



Description

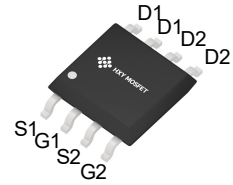
The SI4946BEY-T1-E3 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

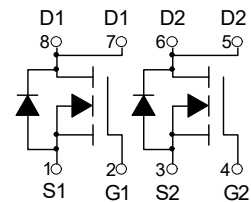
$V_{DS} = 60V$ $I_D = 5A$
 $R_{DS(ON)} < 33m\Omega$ @ $V_{GS}=10V$
 $R_{DS(ON)} < 43m\Omega$ @ $V_{GS}=4.5V$

Application

Battery protection
Load switch
Uninterruptible power supply



SOP-8
(SOIC-8)



Dual N-Channel MOSFET

Ordering Information

Product ID	Pack	Brand	Qty(PCS)
SI4946BEY-T1-E3	SOP-8	HXY MOSFET	3000

Absolute Maximum Ratings@ $T_J=25^\circ C$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_A=25^\circ C$	Drain Current, V_{GS} @ 4.5V ³	5	A
$I_D@T_A=100^\circ C$	Drain Current, V_{GS} @ 4.5V ³	3.5	A
I_{DM}	Pulsed Drain Current ¹	20	A
$P_D@T_A=25^\circ C$	Total Power Dissipation	1.5	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
R_{thj-a}	Maximum Thermal Resistance, Junction-ambient ³	85	$^\circ C/W$



Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

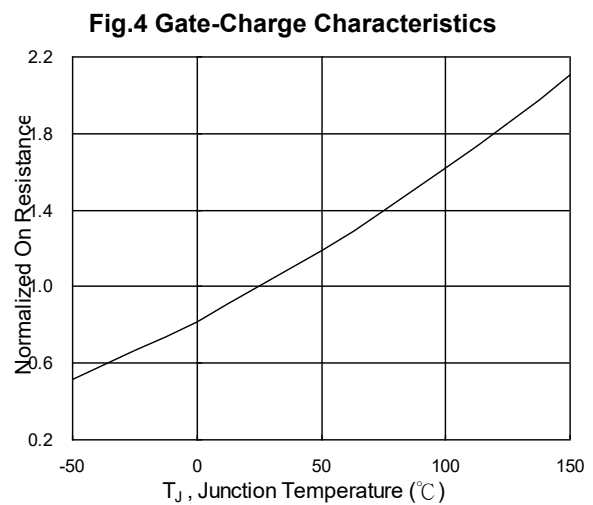
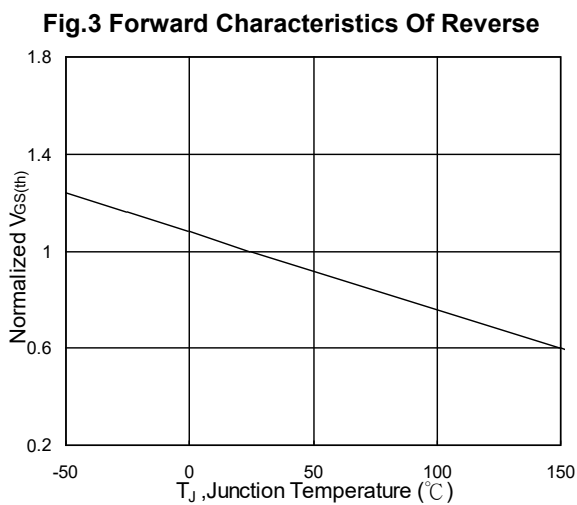
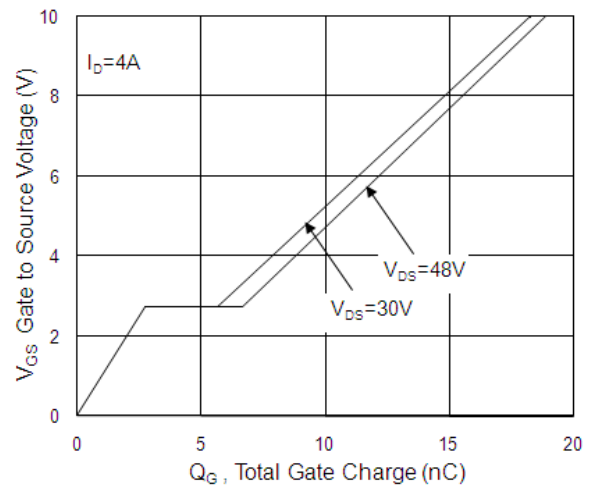
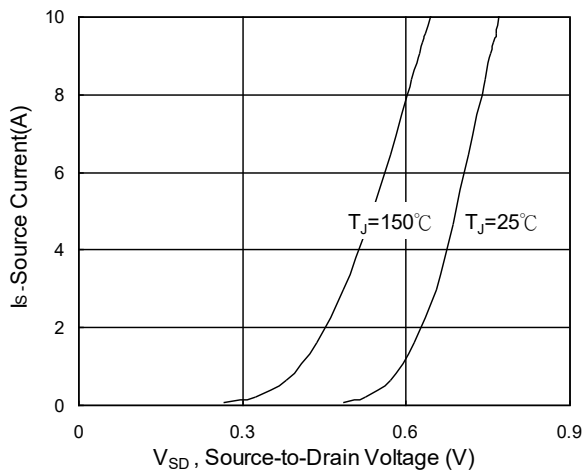
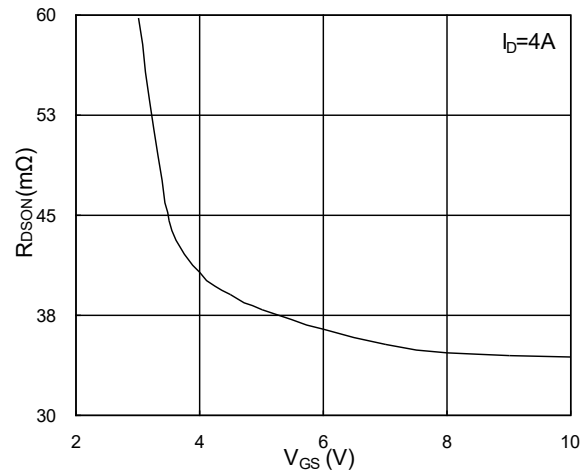
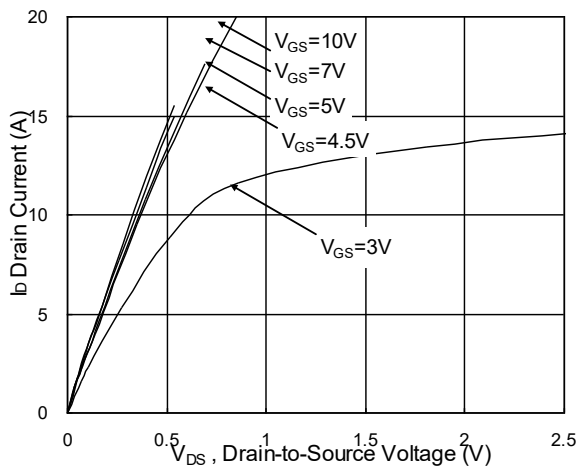
Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=60V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	± 100	nA
$V_{GS(th)}$	Gate-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.5	1.57	2.5	V
$R_{DS(on)}$	Drain-Source On Resistance ⁴	$V_{GS}=10V, I_D=4A$	---	25	33	m Ω
		$V_{GS}=4.5V, I_D=3A$	---	33	43	m Ω
C_{iss}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1MHz$	---	1027	---	pF
C_{oss}	Output Capacitance		---	60	--	
C_{rss}	Reverse Transfer Capacitance		---	45	---	
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=30V, I_D=4A,$ $R_{ENG}=3.3\Omega, V_{GS}=10V$	---	3	---	ns
t_r	Rise Time		---	34	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	23	---	ns
t_f	Fall Time		---	6	---	ns
Q_g	Total Gate Charge	$V_{GS}=10V, V_{DS}=48V,$ $I_D=4A$	---	19	---	nC
Q_{gs}	Gate-Source Charge		---	2.6	---	nC
Q_{gd}	Gate-Drain "Miller" Charge		---	4.1	---	nC
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_{SD}=1A$	---	---	1.2	V
I_S	Continuous Drain Current	$V_D=V_G=0V$	---	---	5	A
I_{SM}	Pulsed Drain Current		---	---	20	A
T_{rr}	Reverse Recovery Time	$I_F=4A, T_J=25^{\circ}\text{C}$	---	12.1	---	ns
Q_{rr}	Reverse Recovery Charge	$di/dt=100A/\mu s$	---	6.7	---	nC

Notes:

1. Computed continuous current assumes the condition of $T_{j,Max}$ while the actual continuous current depends on the thermal & electro-mechanical application board design
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. EAS condition : $T_J=25^{\circ}\text{C}, V_{DD}=30V, V_G=10V, L=0.1mH$
4. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$



Typical Characteristics



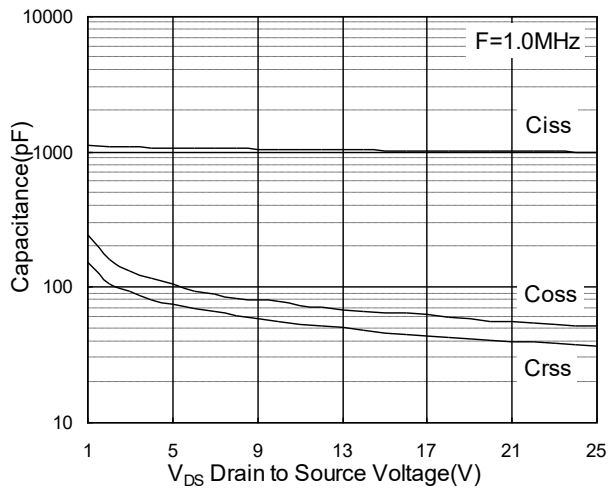


Fig.7 Capacitance

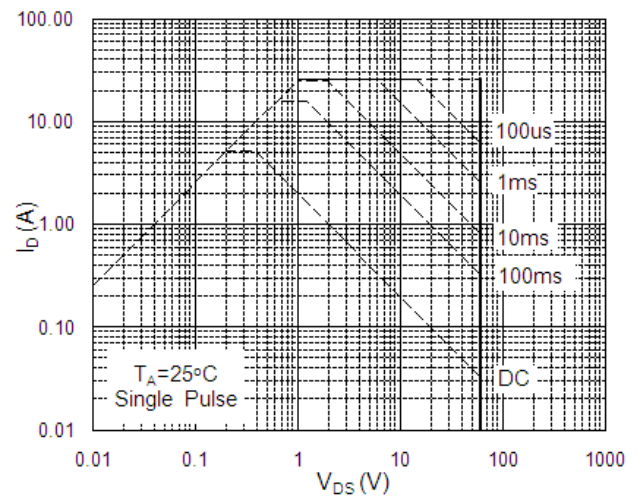


Fig.8 Safe Operating Area

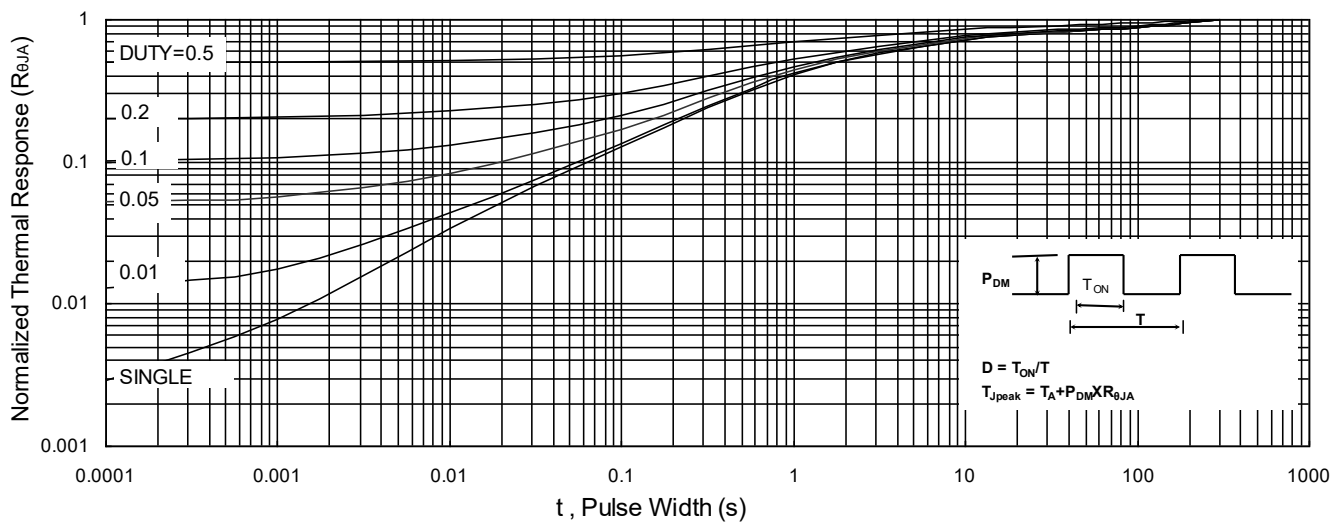


