

60V, 7A N-CHANNEL POWER MOSFET

GENERAL DESCRIPTION

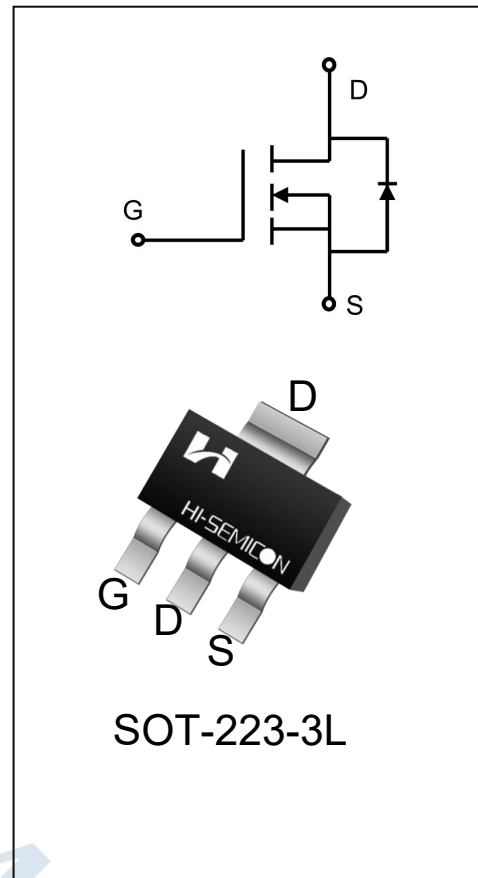
The SFK6007T uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge. It can be used in a wide variety applications.

Features

- ◆ $V_{DS}=60V, I_D=7A$
- ◆ $R_{DS(on)}$
 TYP: $29m\Omega @ V_{GS}=10V$
 TYP: $35m\Omega @ V_{GS}=4.5V$

Applications

- ◆ Power switching application
- ◆ Hard switched and high frequency circuits
- ◆ Uninterruptible power supply (UPS)
- ◆ LED lighting power



ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SFK6007T	SOT-223-3L	SFK6007T	Pb Free	Reel

ABSOLUTE MAXIMUM RATINGS ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	$T_C = 25^{\circ}\text{C}$	I_D	7.0	A
	$T_C = 100^{\circ}\text{C}$		4.9	
Drain Current Pulsed(Note 1)		I_{DM}	28	A
Power Dissipation($T_C=25^{\circ}\text{C}$)		P_D	2.1	W
Single Pulsed Avalanche Energy (Note 2)		E_{AS}	65	mJ
Operation Junction Temperature Range		T_J	$-55\sim+150$	$^{\circ}\text{C}$
Storage Temperature Range		T_{stg}	$-55\sim+150$	$^{\circ}\text{C}$
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		TL	260	$^{\circ}\text{C}$

THERMAL CHARACTERISTICS

Characteristics	Symbol	MAX	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	$^{\circ}\text{C}/\text{W}$

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	$B_{V_{DSS}}$	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	60	--	--	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=60\text{V}, V_{GS}=0\text{V}$	--	--	1.0	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=20\text{V}, V_{DS}=0\text{V}$	--	--	100	nA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=-20\text{V}, V_{DS}=0\text{V}$	--	--	-100	
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu\text{A}$	1.0	1.8	2.5	V
Static Drain- Source On State Resistance	$R_{DS(on)}$	$V_{GS}=10\text{V}, I_D=7\text{A}$	--	29	35	m Ω
		$V_{GS}=4.5\text{V}, I_D=5\text{A}$	--	35	40	
Dynamic Characteristics						
Gate Resistance	Rg	$V_{GS}=0\text{V}, f=1.0\text{MHZ}$	1.0	5.0	10	Ω
Input Capacitance	C_{iss}	$V_{DS}=25\text{V}$ $V_{GS}=0\text{V}$ $f=1.0\text{MHZ}$	--	1120	--	pF
Output Capacitance	C_{oss}		--	59	--	
Reverse Transfer Capacitance	C_{rss}		--	51	--	
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=30\text{V}, V_{GS}=10\text{V}$ $R_{GS}=25\Omega, I_D=7\text{A}$ (Note 3.4)	--	10.6	--	ns
Turn-on Rise Time	t_r		--	7.2	--	
Turn-off Delay Time	$t_{d(off)}$		--	22.0	--	
Turn-off Fall Time	t_f		--	4.5	--	
Total Gate Charge	Q_g	$V_{DS}=30\text{V}, I_D=7\text{A}$ $V_{GS}=10\text{V}$ (Note 3.4)	--	24.0	--	nC
Gate-Source Charge	Q_{gs}		--	2.6	--	
Gate-Drain Charge	Q_{gd}		--	5.9	--	

