

## N-Channel Enhancement Mode Power MOSFET

### Description

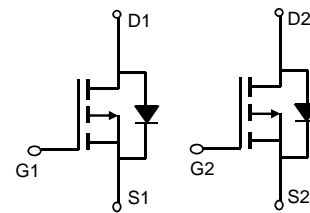
The HM2818D uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a battery protection or in other switching application.

### General Features

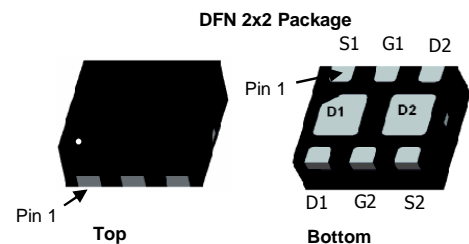
- $V_{DS} = 40V, I_D = 4.0A$   
 $R_{DS(ON)} < 41m\Omega @ V_{GS}=2.5V$   
 $R_{DS(ON)} < 68m\Omega @ V_{GS}=4.5V$
- High power and current handling capability
- Lead free product is acquired
- Surface mount package

### Application

- Battery protection
- Load switch
- Power management



Schematic diagram



### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
HM2818D	HM2818D	DFN2X2-6L	Ø180mm	8 mm	3000 units

### Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		$V_{DS}$	40	V
Gate-Source Voltage		$V_{GS}$	$\pm 12$	V
Continuous Drain Current	$T_A = 25^\circ\text{C}$	$I_D$	4.0	A
	$T_A = 70^\circ\text{C}$		2.8	
Drain Current-Pulsed (Note 1)		$I_{DM}$	12	A
Maximum Power Dissipation		$P_D$	6.8	W
Operating Junction and Storage Temperature Range		$T_J, T_{STG}$	-55 To 150	$^\circ\text{C}$

### Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	100	$^\circ\text{C/W}$
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### Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	40	22	-	V



Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =40V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	1.5	2.5	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =2.5V, I <sub>D</sub> =4.0 A	-	33	41	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =4.5A	-	46	68	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =4A	-	10	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =8V, V <sub>GS</sub> =0V, F=1.0MHz	-	500	-	PF
Output Capacitance	C <sub>oss</sub>		-	300	-	PF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	140	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =10V, I <sub>D</sub> =1A V <sub>GS</sub> =4.5V, R <sub>GEN</sub> =6Ω	-	20	40	nS
Turn-on Rise Time	t <sub>r</sub>		-	18	40	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	60	108	nS
Turn-Off Fall Time	t <sub>f</sub>		-	28	56	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =3A, V <sub>GS</sub> =4.5V	-	10	15	nC
Gate-Source Charge	Q <sub>gs</sub>		-	2.3	-	nC
Gate-Drain Charge	Q <sub>gd</sub>		-	2.9	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A	-	-	1.2	V
Diode Forward Current (Note 2)	I <sub>S</sub>		-	-	1	A

#### Notes:

1. Repetitive rating: pulse width limited by maximum junction temperature.
2. Surface mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production



