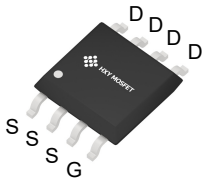
SQ4470EY

N-Channel Enhancement Mode MOSFET

Description

The SQ4470EY uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



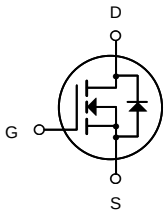
SOP-8
(SOIC-8)

General Features

V_{DS} = 60V I_D =10 A

$R_{DS(ON)}$ < 13mΩ @ V_{GS}=10V

$R_{DS(ON)}$ < 15mΩ @ V_{GS}=4.5V



N-Channel MOSFET

Application

Battery protection

Load switch

Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
SQ4470EY	SOP-8(SOIC-8)	HXY MOSFET	3000

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current-Continuous	10	A
I_D (100℃)	Drain Current-Continuous(T_C=100℃)	8.5	A
I_{DM}	Pulsed Drain Current	30	A
P_D	Maximum Power Dissipation	3	W
T_J,T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	℃

Electrical Characteristics (TC=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	60		-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	0.9	1.3	1.8	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=10A	-	10	13	mΩ
		V_{GS}=4.5V, I_D=5A	-	11.5	15	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=12A	40	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=30V,V_{GS}=0V, F=1.0MHz	-	4100	-	PF
Output Capacitance	C_{oss}		-	298	-	PF
Reverse Transfer Capacitance	C_{rss}		-	229	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=30V, R_L=1Ω V_{GS}=10V,R_{GEN}=3Ω	-	8.5	-	nS
Turn-on Rise Time	t_r		-	7	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	40	-	nS
Turn-Off Fall Time	t_f		-	15	-	nS
Total Gate Charge	Q_g	V_{DS}=30V,I_D=10A, V_{GS}=10V	-	93	-	nC
Gate-Source Charge	Q_{gs}		-	9.7	-	nC
Gate-Drain Charge	Q_{gd}		-	20	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=10A	-	-	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	10	A
Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F=10A di/dt = 100A/μs (Note3)	-	32	-	nS
Reverse Recovery Charge	Qrr		-	45	-	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.

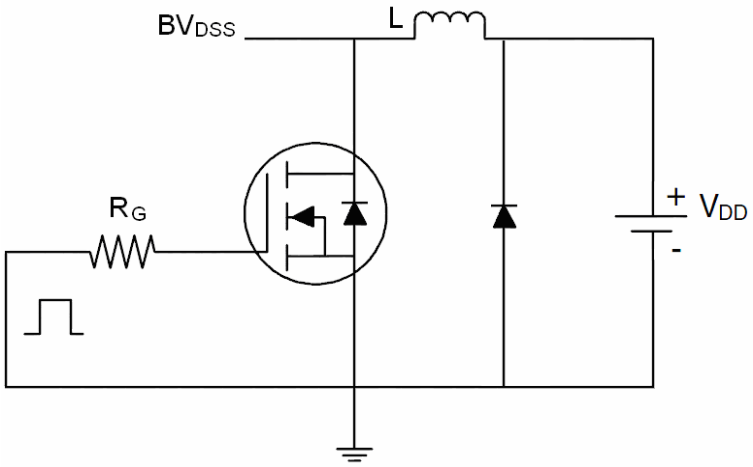
2. The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C. The value in any given application depends on the user's specific board design.

3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

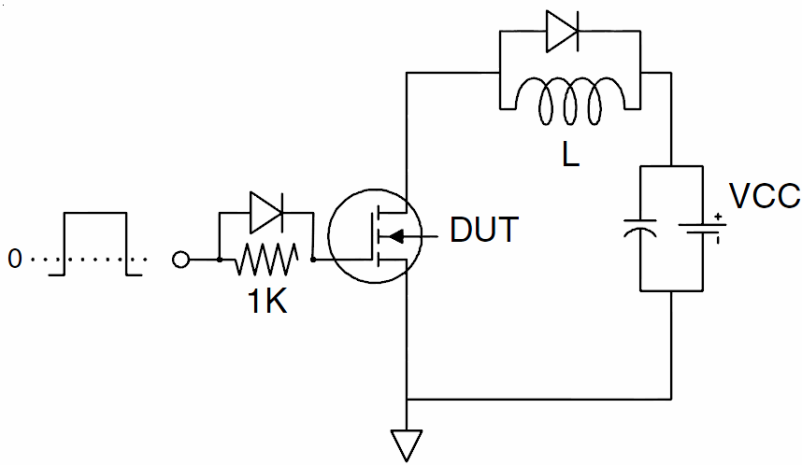
4. Guaranteed by design, not subject to production