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	--	--	7	A
Pulsed Source Current	I_{SM}		--	--	28	
Diode Forward Voltage	V_{SD}	$I_S=7A, V_{GS}=0V$	--	--	1.2	V
Reverse Recovery Time	T_{rr}	$I_F=7A, V_R=15V,$ $dI_F/dt=100A/\mu S$	--	66	--	ns
Reverse Recovery Charge	Q_{rr}		--	33.6	--	nC

1. Pulse width limited by maximum junction temperature
2. $L=0.5mH, V_{DD}=30V, V_G=10V, R_G=25\Omega$, starting $T_J=25^\circ C$
3. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
4. Essentially independent of operating temperature

Typical Performance Characteristics

Figure 1. Output Characteristics

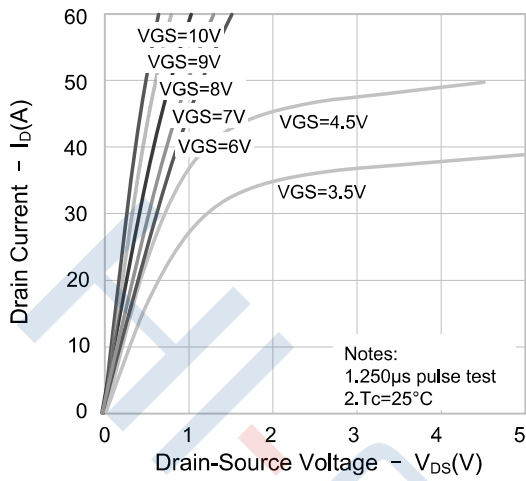


Figure 2. Transfer Characteristics

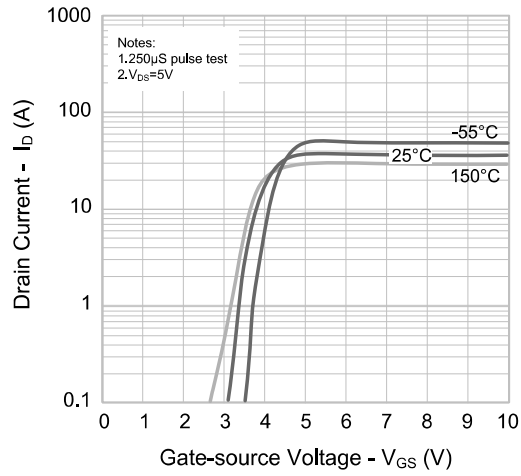


Figure 3. On-resistance vs. Drain Current

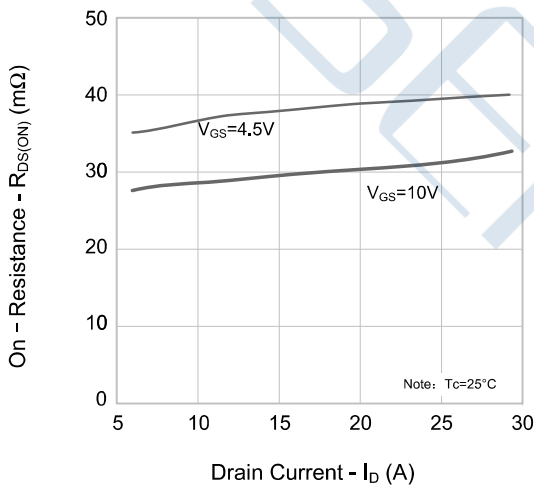


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

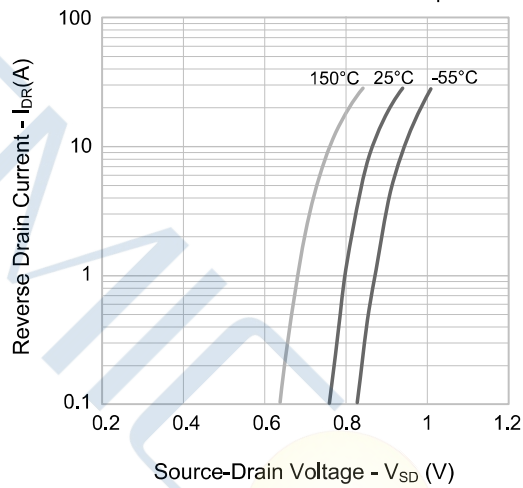


Figure 5. Capacitance Characteristics

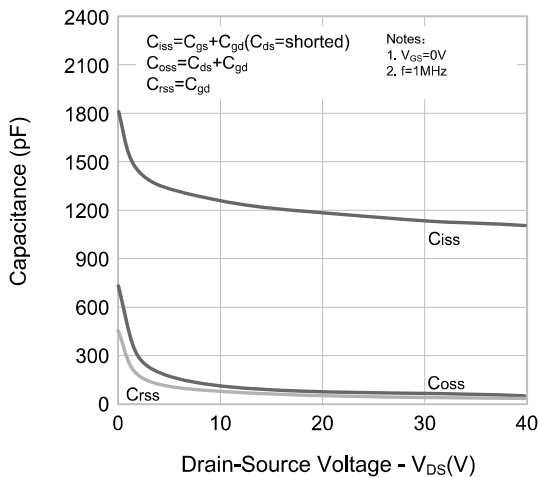
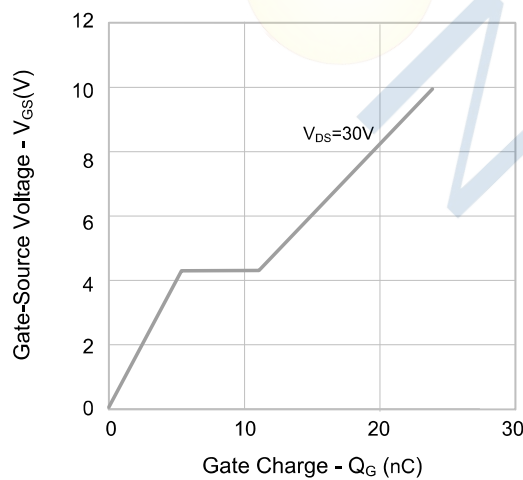


