



P-Channel Enhancement Mode Field Effect Transistor

● Features

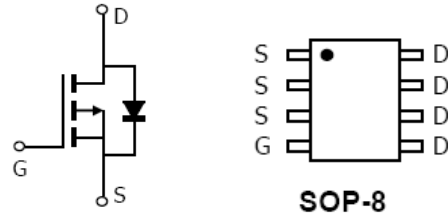
$V_{DS}(V) = -30V$

$I_D = -14 A (V_{GS} = -10V)$

$R_{DS(ON)} < 11m\Omega (V_{GS} = -10V)$

$R_{DS(ON)} < 13m\Omega (V_{GS} = -4.5V)$

● Pin Configurations



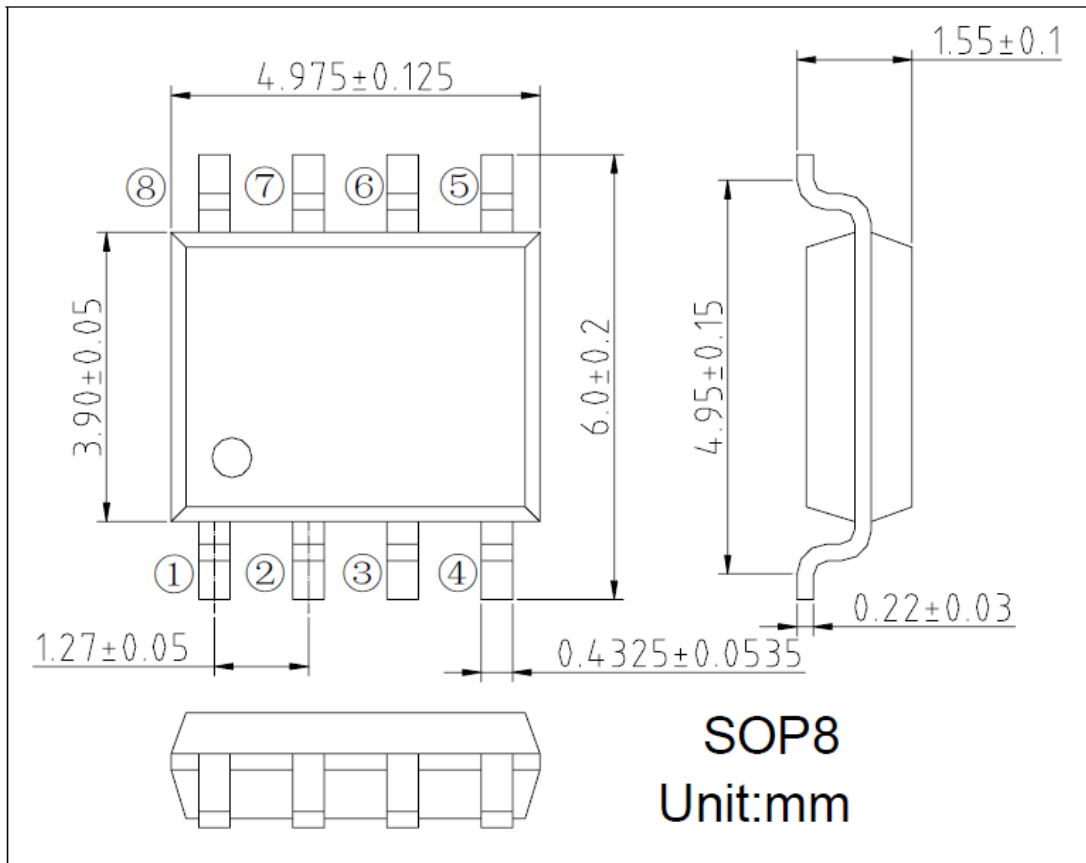
● General Description

The HX4409SQ/L uses advanced trench technology to provide excellent $R_{DS(ON)}$, and ultra-low low gate charge. This device is suitable for use as a load switch or in PWM applications. HX4409SQ and HX4409SQL are electrically identical.

