Common Drain N-Channel Enhancement Mode Field Effect Transistor with ESD Protection

Features

V_{DS} (V) = 20V

I_D = 7A (V_{GS} = 4.5V)

$R_{DS(ON)}$ <21mΩ (V_{GS} = 4.5V)

$R_{DS(ON)}$ <25mΩ (V_{GS} = 2.5V)

$R_{DS(ON)}$ <33mΩ (V_{GS} = 1.8V)

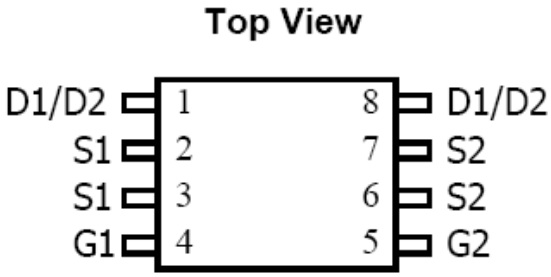
ESD Protected : 2000V

Standard Product HX9926A is Pb-free.

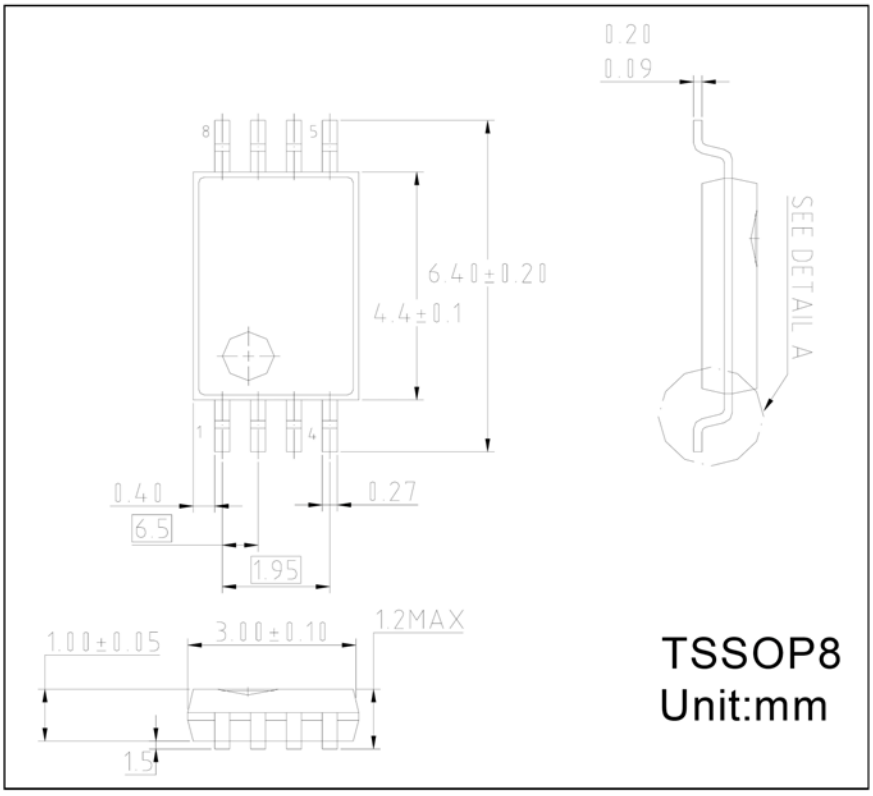
General Description

The HX9926A uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. They offer operation over a wide gate drive range from 1.8V to 8V. It is ESD protected. This device is suitable for use as a uni-directional or bi-directional load switch, facilitated by its common-drain configuration.

Pin Configurations



Package Information



- **Absolute Maximum Ratings** @T_A=25℃ unless otherwise noted

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	±12	V
Drain Current (Continuous) *AC	T_A=25°C	I_D	7	A
	T_A=70°C		5.6	
Drain Current (Pulse) *B		I_{DM}	30	A
Power Dissipation	T_A=25°C	P_D	1.5	W
	T_A=70°C		1	
Operating Temperature/ Storage Temperature		T_J/T_{STG}	-55~150	℃

