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =75V V <sub>DS</sub> =10V R <sub>G</sub> =36Ω, I <sub>D</sub> =1A (Note 2.3)	--	8.5	--	ns
Turn-on Rise Time	t <sub>r</sub>		--	13.2	--	
Turn-off Delay Time	t <sub>d(off)</sub>		--	15.2	--	
Turn-off Fall Time	t <sub>f</sub>		--	11.2	--	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =75V, I <sub>D</sub> =1A V <sub>GS</sub> =10V (Note 2.3)	--	5.5	--	nC
Gate-Source Charge	Q <sub>gs</sub>		--	1.3	--	
Gate-Drain Charge	Q <sub>gd</sub>		--	2.2	--	

## 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	--	--	2.0	A
Pulsed Source Current	$I_{SM}$		--	--	8.0	
Diode Forward Voltage	$V_{SD}$	$I_S=2.0A, V_{GS}=0V$	--	0.8	1.2	V

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

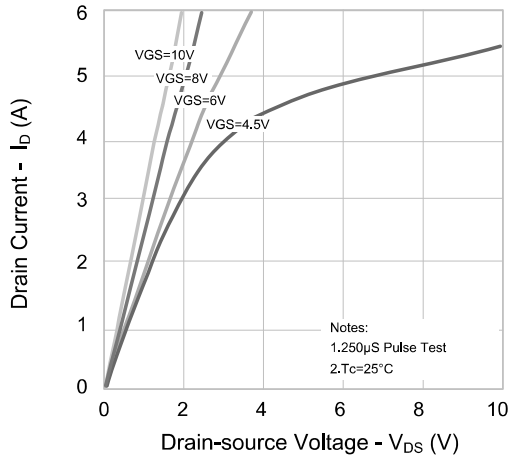


Figure 2. Transfer Characteristics

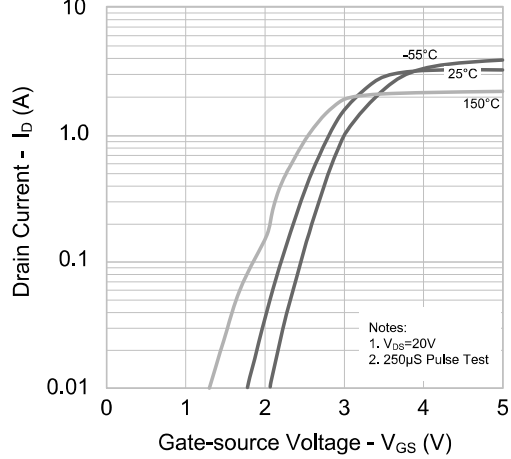


Figure 3. On-resistance vs. Drain Current

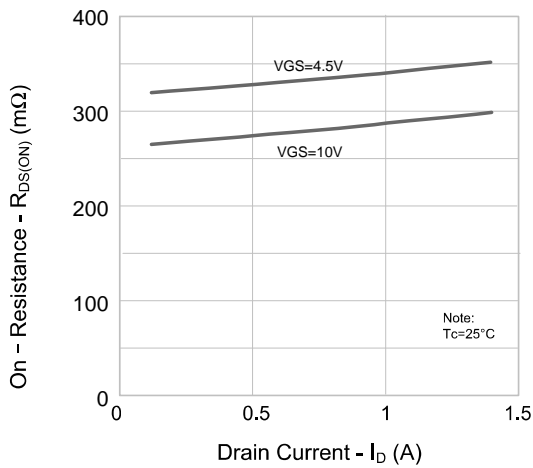


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

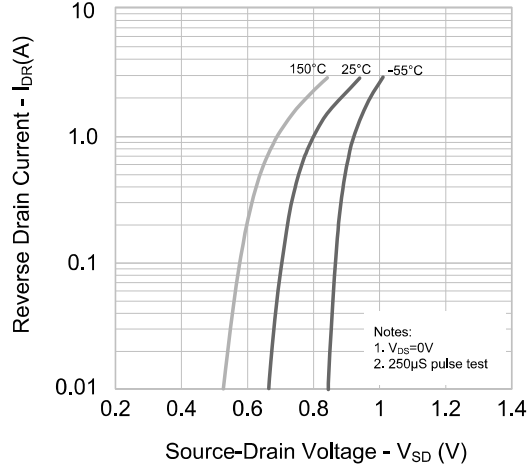


Figure 5. Capacitance Characteristics

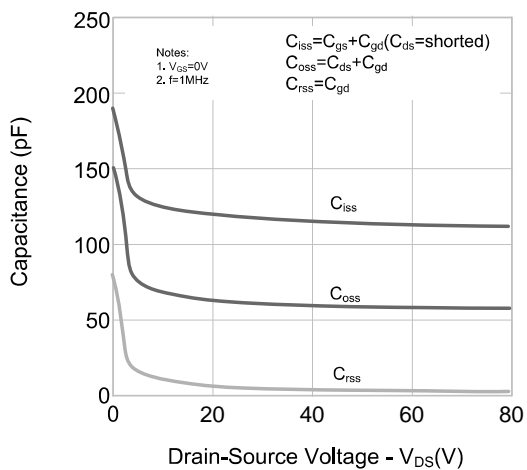
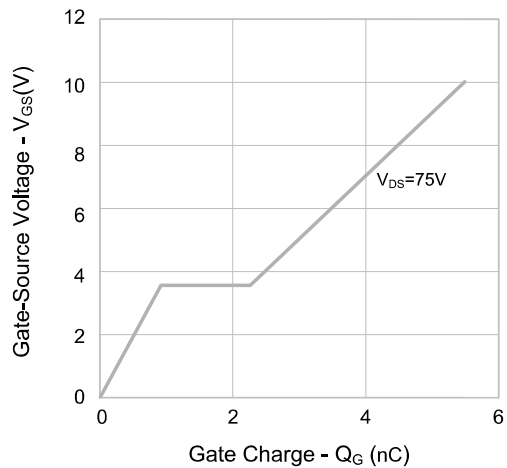


Figure 6. Gate Charge



Typical Performance Characteristics

Figure 7. Breakdown Voltage vs. Temperature Characteristics

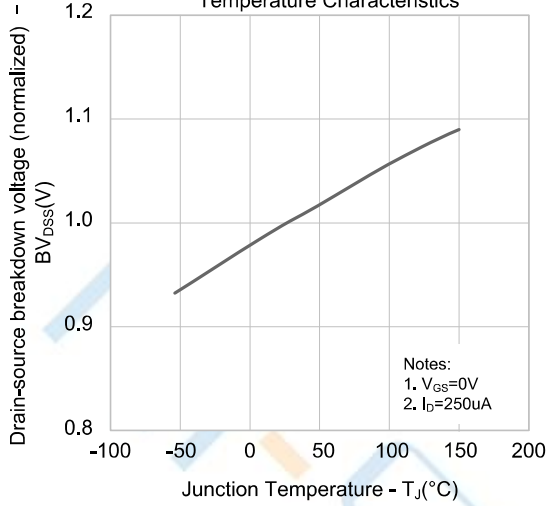


Figure 8. On-resistance vs. Temperature Characteristics

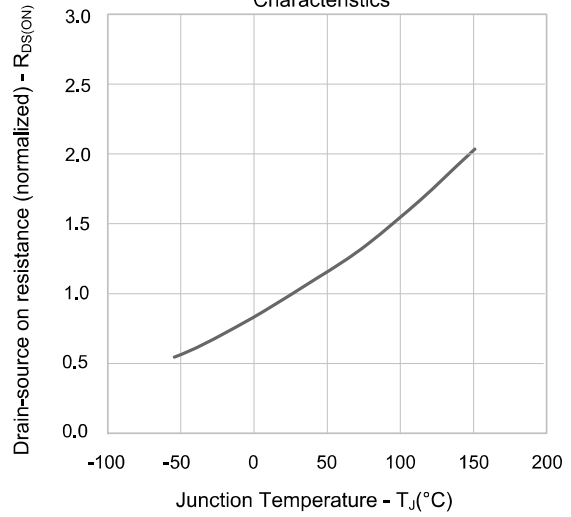
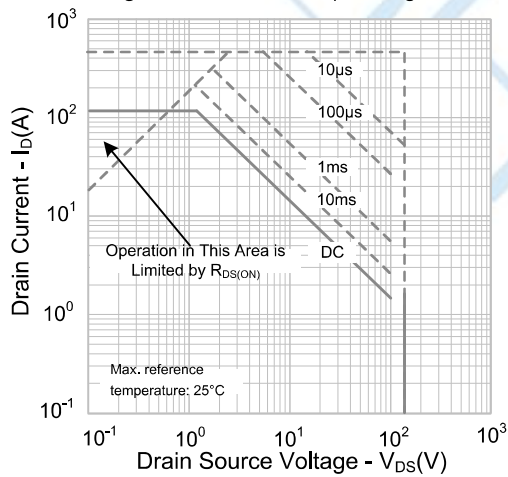
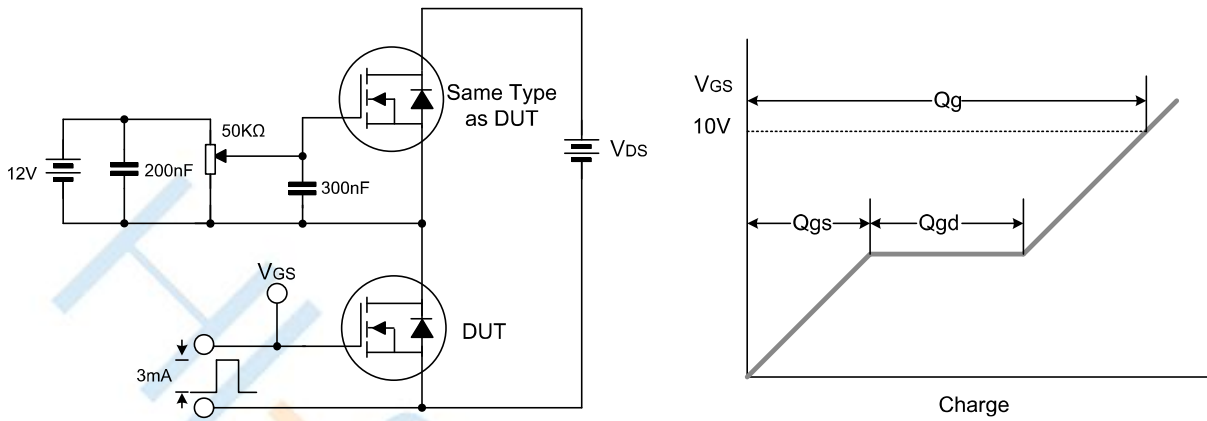