-RoHS Compliant

-HX4409SQL is Halogen Free

● Package Information





● **Absolute Maximum Ratings** @ $T_A=25^{\circ}\text{C}$ unless otherwise noted

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DSS}	-30	V
Gate-Source Voltage	V_{GSS}	± 20	V
Drain Current (Continuous) *AC	I_D	$T_A=25^{\circ}\text{C}$	-14
		$T_A=70^{\circ}\text{C}$	-11
Drain Current (Pulse) *B	I_{DM}	-70	A
Power Dissipation	P_D	$T_A=25^{\circ}\text{C}$	3
		$T_A=70^{\circ}\text{C}$	2.1
Operating Temperature/ Storage Temperature	T_{J}/T_{STG}	-55~150	$^{\circ}\text{C}$

● **Electrical Characteristics** @ $T_A=25^{\circ}\text{C}$ unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250 \mu A$	-30	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -30V, V_{GS} = 0V$	--	--	-1	μA
Gate Threshold Voltage	V_{GSS}	$V_{GS} = V_{DS}, I_{DS} = -250 \mu A$	-1.0	-1.3	-2	V
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	--	--	100	nA
Drain-Source On-state Resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -15A$	--	9.4	11	m Ω
		$V_{GS} = -4.5V, I_D = -10A$	--	11.1	13	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = -5V, I_D = -15A$	--	50	--	S
Diode Forward Voltage	V_{SD}	$I_{SD} = -1A, V_{GS} = 0V$	--	-0.71	-1.0	V
Maximum Body-Diode Continuous Current	I_S		--	--	-5	A
Switching						
Total Gate Charge	Q_g	$V_{GS} = -10V, V_{DS} = -15V, I_D = -15A$	--	100	120	nC
Gate-Source Charge	Q_{gs}		--	51.5	--	nC
Gate-Drain Charge	Q_{gd}		--	14.5	--	nC
Turn-on Delay Time	$t_{d(on)}$	$V_{GS} = -10V, V_{DS} = -15V, R_L = 1\Omega,$	--	14	--	ns
Turn-off Delay Time	$t_{d(off)}$	$R_{GEN} = 3\Omega$	--	74	--	ns
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0V, V_{DS} = -15V, f = 1MHz$	--	5200	6300	pF
Output Capacitance	C_{oss}		--	925	--	pF
Reverse Transfer Capacitance	C_{rss}		--	720	--	pF

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

B: Repetitive rating, pulse width limited by junction temperature.

C: The current rating is based on the $\leq 10s$ junction to ambient thermal resistance rating.



● TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

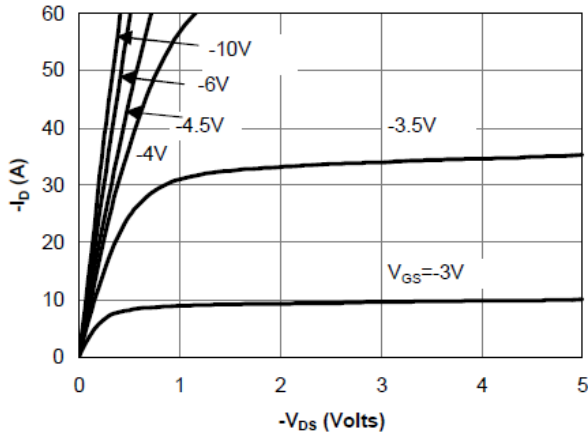


Fig 1: On-Region Characteristics

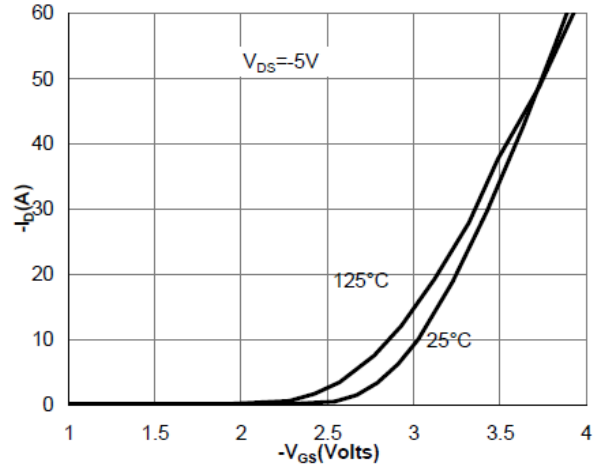


Figure 2: Transfer Characteristics

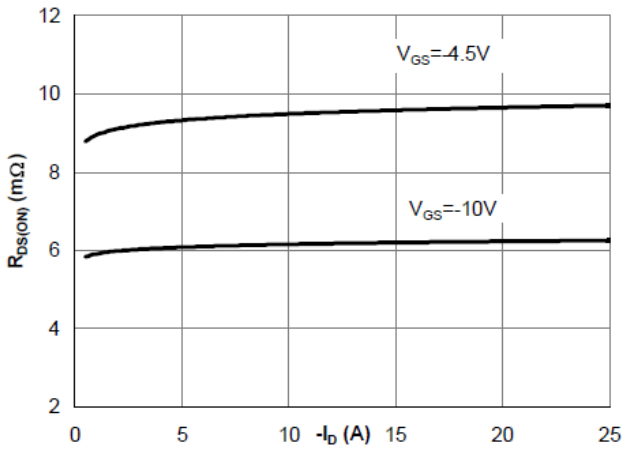


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

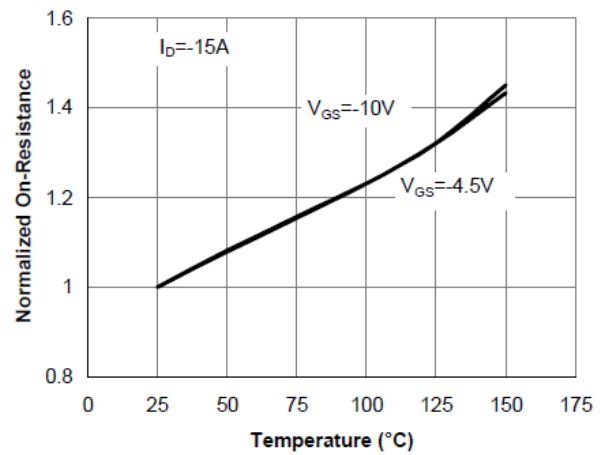


Figure 4: On-Resistance vs. Junction Temperature

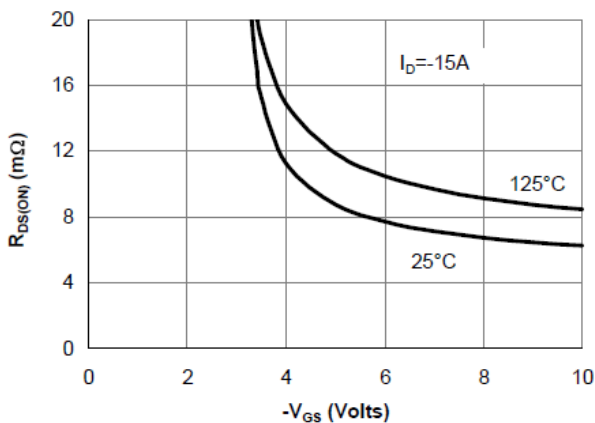


Figure 5: On-Resistance vs. Gate-Source Voltage

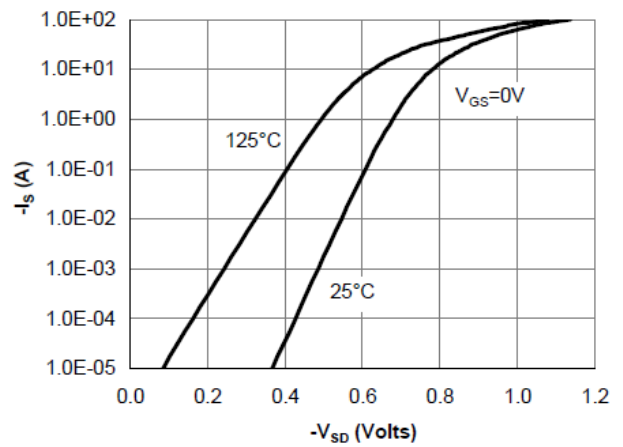