Figure 6. Gate Charge



Typical Performance Characteristics

Figure 7. Breakdown Voltage vs. Temperature Characteristics

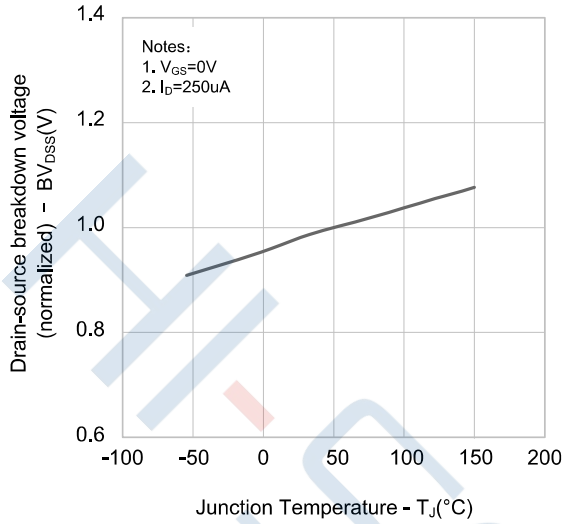


Figure 8. On-resistance vs. Temperature Characteristics

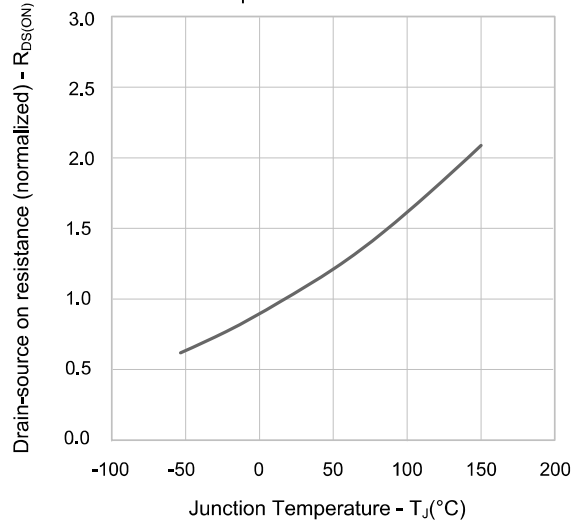
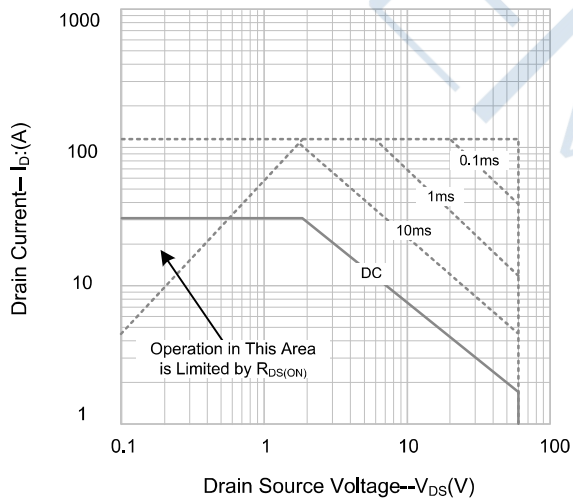
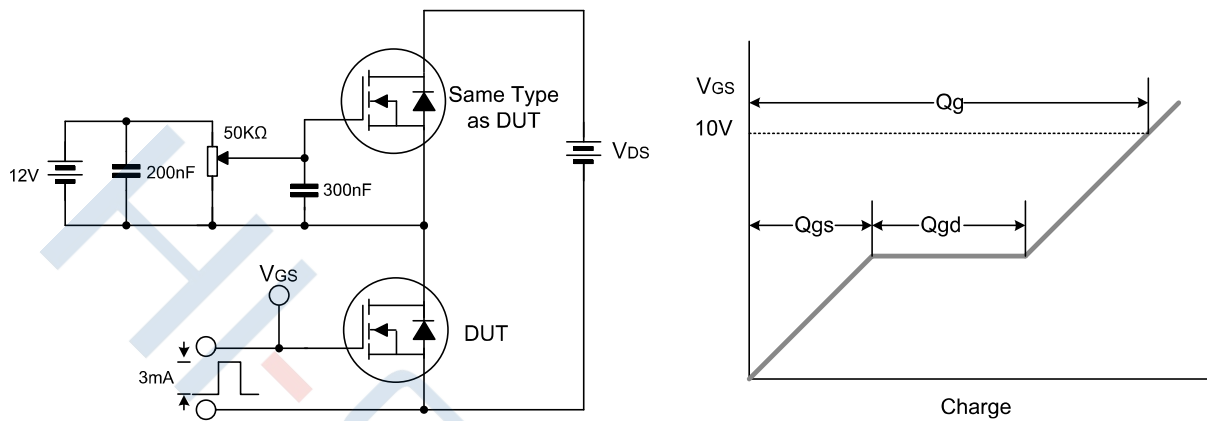