Figure 9. Max. Safe Operating Area

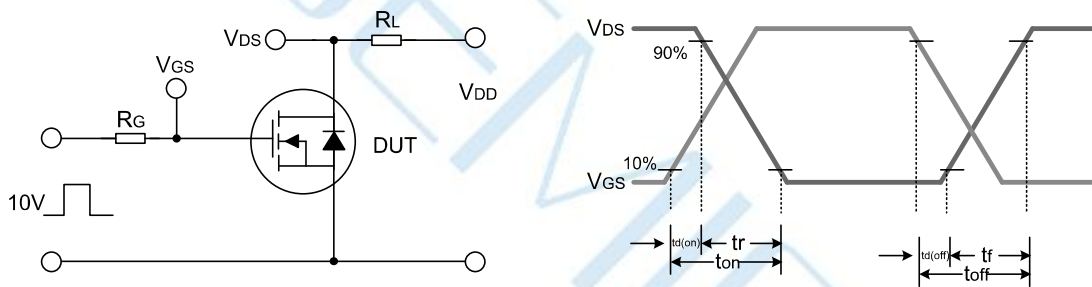


Test Circuit

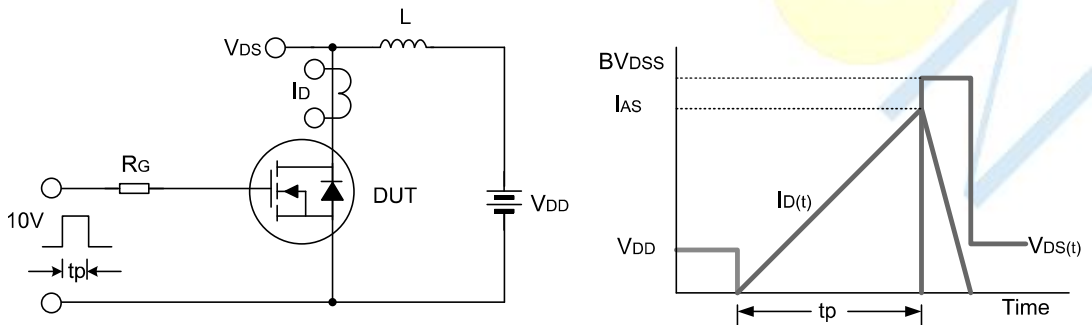
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform

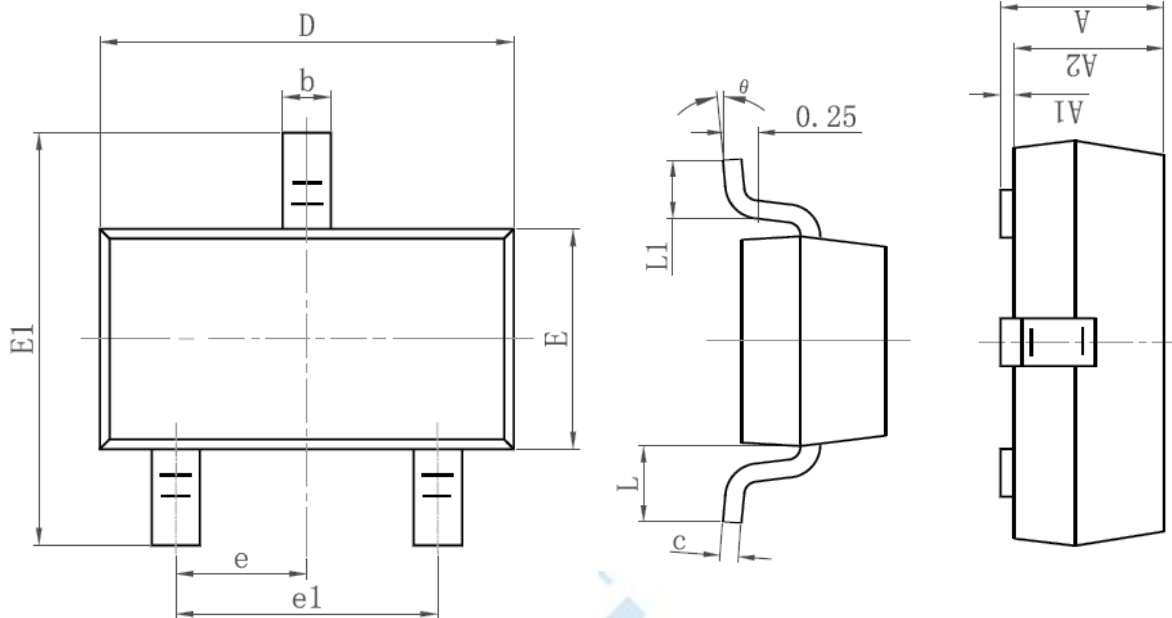


Unclamped Inductive Switching Test Circuit & Waveform



Package Dimensions of SOT-23

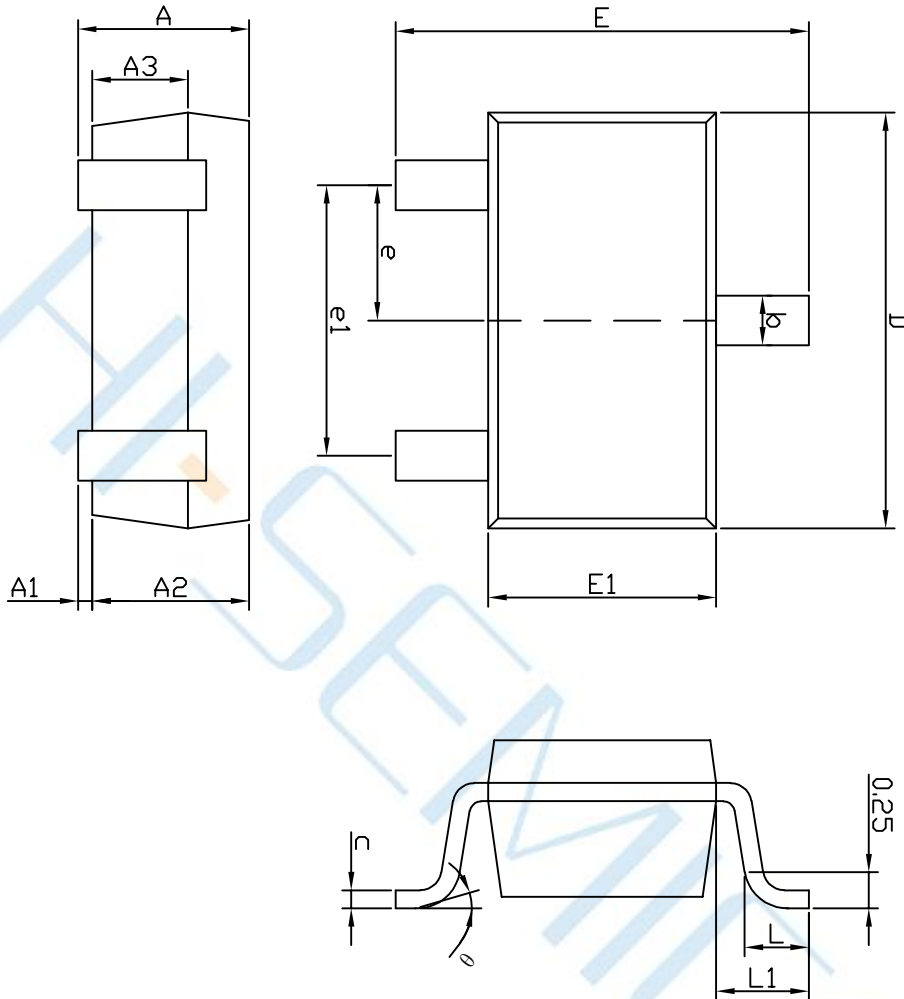
Unit:mm



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°

Package Dimensions of SOT23-3L

Unit:mm



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°



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