

Silicon N-Channel Power MOSFET

General Description:

The HMS1130 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications. The package form is SOP-8, which accords with the RoHS standard.

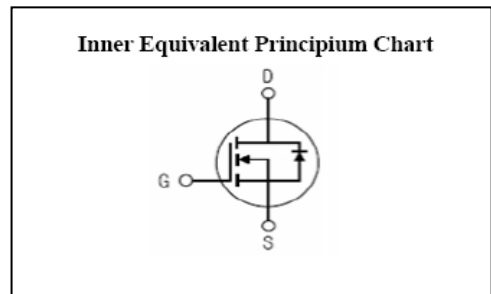
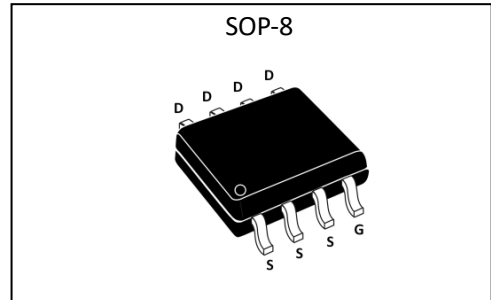
Features:

- Fast Switching
- Low Gate Charge and Rds on
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Applications:

- PWM applications
- Load switch
- Power management

V _{DSS}	30	V
I _D	8	A
P _D	2.5	W
R _{DS(ON)MAX}	20	mΩ



Absolute (T_c=25°C unless otherwise specified):

Symbol	Parameter	Rating	Units
V _{DSS}	Drain-to-Source Voltage	30	V
I _D	Continuous Drain Current	8	A
	Continuous Drain Current T _C = 70 °C	6	A
I _{DM} ^{a1}	Pulsed Drain Current	32	A
V _{GS}	Gate-to-Source Voltage	±20	V
E _{as} ^{a2}	L=0.1mH	28	mJ
dv/dt ^{a3}	Peak Diode Recovery dv/dt	5.0	V/ns
P _D	Power Dissipation	2.5	W
T _J , T _{stg}	Operating Junction and Storage Temperature Range	150, -55 to 150	°C
T _L	Maximum Temperature for Soldering	300	°C

Electrical Characteristics (Tc=25°C unless otherwise specified):

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	30	--	--	V
ΔBV _{DSS} /ΔT _J	Bvdss Temperature Coefficient	I _D =-250uA, Reference 25°C	--	0.1	--	V/°C
I _{DSS}	Drain to Source Leakage Current	V _{DS} =30, V _{GS} = 0V, T _a =25°C	--	--	1	μA
		V _{DS} =24V, V _{GS} =0V, T _a =125°C	--	--	250	
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} = +20V	--	--	1	μA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} = -20V	--	--	-1	μA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R _{DS(ON)}	Drain-to-Source On-Resistance	V _{GS} =10V, I _D =5A	--	11	20	mΩ
R _{DS(ON)}	Drain-to-Source On-Resistance	V _{GS} =4.5V, I _D =5.0A	--	15	26	mΩ
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.5	--	2.0	V

Pulse width tp ≤ 380μs, δ ≤ 2%

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =10A	15	--	--	S
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V f=1.0MHz	--	680	--	pF
C _{oss}	Output Capacitance		--	160	--	
C _{rss}	Reverse Transfer Capacitance		--	80	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	I _D =1A, V _{DD} =25V V _{GS} =10V, R _G =6Ω	--	13	--	ns
t _r	Rise Time		--	8	--	
t _{d(OFF)}	Turn-Off Delay Time		--	40	--	
t _f	Fall Time		--	30	--	
Q _g	Total Gate Charge	I _D =5A, V _{DD} =30V V _{GS} =5V	--	8	--	nC
Q _{gs}	Gate to Source Charge		--	4.8	--	
Q _{gd}	Gate to Drain ("Miller") Charge		--	2.2	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	8	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	32	A
V_{SD}	Diode Forward Voltage	$I_S=8A, V_{GS}=0V$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$I_S=8A, T_j=25^\circ C$	--	60	--	ns
Q_{rr}	Reverse Recovery Charge	$di_F/dt=100A/us, V_{GS}=0V$	--	150	--	nC