Figure 9. Max. Safe Operating Area

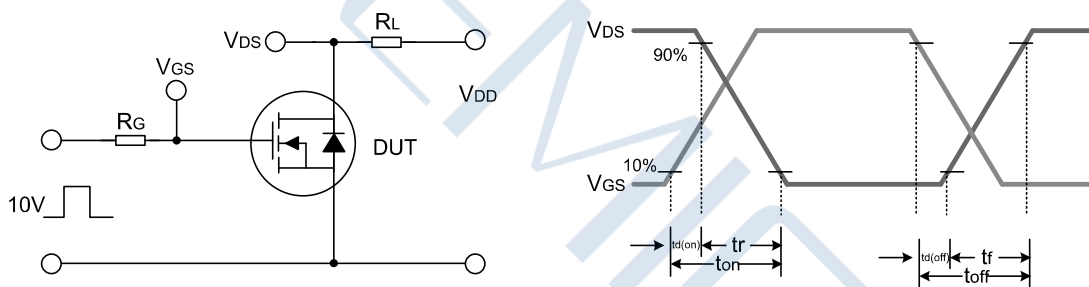


Test Circuit

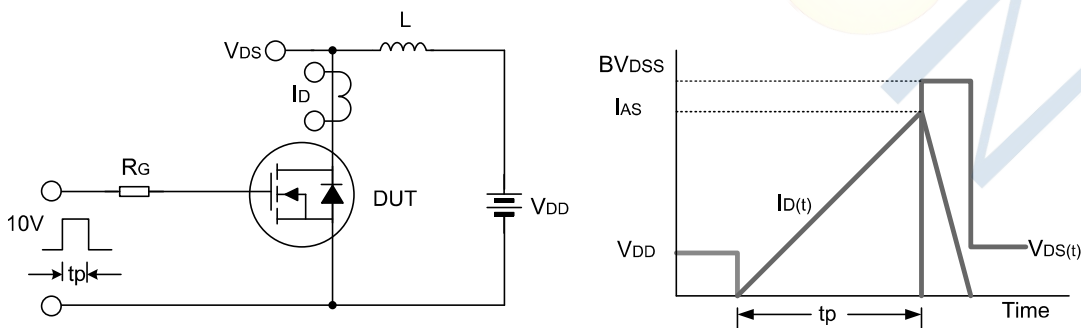
Gate Charge Test Circuit & Waveform



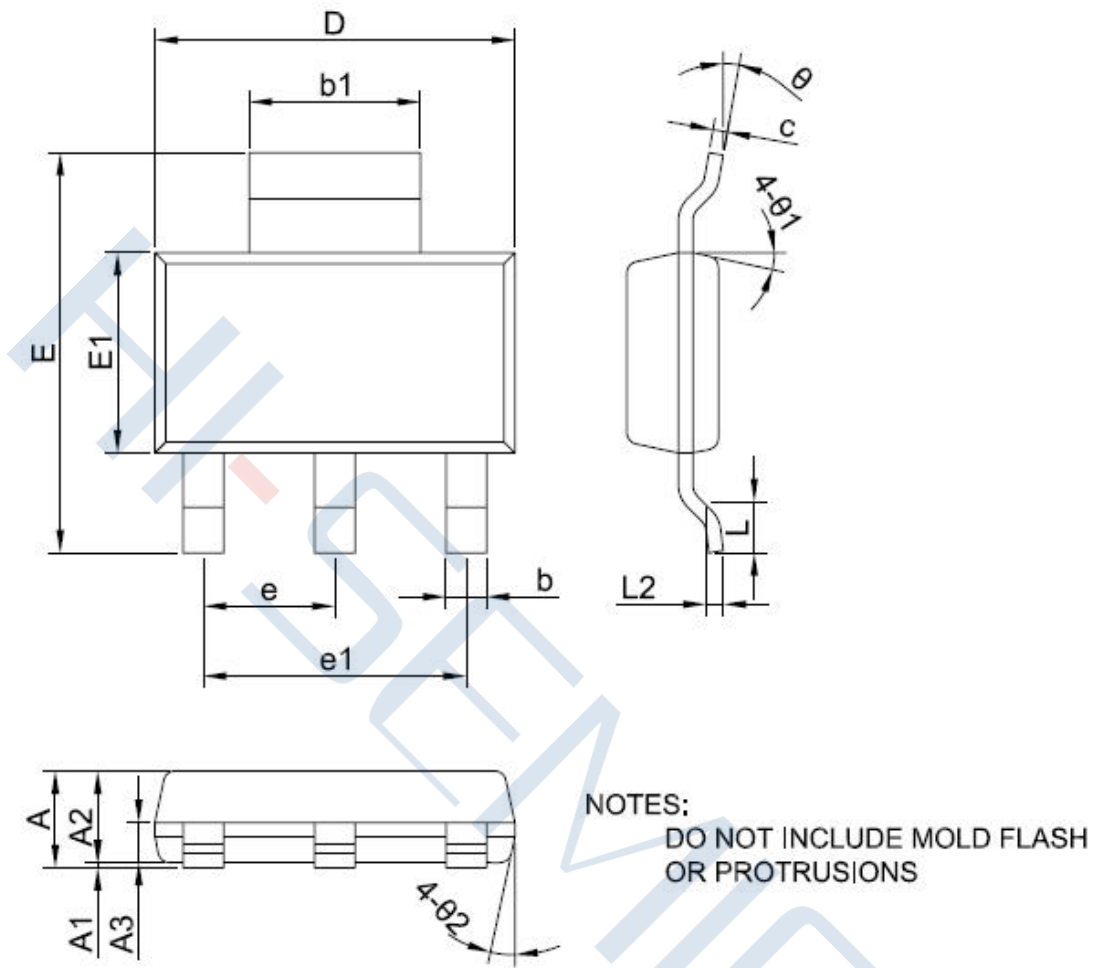
Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



Package Dimensions of SOT-223-3L



SYMBOL	MIN	NOM	MAX
A	1.55	—	1.80
A1	0.02	—	0.12
A2	1.45	1.60	1.75
A3	0.60	0.70	0.80
b	0.60	—	0.80
b1	2.90	—	3.10
c	0.24	—	0.32
D	6.20	6.30	6.50
E	6.70	7.00	7.30
E1	3.30	3.50	3.70
e	2.299REF		
e1	4.598REF		
L	0.90MIN		
L2	0.30BSC		
θ	0°	—	10°
θ_1	10°	12°	14°
θ_2	10°	12°	14°

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