## Typical Electrical and Thermal Characteristics

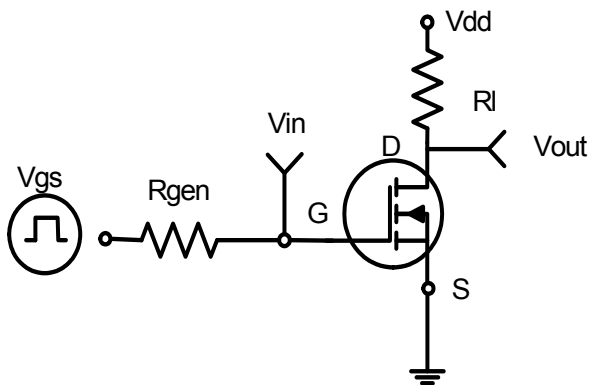


Figure 1: Switching Test Circuit

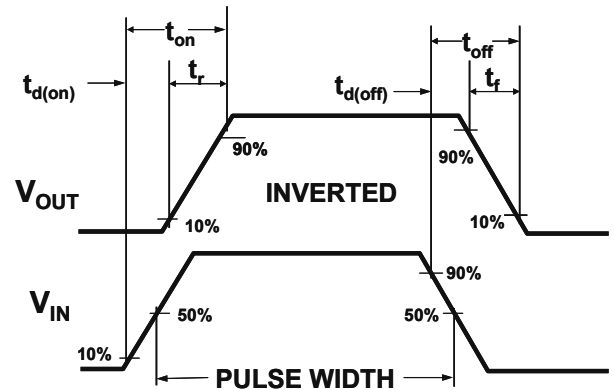


Figure 2: Switching Waveforms

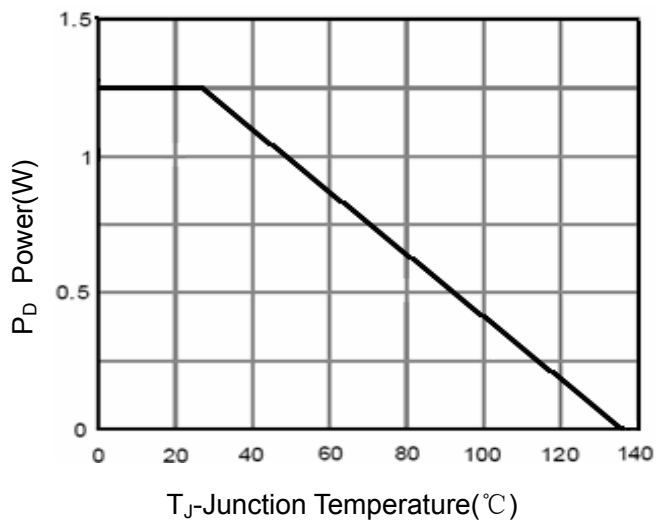


Figure 3 Power Dissipation