Test Circuit

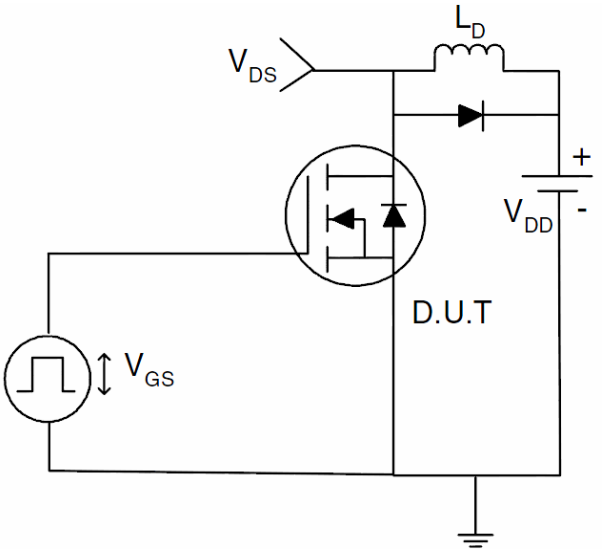
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

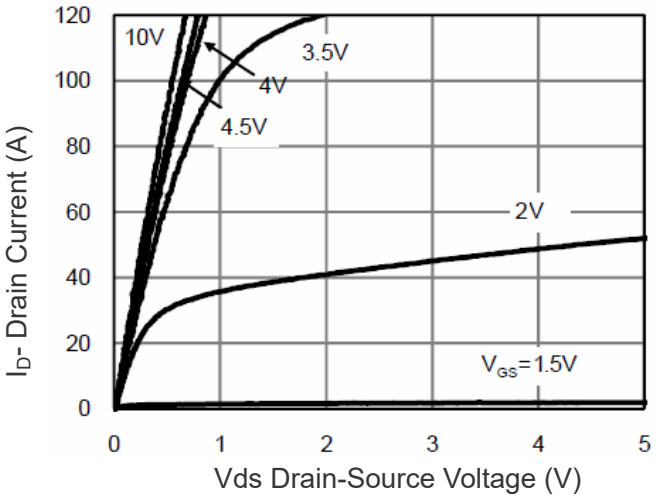


Figure 1 Output Characteristics

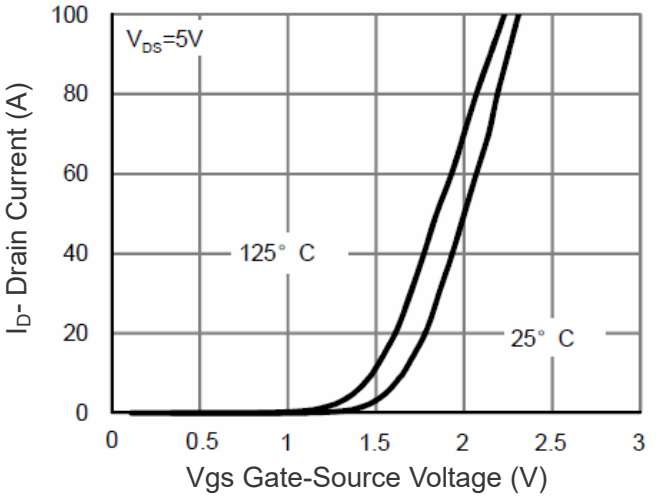


Figure 2 Transfer Characteristics

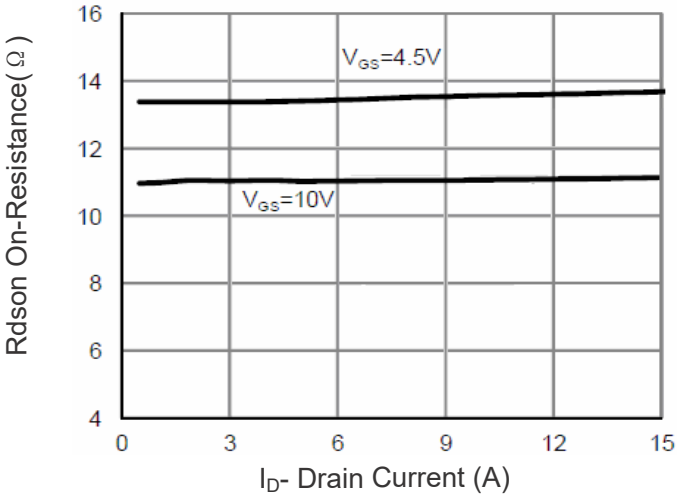