Fig.9 Normalized Maximum Transient Thermal Impedance

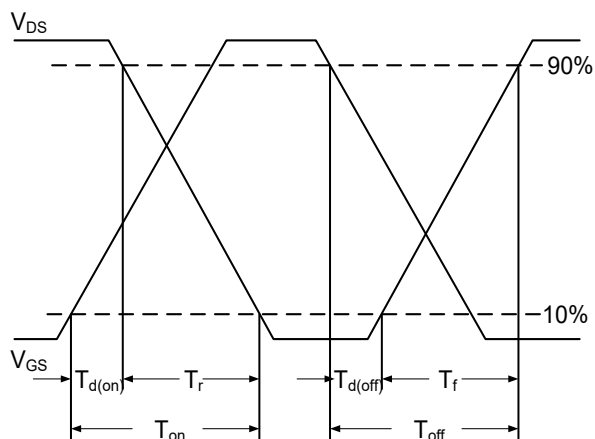


Fig.10 Switching Time Waveform

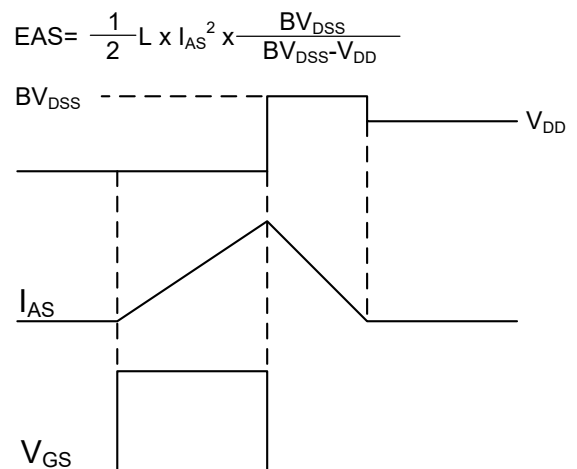
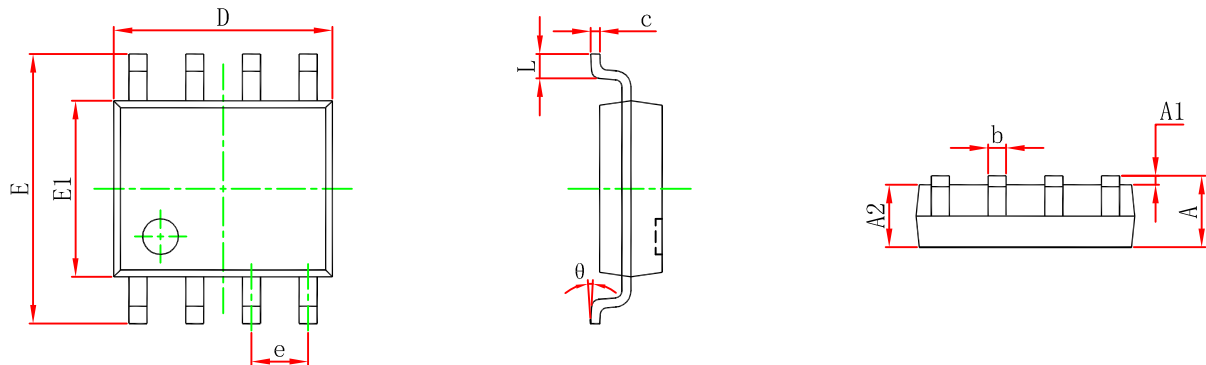


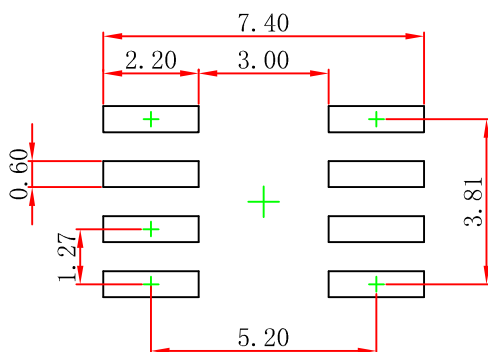
Fig.11 Unclamped Inductive Switching Waveform



SOP-8 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270 (BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



Note:
1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.



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