



Description

The HDMN6140L13 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

$V_{DS} = 60V$ $I_D = 3A$

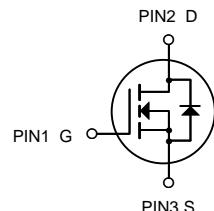
$R_{DS(ON)} < 85m\Omega$ @ $V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply



N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
HDMN6140L13	SOT-23	S10	3000PCS

Absolute Maximum Ratings ($T_A=25^\circ C$ 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	3	A
I_{DM}	Drain Current-Pulsed (Note 1)	10	A
P_D	Maximum Power Dissipation	1.7	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	°C
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 2)	73.5	°C/W



Electrical Characteristics (T_A=25°C unless otherwise noted)

Gate-Body Leakage Current	I _{GS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics <small>(Note 3)</small>						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.8	1.3	2.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =3A	-	72	85	mΩ
		V _{GS} =4.5V, I _D =1.5A	-	85	103	mΩ
Forward Transconductance	g _{FS}	V _{DS} =15V, I _D =2A		3	-	S
Dynamic Characteristics <small>(Note 4)</small>						
Input Capacitance	C _{iss}	V _{DS} =30V, V _{GS} =0V, F=1.0MHz	-	510	-	PF
Output Capacitance	C _{oss}		-	34	-	PF
Reverse Transfer Capacitance	C _{rss}		-	26	-	PF
Switching Characteristics <small>(Note 4)</small>						
Turn-on Delay Time	t _{d(on)}	V _{DD} =30V, I _D =1.5A V _{GS} =10V, R _{GEN} =1Ω	-	6	-	nS
Turn-on Rise Time	t _r		-	15	-	nS
Turn-Off Delay Time	t _{d(off)}		-	15	-	nS
Turn-Off Fall Time	t _f		-	10	-	nS
Total Gate Charge	Q _g	V _{DS} =30V, I _D =3A, V _{GS} =4.5V	-	7.5	-	nC
Gate-Source Charge	Q _{gs}		-	1.4	-	nC
Gate-Drain Charge	Q _{gd}		-	3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage <small>(Note 3)</small>	V _{SD}	V _{GS} =0V, I _S =3A	-	-	1.2	V
Diode Forward Current <small>(Note 2)</small>	I _S		-	-	3	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production



