



Description

The HAM3930N 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

$V_{DS} = 30V$ $I_D = 4.5A$

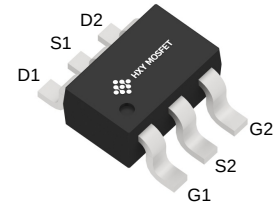
$R_{DS(ON)} < 38m\Omega$ @ $V_{GS}=10V$

Application

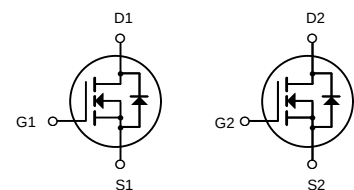
Battery protection

Load switch

Uninterruptible power supply



SOT-23-6L



Dual N-Channel MOSFET

Ordering Information

Product ID	Pack	Marking	Qty(PCS)
HAM3930N	SOT-23-6L	6800 XXX YYYY	3000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_A=25^\circ C$	Drain Current, V_{GS} @ 4.5V ³	4.5	A
I_{DM}	Pulsed Drain Current ¹	15	A
$P_D@T_A=25^\circ C$	Total Power Dissipation	1.25	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	125	$^\circ C/W$



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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V,	-	-	1.0	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.5	2.5	V
R _{DS(on)}	Static Drain-Source on-Resistance note2	V _{GS} =10V, I _D =4A	-	29	38	mΩ
		V _{GS} =4.5V, I _D =3A	-	45	65	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1.0MHz	-	233	-	pF
C _{oss}	Output Capacitance		-	44	-	pF
C _{rss}	Reverse Transfer Capacitance		-	33	-	pF
Q _g	Total Gate Charge	V _{DS} =15V, I _D =2A, V _{GS} =10V	-	3	-	nC
Q _{gs}	Gate-Source Charge		-	0.5	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	0.8	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DS} =15V, I _D =4A, R _{GEN} =3Ω, V _{GS} =10V	-	4	-	ns
t _r	Turn-on Rise Time		-	2.1	-	ns
t _{d(off)}	Turn-off Delay Time		-	15	-	ns
t _f	Turn-off Fall Time		-	3.2	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	4.5	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	16	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S =4A	-	-	1.2	V