Pulse width $t_p \leq 380\mu s, \delta \leq 2\%$

Symbol	Parameter	Typ.	Units
$R_{\theta JA}$	Junction-to-Ambient	50	$^\circ C/W$

^{a1}: Repetitive rating; pulse width limited by maximum junction temperature

^{a2}: $T_J=25^\circ C, V_{DD}=15V, V_G=10V, L=0.1mH$

^{a3}: $I_{SD}=8A, di/dt \leq 100A/us, V_{DD} \leq BV_{DS}, \text{Start } T_J=25^\circ C$

Typical Electrical and Thermal Characteristics

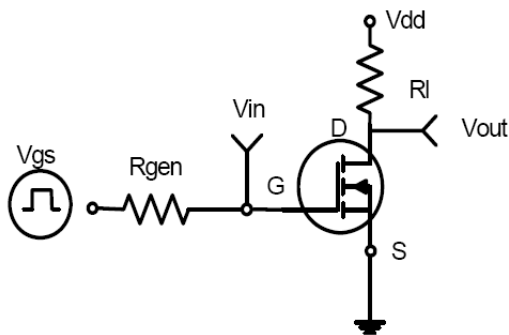


Figure 1: Switching Test Circuit

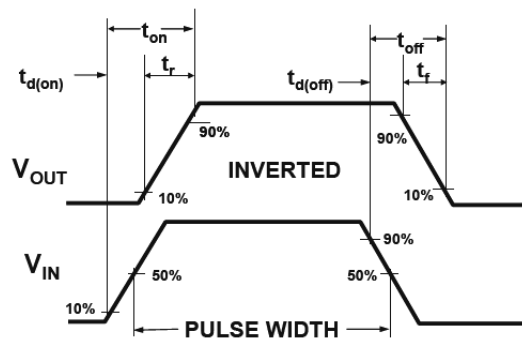


Figure 2: Switching Waveforms

Typical Electrical and Thermal Characteristics (Curves)