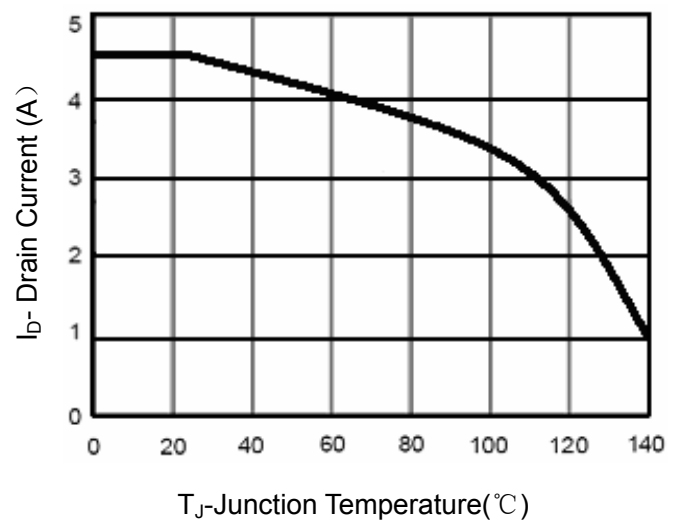


Figure 4 Drain Current

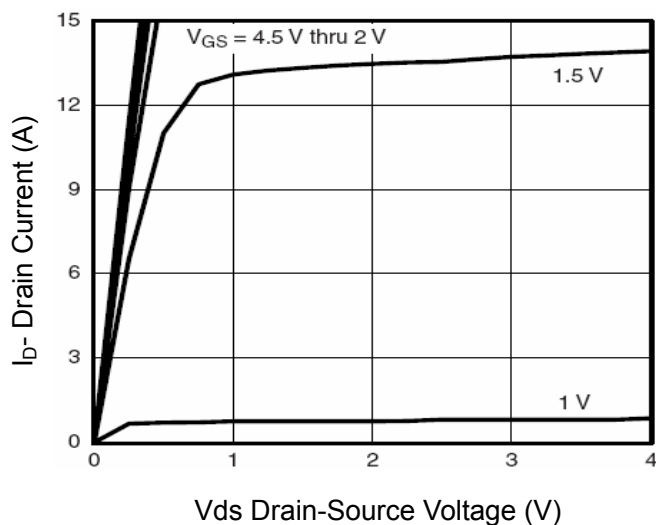


Figure 5 Output CHARACTERISTICS

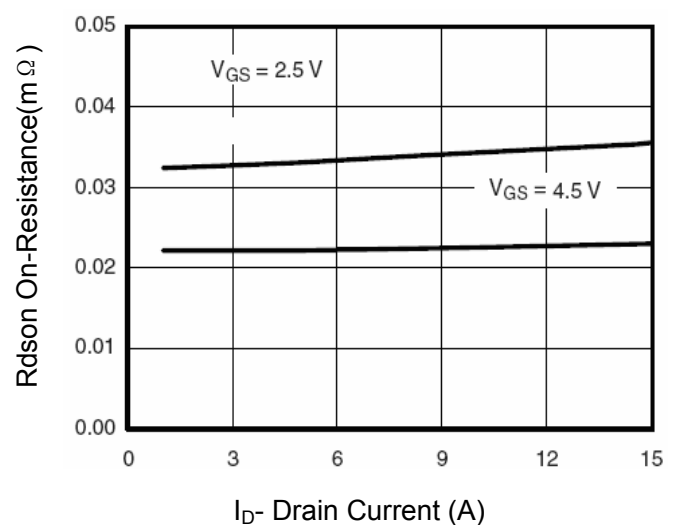
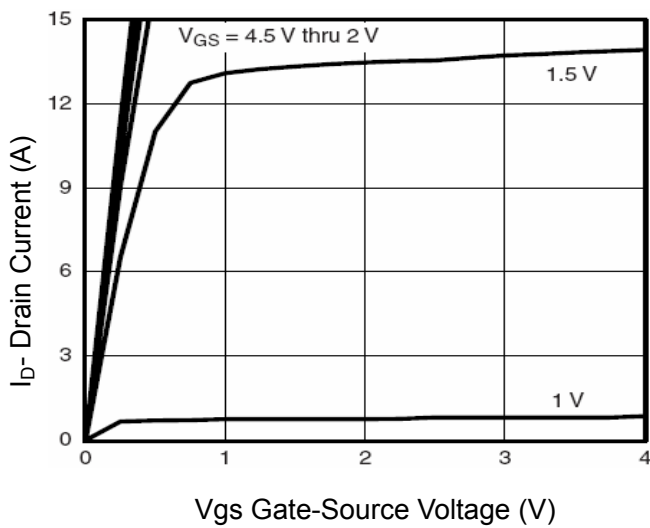
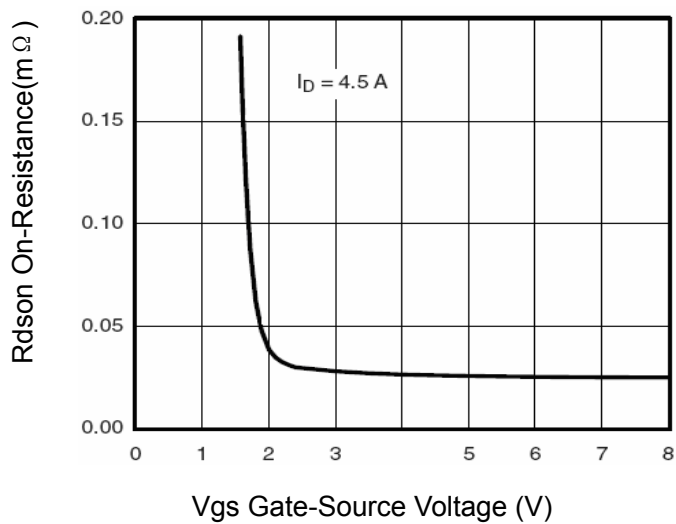