Typical Electrical and Thermal Characteristics

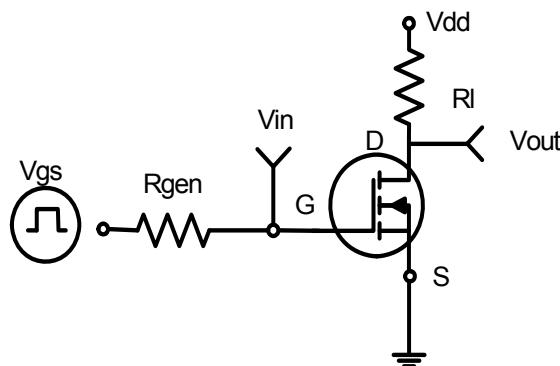


Figure 1:Switching Test Circuit

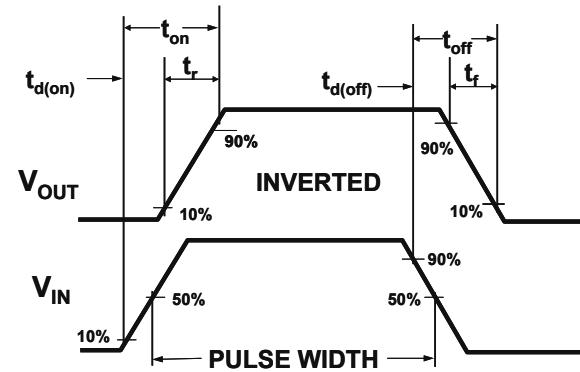
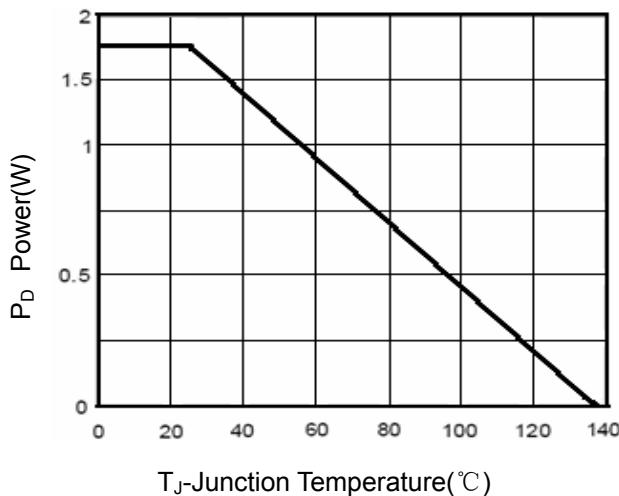
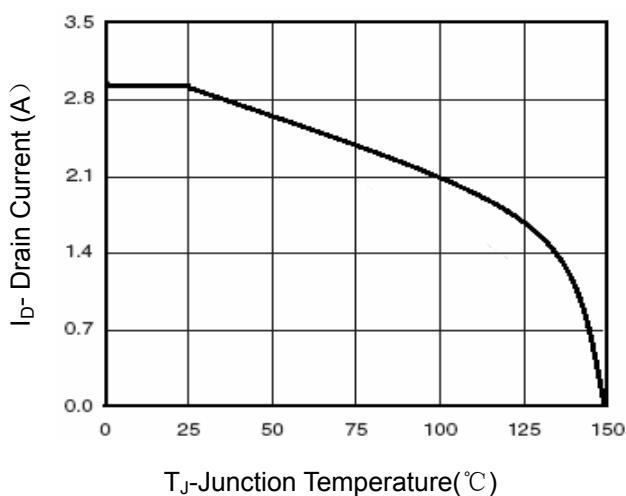


Figure 2:Switching Waveforms



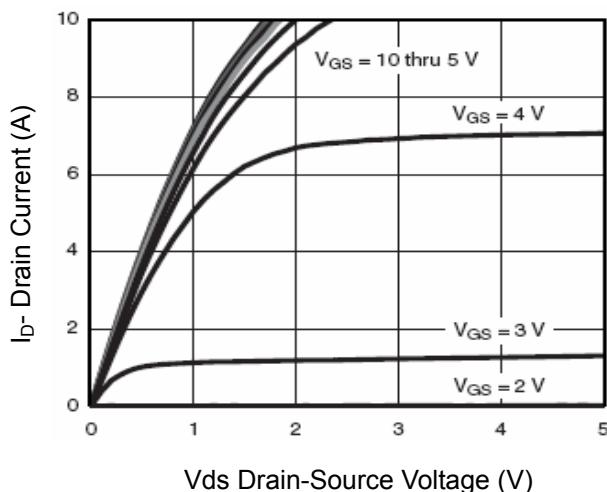
T_J-Junction Temperature(°C)

Figure 3 Power Dissipation



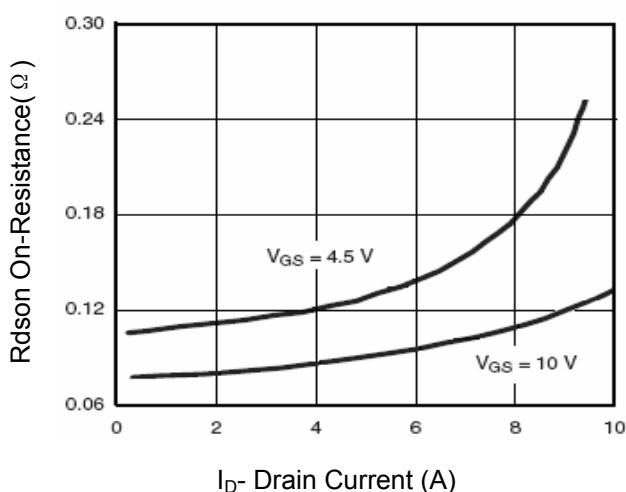
T_J-Junction Temperature(°C)