- **Electrical Characteristics** @T_A=25℃ unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	20	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20 V, V_{GS} = 0V	--	--	1	μA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_{DS} = 250μA	0.4	0.54	1	V
Gate Leakage Current	I_{GSS}	V_{GS} = ±10V, V_{DS} = 0V	--	±10	--	μA
Drain-Source On-state Resistance	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 8A	--	16.5	21	mΩ
		V_{GS} = 2.5V, I_D = 7A	--	20	25	mΩ
		V_{GS} = 1.8V, I_D = 6A	--	25	33	mΩ
Forward Transconductance	g_{FS}	V_{DS} =5V, I_D = 6.5A	--	13	--	S
Diode Forward Voltage	V_{SD}	I_{SD} = 2.5A , V_{GS} = 0V	--	0.79	1.6	V
Maximum Body-Diode Continuous Current	I_S		--	--	2.5	A
Switching						
Total Gate Charge	Q_g	V_{GS}=4.5V, V_{DS}=10V, I_D=8A	--	13.8	17.94	nC
Gate-Source Charge	Q_{gs}		--	4.1	5.33	nC
Gate-Drain Charge	Q_{gd}		--	5.6	7.28	nC
Turn-on Delay Time	$t_{d(on)}$	V_{GS}=5V, V_{DS}=10V, R_L=1.5Ω,R_{GEN}=3Ω	--	6.2	12.4	ns
Turn-on Rise Time	t_r		--	12.7	25.4	ns
Turn-off Delay Time	$t_{d(off)}$		--	51.7	103.4	ns
Turn-off Fall Time	t_f		--	16	32	ns
Dynamic						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=10V, f=1MHz	--	1160	--	pF
Output Capacitance	C_{oss}		--	104	--	pF
Reverse Transfer Capacitance	C_{rss}		--	29	--	pF

A: 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.

B: Repetitive rating, pulse width limited by junction temperature. C: The current rating is based on the t≤ 10s junction to ambient thermal resistance rating.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