Figure 6 Drain-Source On-Resistance

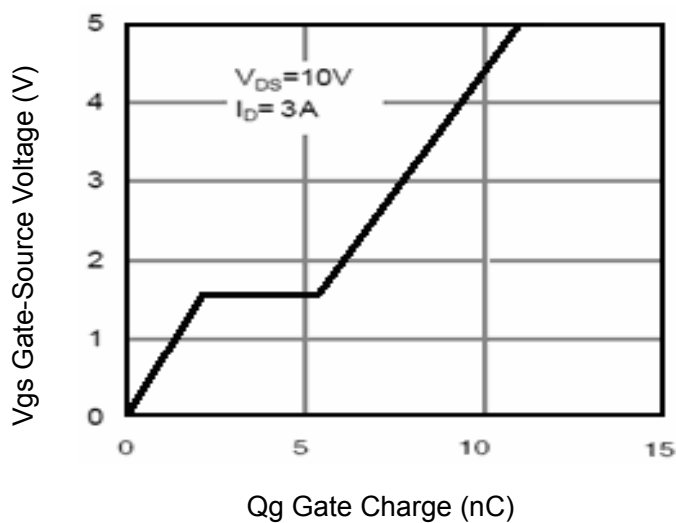




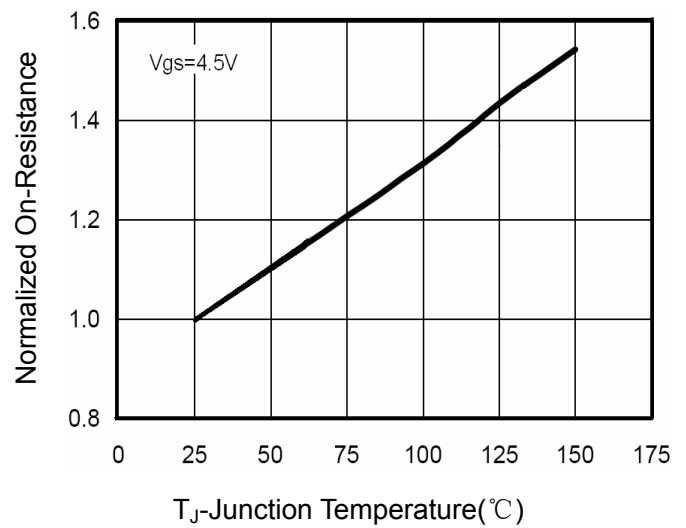
**Figure 7 Transfer Characteristics**



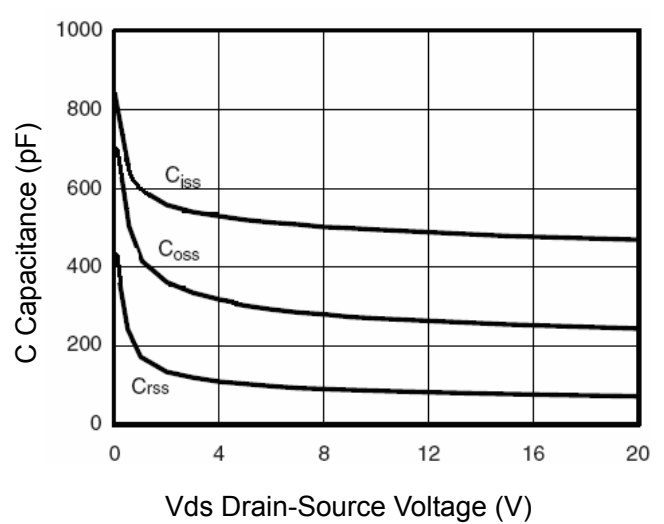
**Figure 9 Rdson vs Vgs**



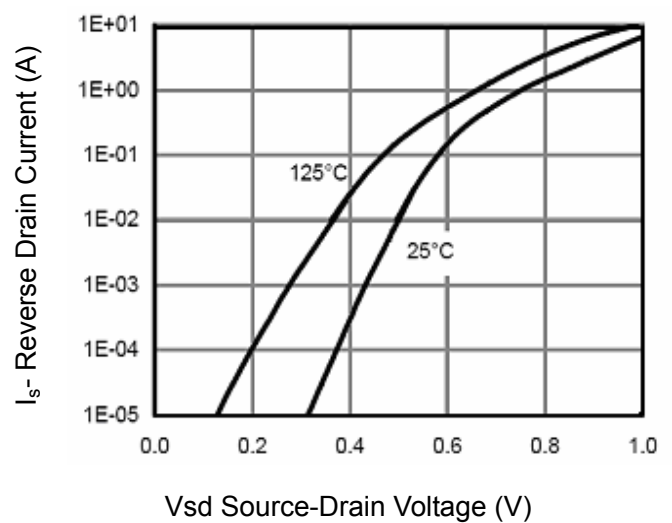
**Figure 11 Gate Charge**



**Figure 8 Drain-Source On-Resistance**



**Figure 10 Capacitance vs Vds**



**Figure 12 Source- Drain Diode Forward**



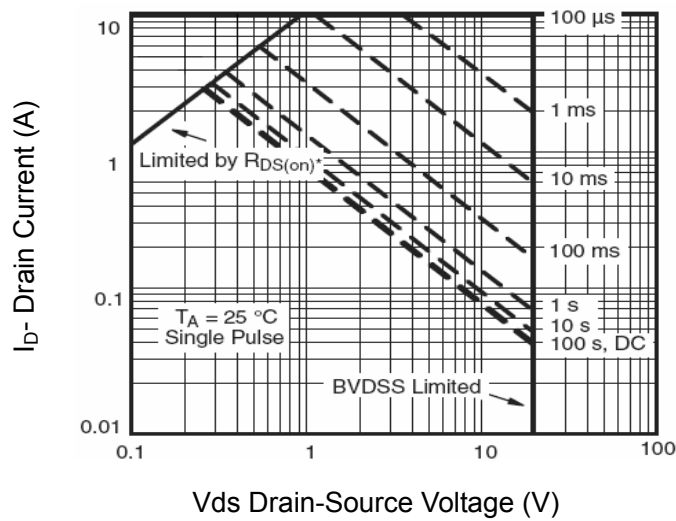


Figure 13 Safe Operation Area

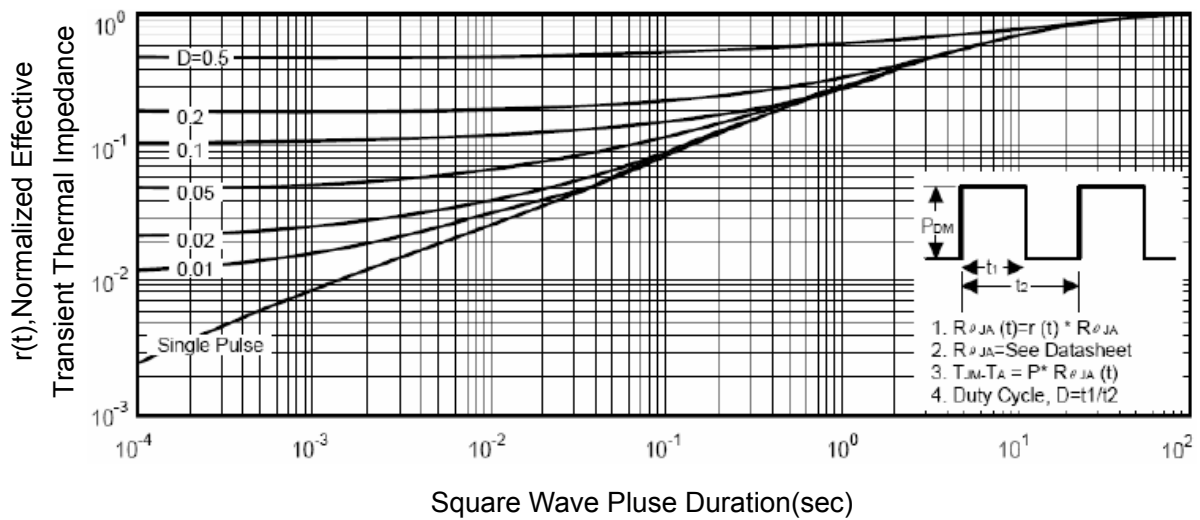
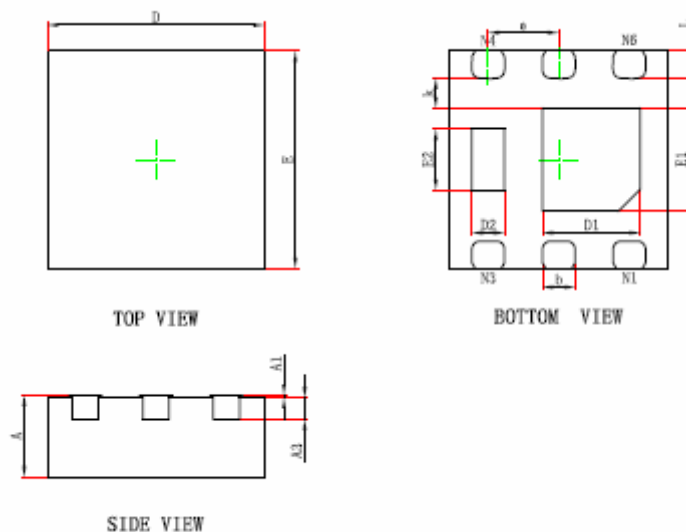


Figure 14 Normalized Maximum Transient Thermal Impedance



## DFN2X2-6L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	1.924	2.076	0.076	0.082
E	1.924	2.076	0.076	0.082
D1	0.800	1.000	0.031	0.039
E1	0.850	1.050	0.033	0.041
D2	0.200	0.400	0.008	0.016
E2	0.460	0.660	0.018	0.026
k	0.200MIN.		0.008MIN.	
b	0.250	0.350	0.010	0.014
e	0.650TYP.		0.026TYP.	
L	0.174	0.326	0.007	0.013

### Notes

1. All dimensions are in millimeters.
2. Tolerance  $\pm 0.10\text{mm}$  (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.



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