Figure 4 Drain Current



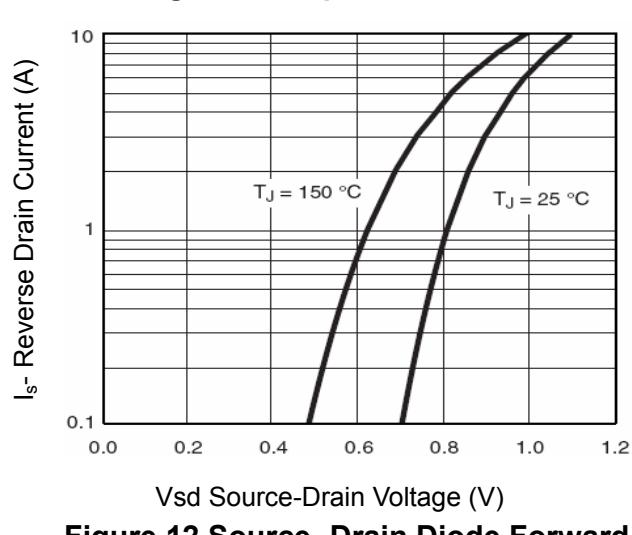
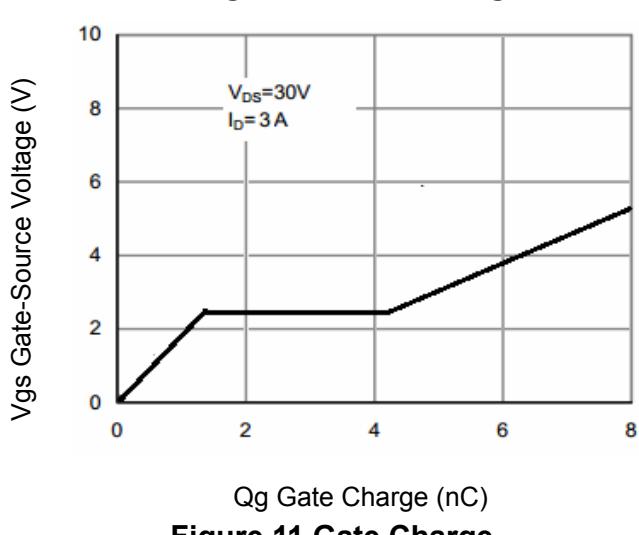
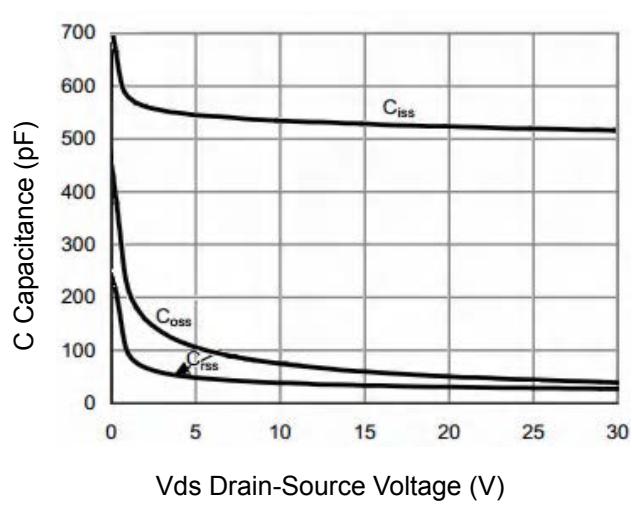