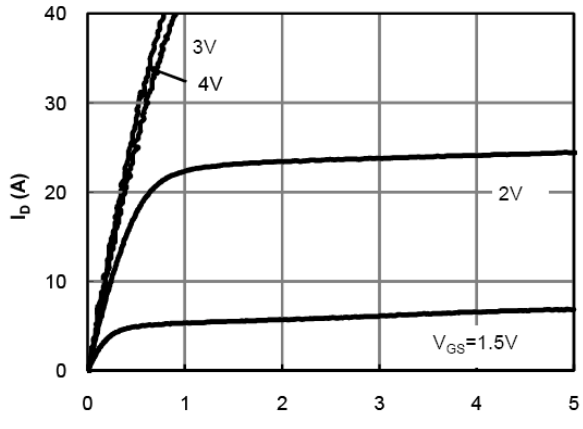


Fig 1: On-Region Characteristics

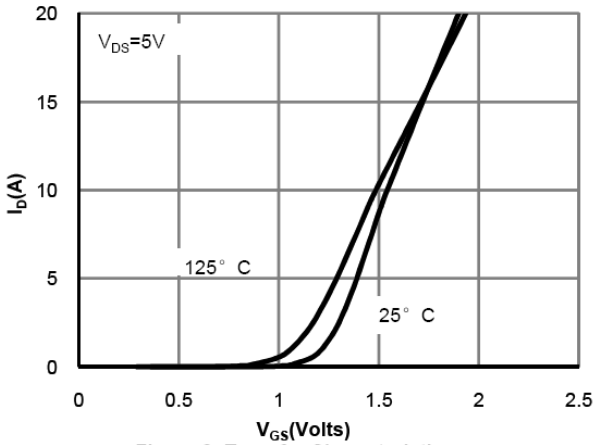


Figure 2: Transfer Characteristics

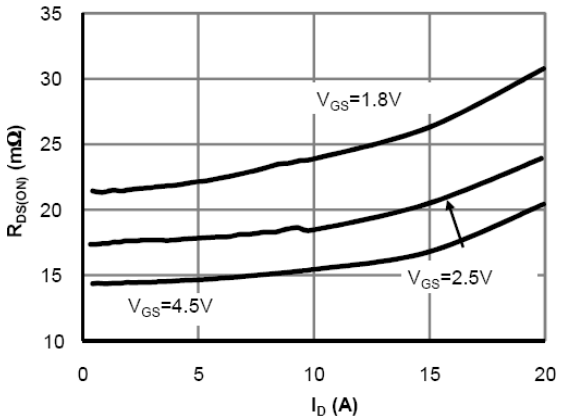


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

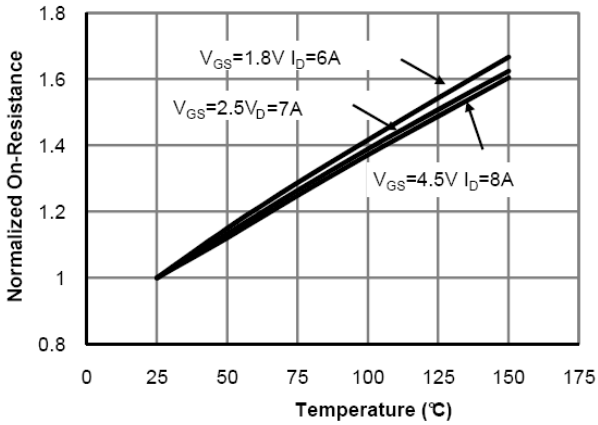


Figure 4: On-Resistance vs. Junction Temperature

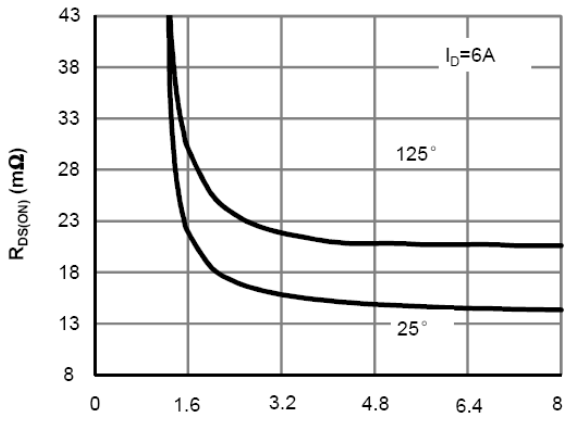


Figure 5: On-Resistance vs. Gate-Source Voltage

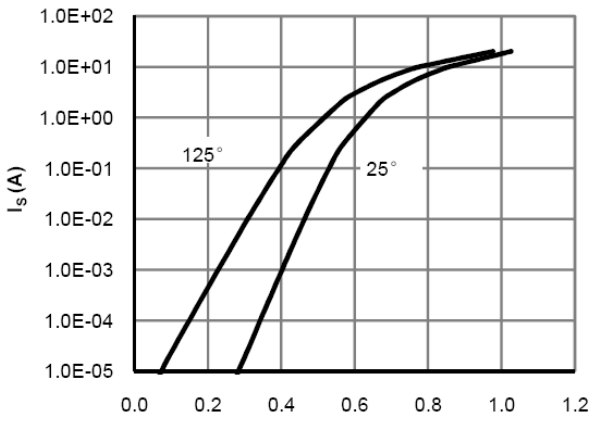


Figure 6: Body-Diode Characteristics