Figure 3 Rdson- Drain Current

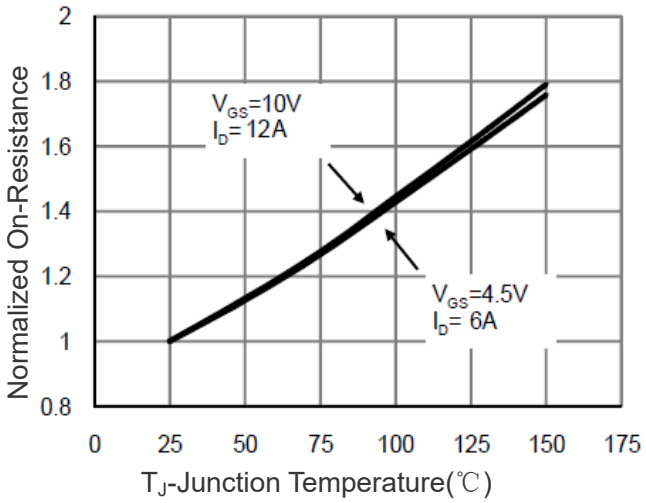


Figure 4 Rdson-JunctionTemperature

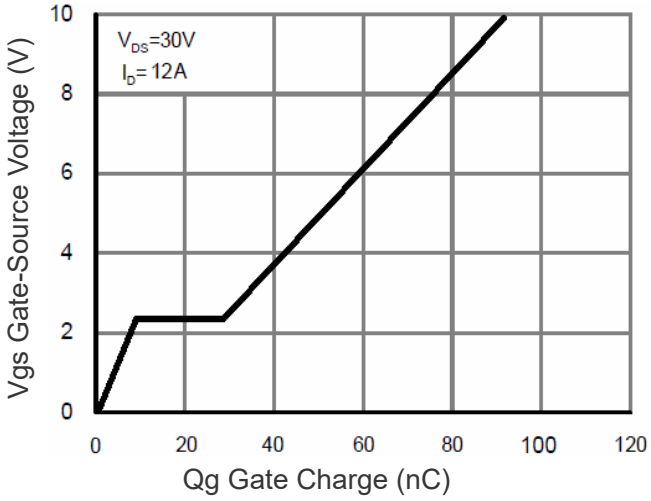


Figure 5 Gate Charge

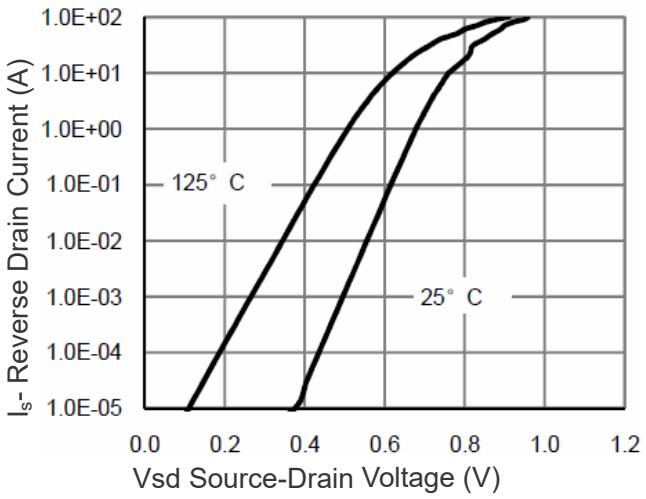


Figure 6 Source- Drain Diode Forward

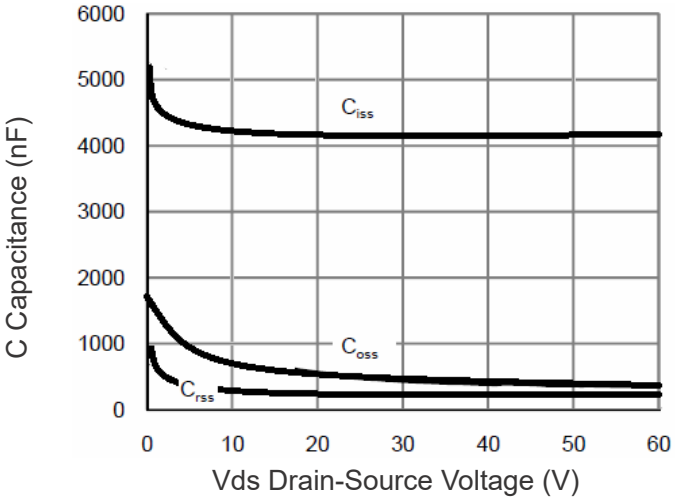