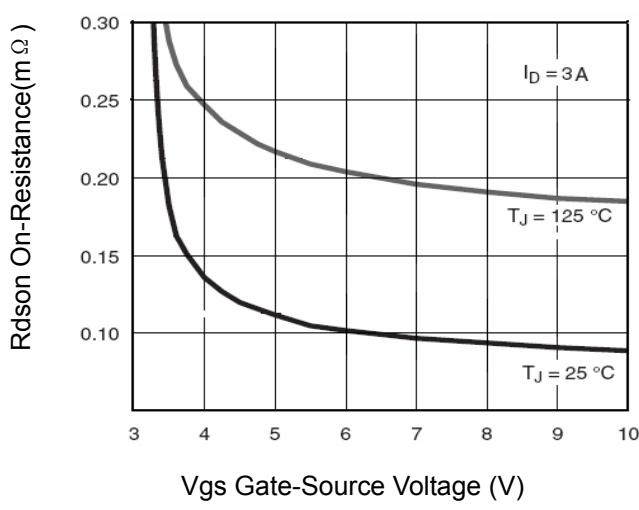
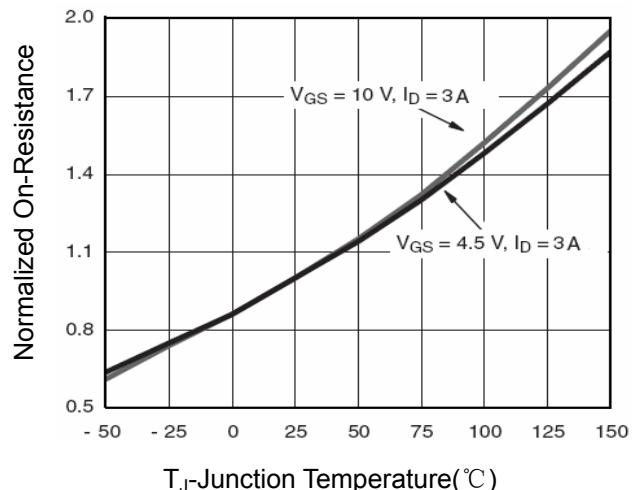
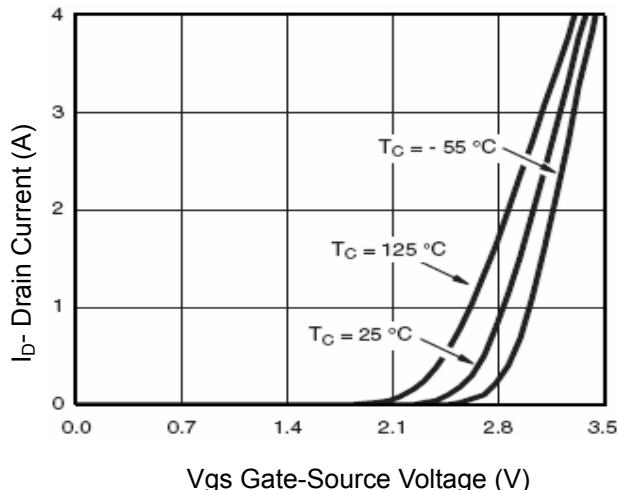
Vds Drain-Source Voltage (V)