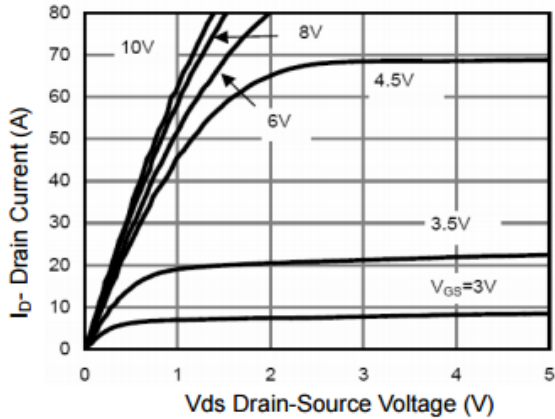


Figure 1 Output Characteristics

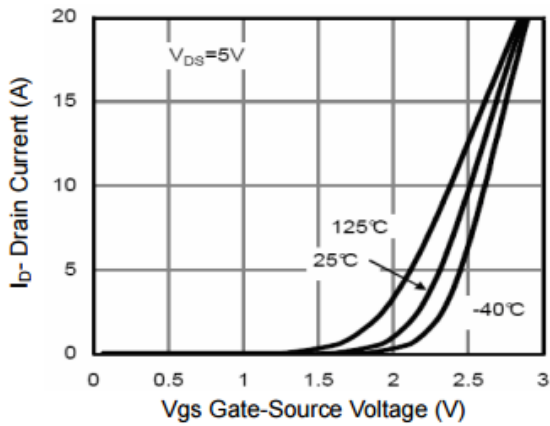


Figure 2 Transfer Characteristics

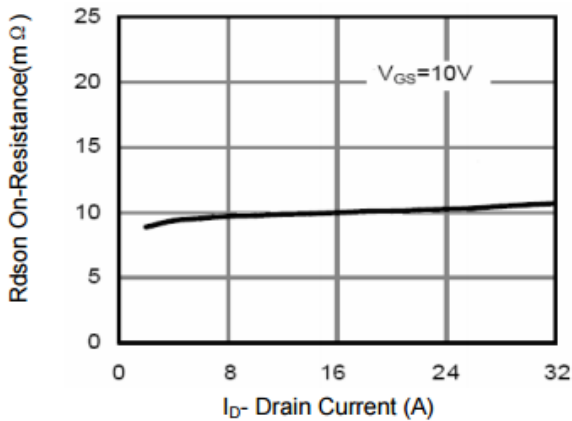


Figure 3 $R_{DS(on)}$ - Drain Current

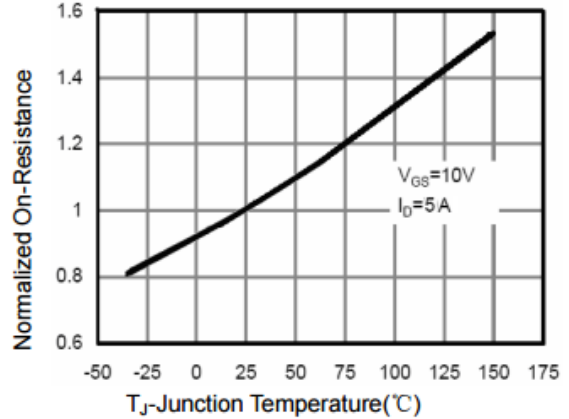


Figure 4 $R_{DS(on)}$ -Junction Temperature

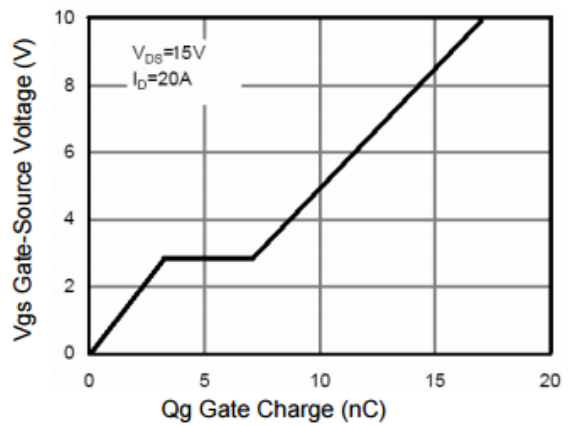


Figure 5 Gate Charge

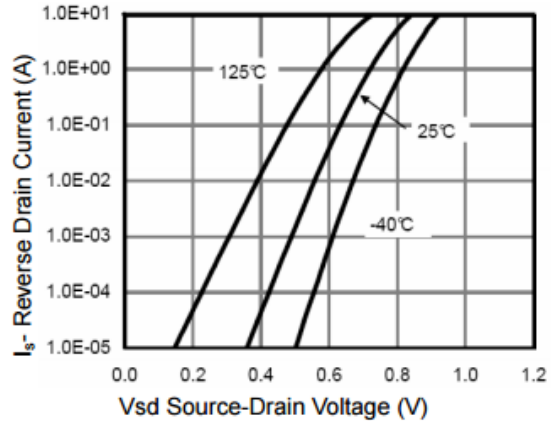