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$



Typical Performance Characteristics

Figure1: Output Characteristics

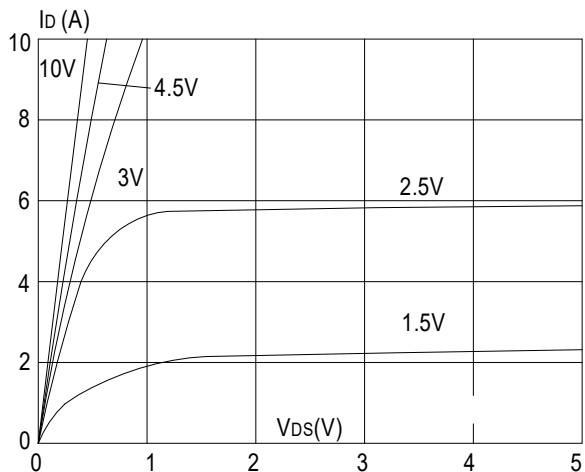


Figure 2: Typical Transfer Characteristics

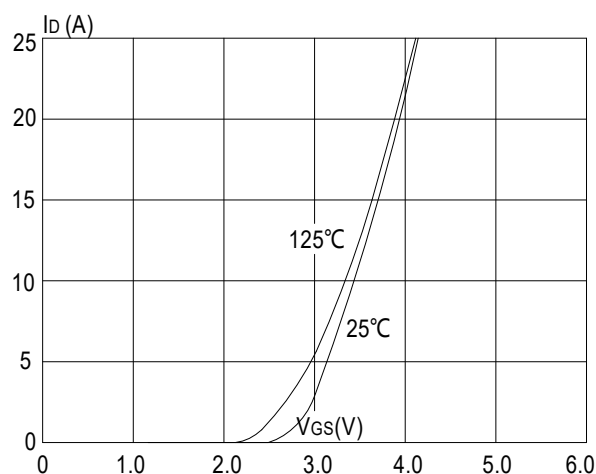


Figure 3: On-resistance vs. Drain Current

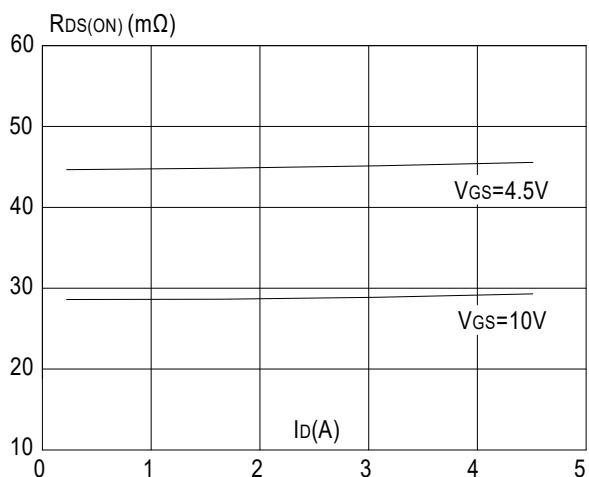


Figure 4: Body Diode Characteristics

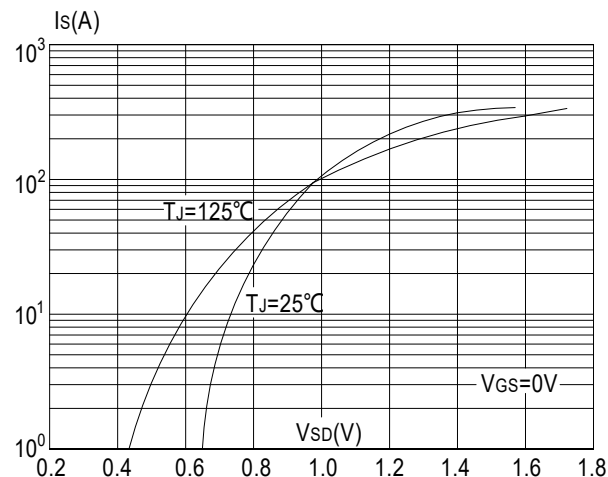


Figure 5: Gate Charge Characteristics

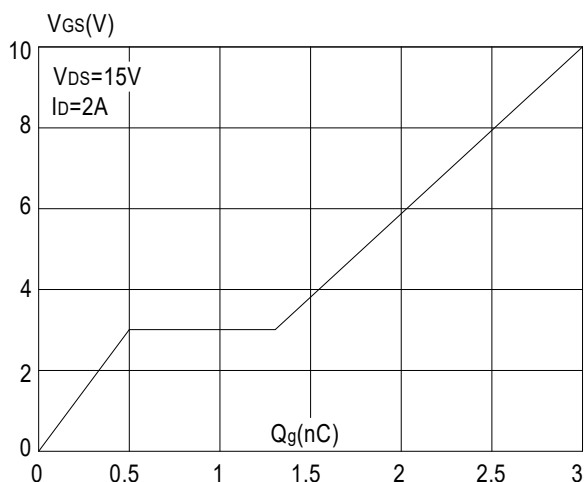
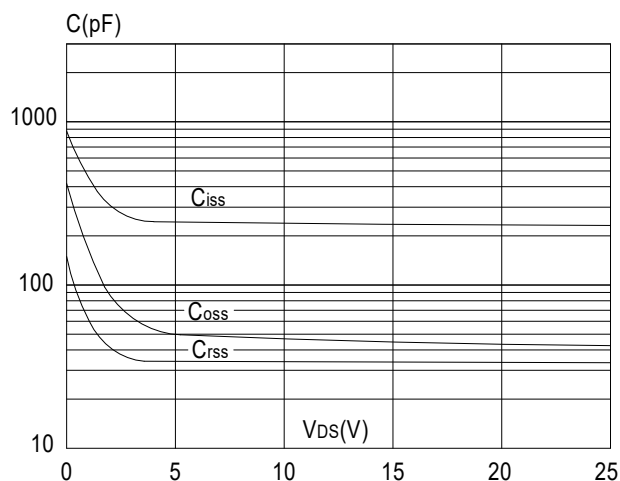