Figure 5 Output Characteristics



I_D- Drain Current (A)

Figure 6 Drain-Source On-Resistance



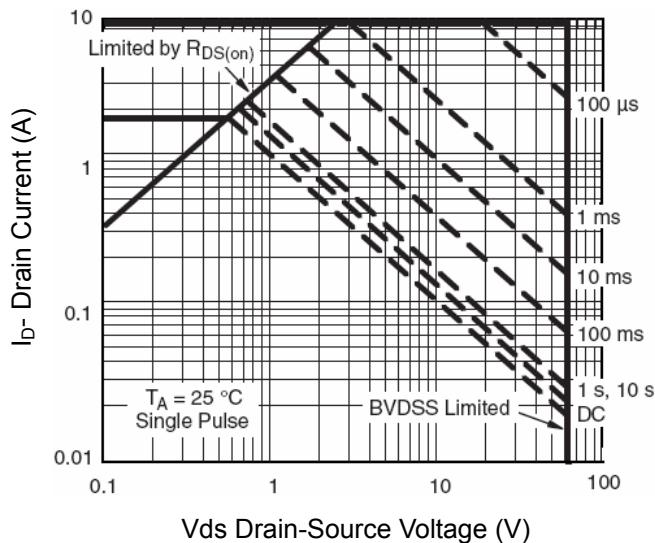


Figure 13 Safe Operation Area

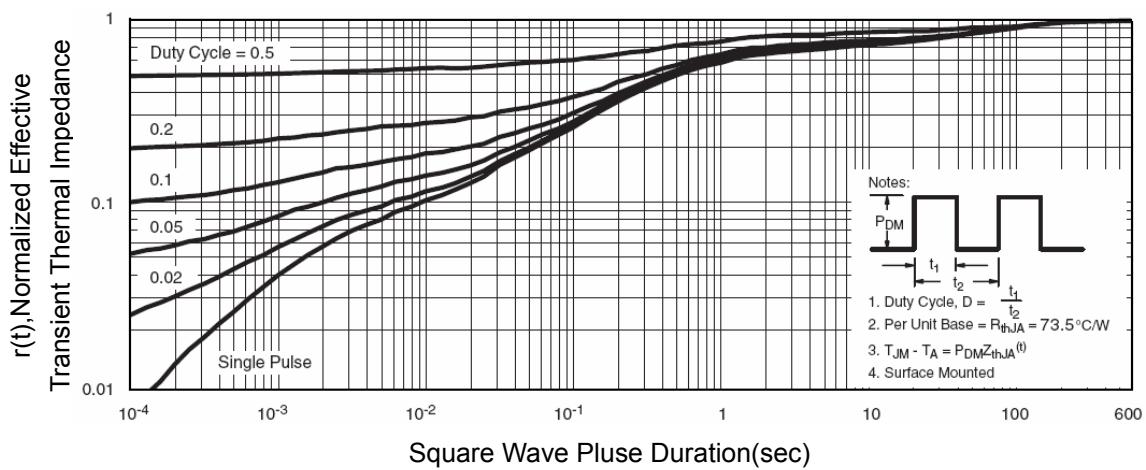
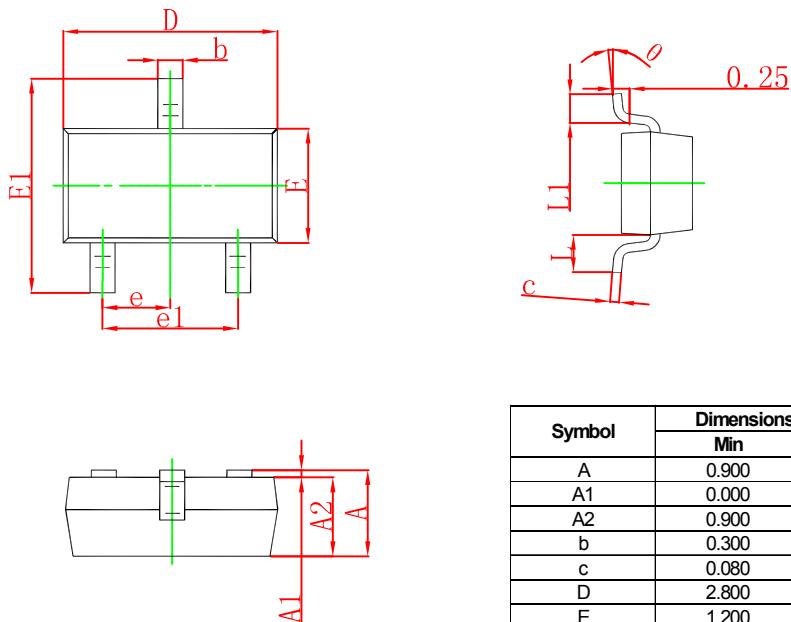


Figure 14 Normalized Maximum Transient Thermal Impedance

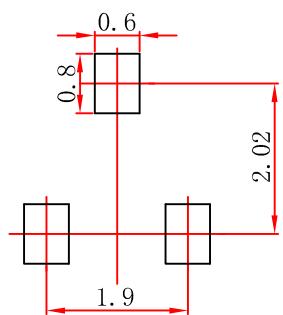


SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

SOT-23 Suggested Pad Layout



Note:
1. Controlling dimension: in millimeters.
2. General tolerance: ± 0.05 mm.
3. The pad layout is for reference purposes only.



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