Figure 7 Capacitance vs Vds

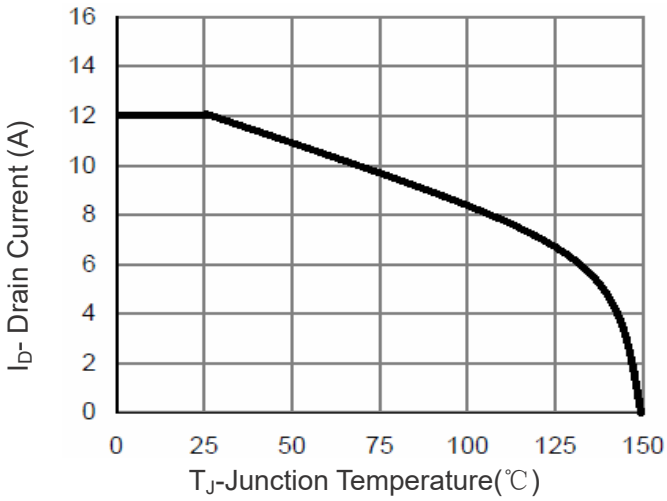


Figure 9 Current De-rating

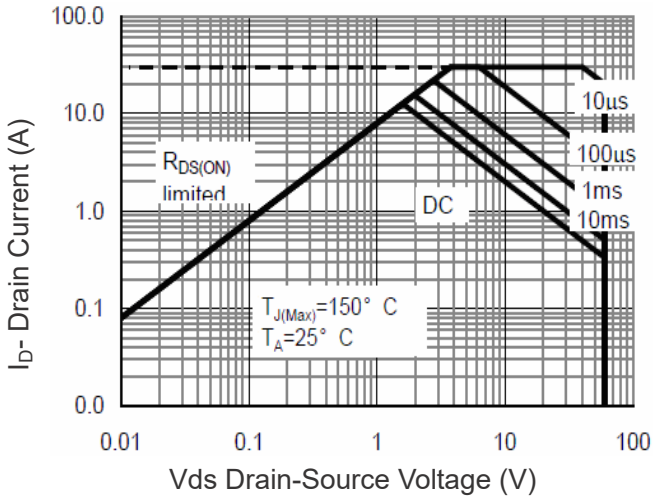


Figure 8 Safe Operation Area

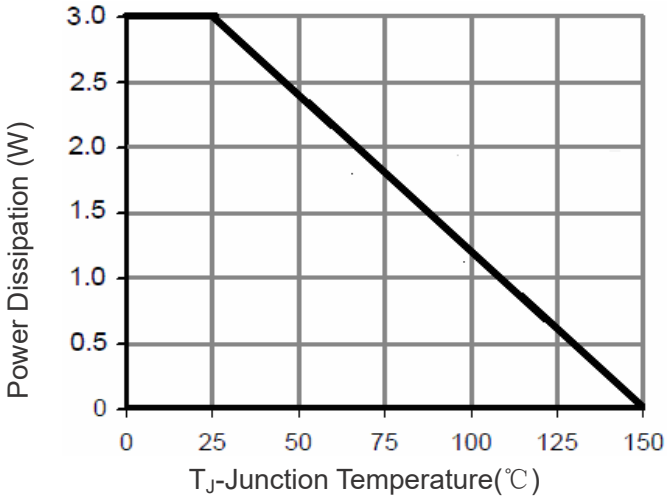


Figure 10 Power De-rating

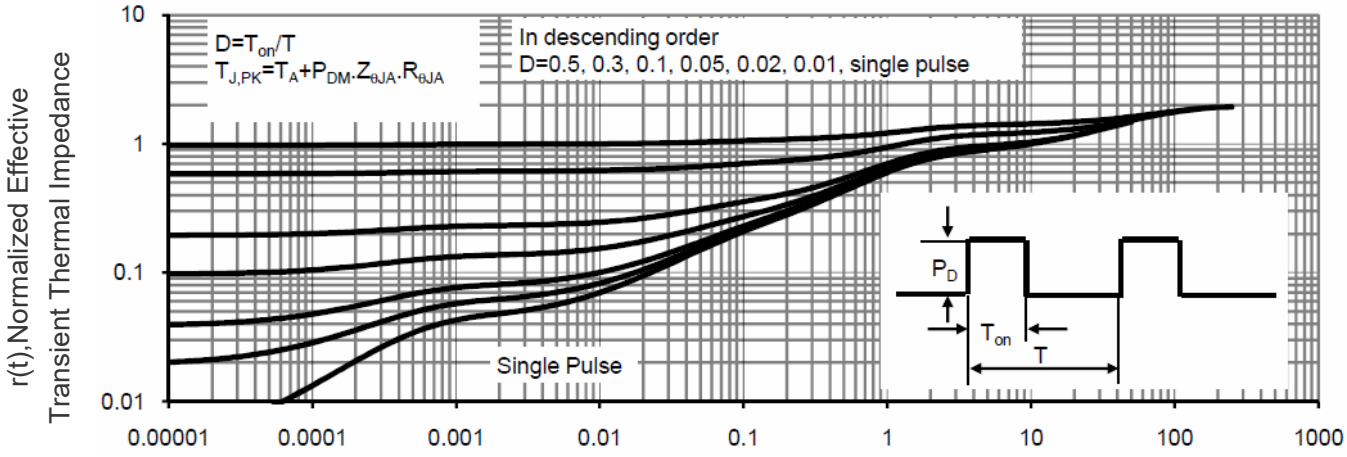