Figure 6: Capacitance Characteristics





Dual N-Channel Enhancement Mode MOSFET

T_j (°C)	$V_{BR}(DSS)$
-50	0.09
0	0.095
50	0.10
100	0.105
150	0.11

Graph of $R_{ds(on)}$ vs T_j for the 2N7000 MOSFET. The y-axis is $R_{ds(on)}$ in Ohms, ranging from 0.5 to 2.5. The x-axis is T_j in $^{\circ}\text{C}$, ranging from -100 to 200. A solid line shows the temperature dependence, starting at approximately 0.6 Ohms at -50°C and rising to about 1.6 Ohms at 150°C . A horizontal dashed line is drawn at $R_{ds(on)} = 1.5$ Ohms.

The graph shows the relationship between the drain current I_D (in Amperes) and the ambient temperature T_A (in degrees Celsius). The y-axis ranges from 0 to 5 A with major grid lines every 1 A. The x-axis ranges from 0 to 175°C with major grid lines every 25°C. The curve starts at $I_D = 4$ A when $T_A = 25$ °C and decreases non-linearly, reaching $I_D = 0$ A at $T_A = 150$ °C.

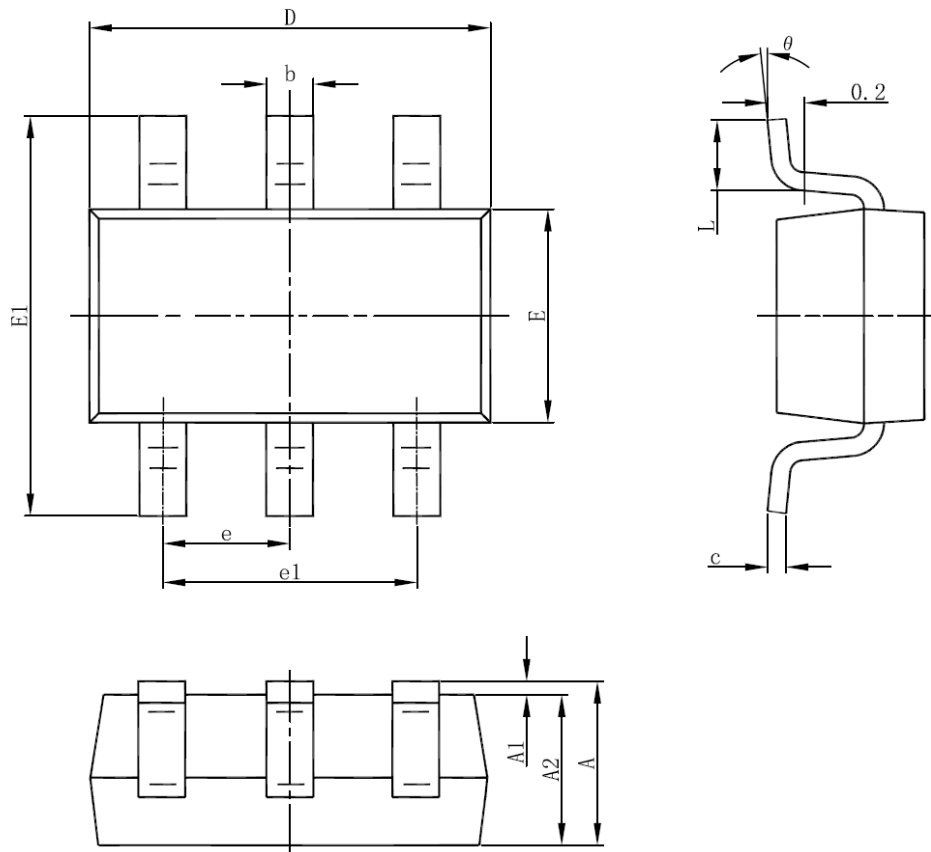
T_A (°C)	I_D (A)
25	4.0
50	3.8
75	3.3
100	2.5
125	1.5
150	0.0

Notes:

1. Duty factor $D = t_1/t_2$
2. Peak $T_J = P_{DM} \cdot Z_{thJA} + T_A$



SOT-23-6L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°



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