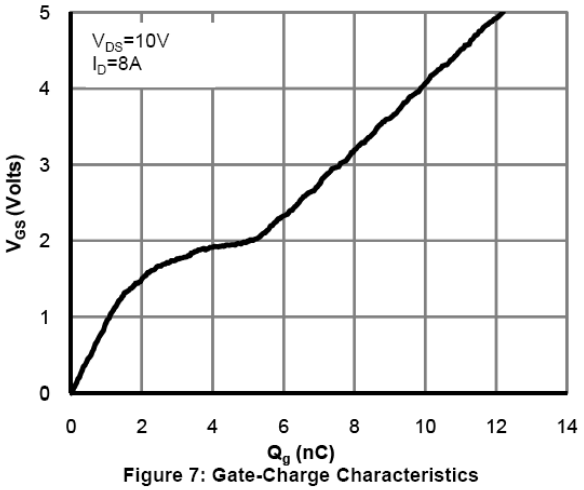


Figure 7: Gate-Charge Characteristics

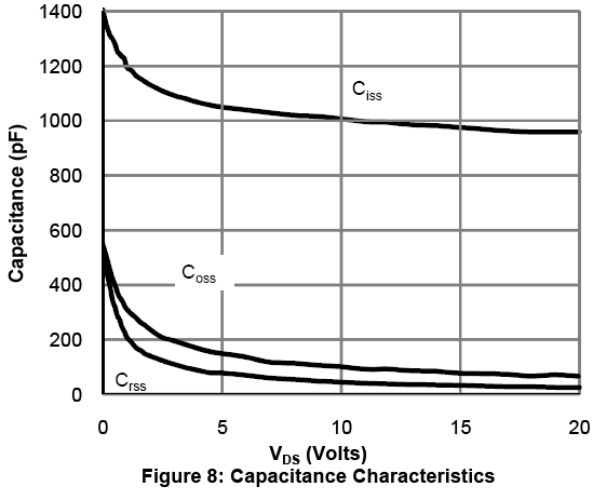


Figure 8: Capacitance Characteristics

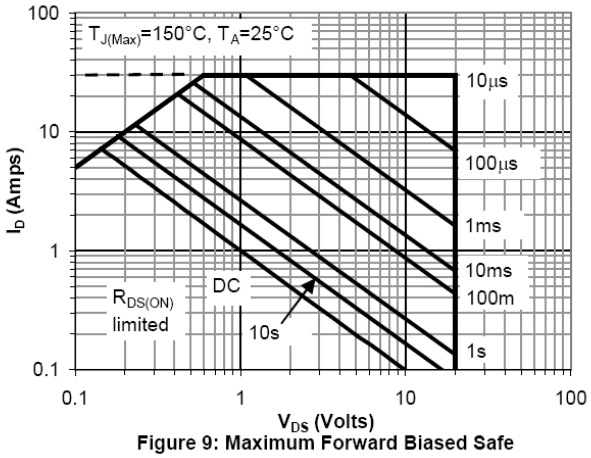


Figure 9: Maximum Forward Biased Safe Operating Area

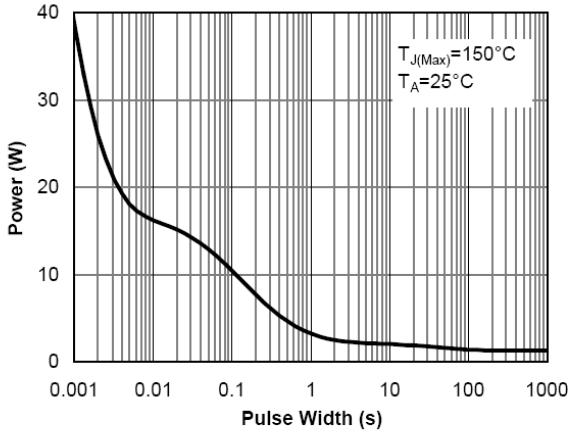


Figure 10: Single Pulse Power Rating Junction-to-Ambient

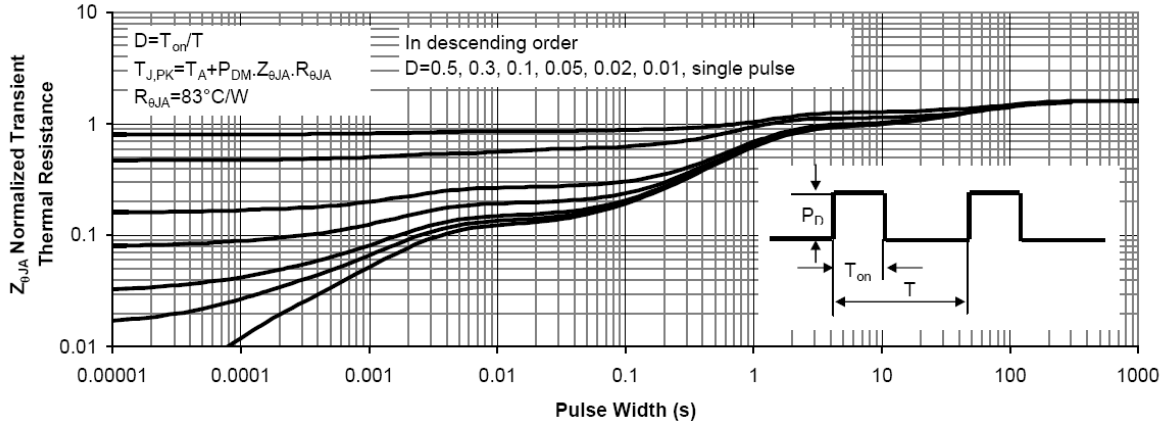


Figure 11: Normalized Maximum Transient Thermal Impedance

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