Figure 6: Body-Diode Characteristics

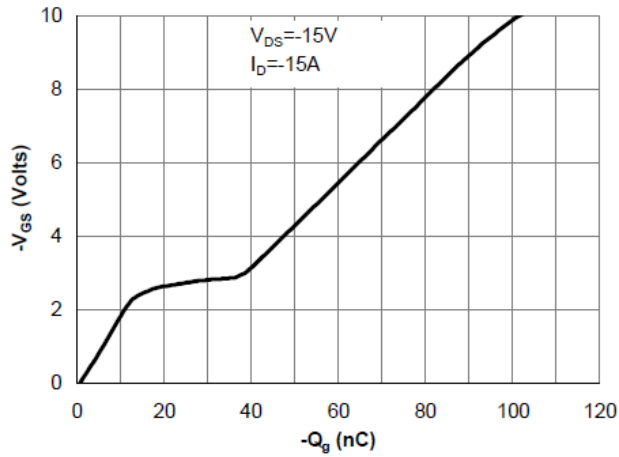


Figure 7: Gate-Charge Characteristics

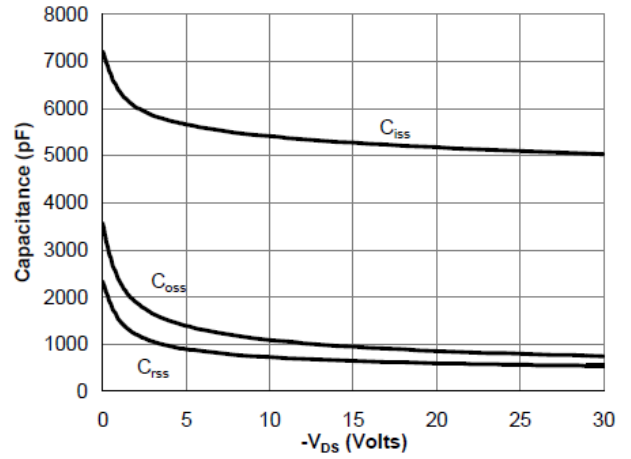


Figure 8: Capacitance Characteristics

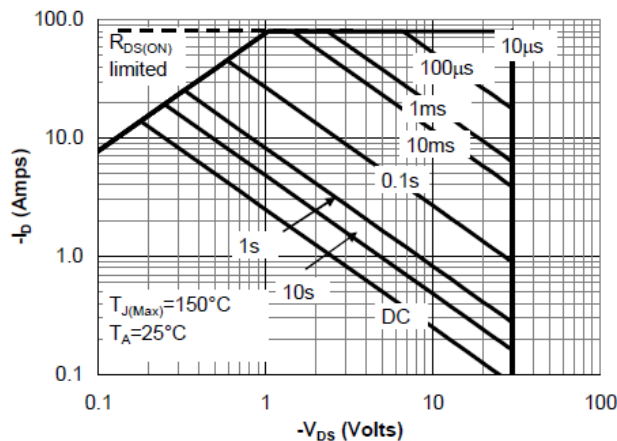


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

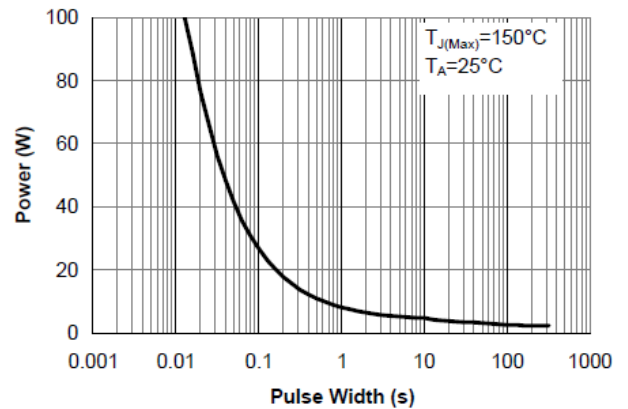


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

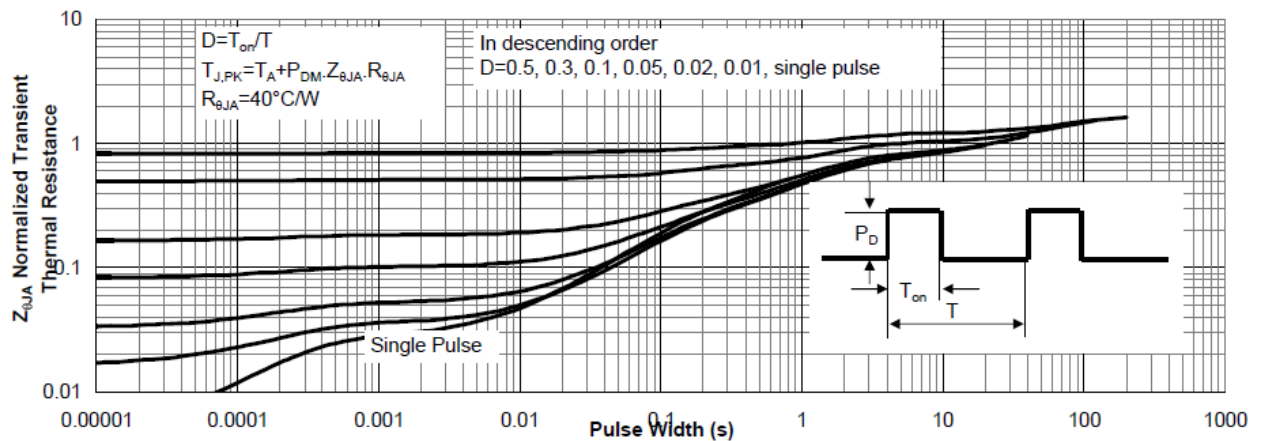


Figure 11: Normalized Maximum Transient Thermal Impedance



HX4409SQ

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