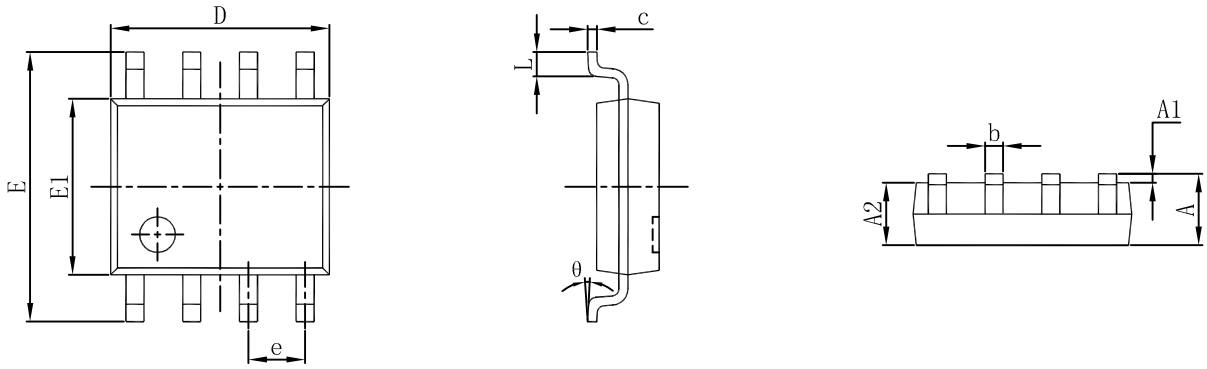
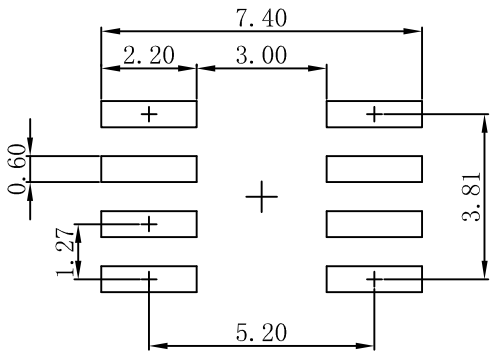


Figure 11 Normalized Maximum Transient Thermal Impedance

SOP-8(SOIC-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:± 0.05mm.
3.The pad layout is for reference purposes only.

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