Figure 6 Source- Drain Diode Forward

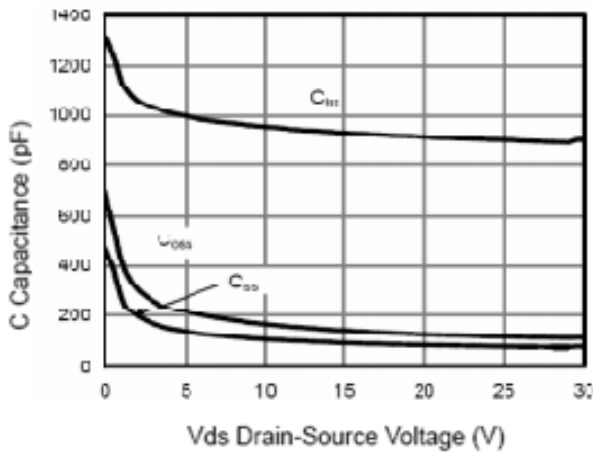


Figure 7 Capacitance vs Vds

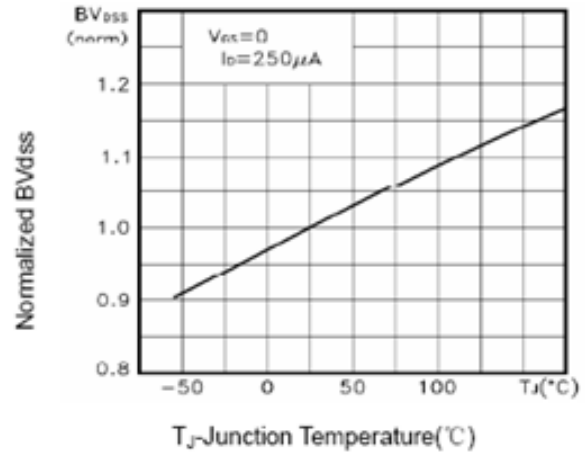


Figure 9 BV_{DSS} vs Junction Temperature

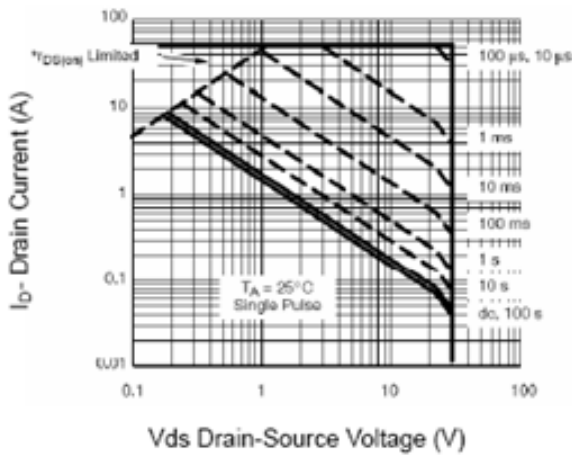


Figure 8 Safe Operation Area

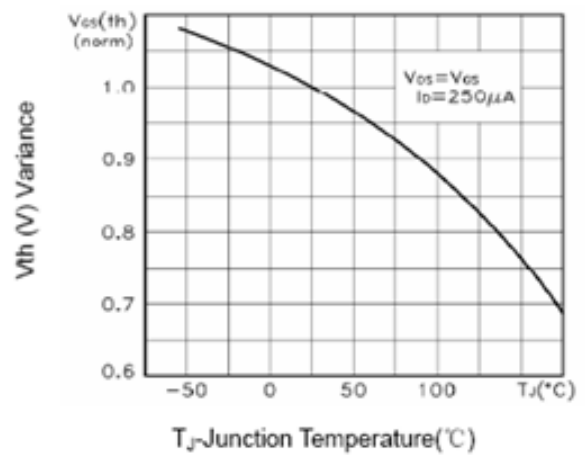


Figure 10 $V_{GS(th)}$ vs Junction Temperature

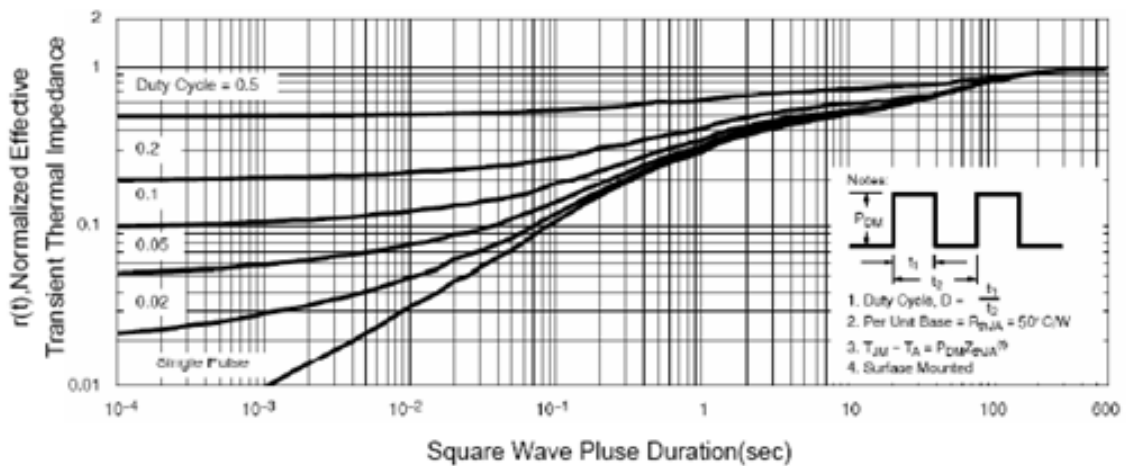


Figure 11 Normalized Maximum Transient Thermal Impedance