

Dual N-Channel Trench Power MOSFET

General Description

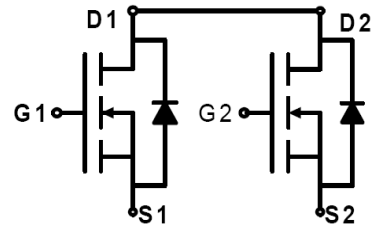
The HM8205D uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching applications.

Features

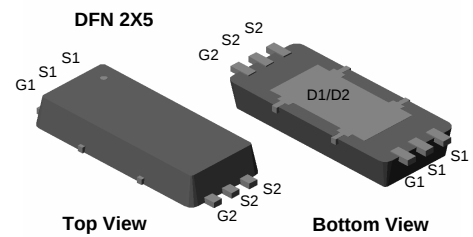
- $V_{DS} = 20V, I_D = 8A$
 $R_{DS(ON)} < 27m\Omega @ V_{GS} = 4.5V$
 $R_{DS(ON)} < 37m\Omega @ V_{GS} = 2.5V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

Application

- Battery protection
- Load switch
- Power management



Schematic Diagram



Top View

Bottom View

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantit
HM8205D	HM8205D	DFN2X5-6	~180mm	8mm	3000 units

Table 1. Absolute Maximum Ratings ($T_A = 25^\circ C$)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage ($V_{GS} = 0V$)	20	V
V_{GS}	Gate-Source Voltage ($V_{DS} = 0V$)	± 10	V
I_D	Drain Current-Continuous	8	A
$I_{DM (pulse)}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	30	A
P_D	Maximum Power Dissipation	2	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	$^\circ C$

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature

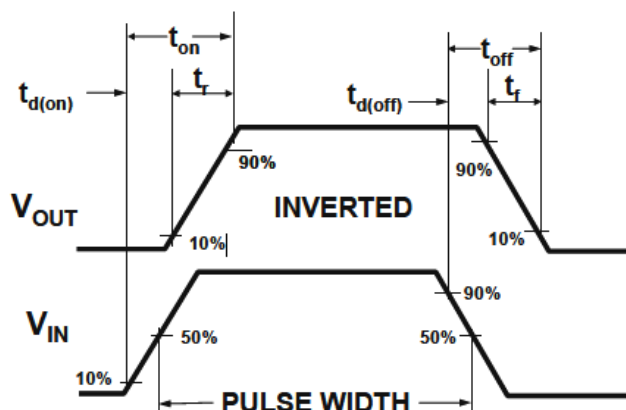
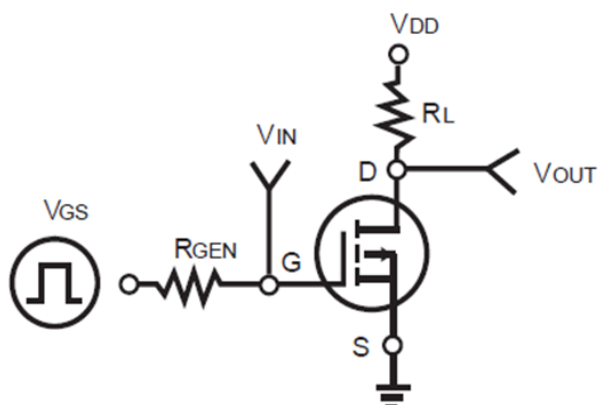
Table 2. Thermal Characteristic

Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	125	$^\circ C/W$

Table 3. Electrical Characteristics (TA=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =250μA	20	21.5		V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =19.5V,V _{GS} =0V			1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±10V,V _{DS} =0V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} ,I _D =250μA	0.5	0.65	1.1	V
g _{FS}	Forward Transconductance	V _{DS} =5V,I _D =4A	4	8		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =4A		19	27	mΩ
		V _{GS} =2.5V, I _D =3A		25	37	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =8V,V _{GS} =0V, f=1.0MHz		605		pF
C _{oss}	Output Capacitance			315		pF
C _{rss}	Reverse Transfer Capacitance			132		pF
Switching Times						
t _{d(on)}	Turn-on Delay Time	V _{DD} =10V,I _D =1A, V _{GS} =4.5V,R _G =6Ω		11		nS
t _r	Turn-on Rise Time			12		nS
t _{d(off)}	Turn-Off Delay Time			36		nS
t _f	Turn-Off Fall Time			32		nS
Q _g	Total Gate Charge	V _{DS} =10V,I _D =4A, V _{GS} =4.5V		10		nC
Q _{gs}	Gate-Source Charge			2.8		nC
Q _{gd}	Gate-Drain Charge			1.8		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current(Body Diode)				1.7	A
V _{SD}	Forward on Voltage ^(Note 1)	V _{GS} =0V,I _S =1.7A		0.79	1	V

Switch Time Test Circuit and Switching Waveforms:



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

Figure1. Power Dissipation

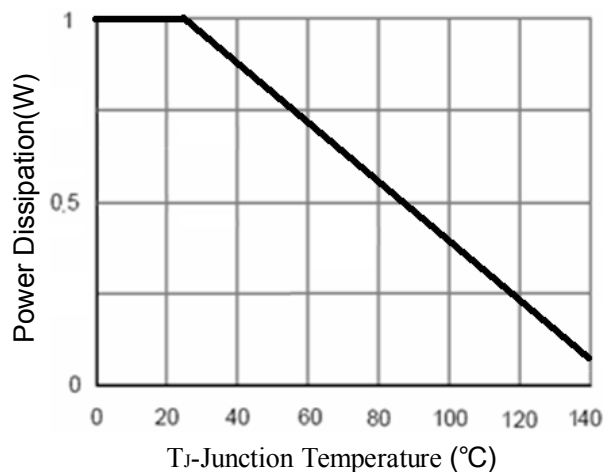


Figure2. Drain Current

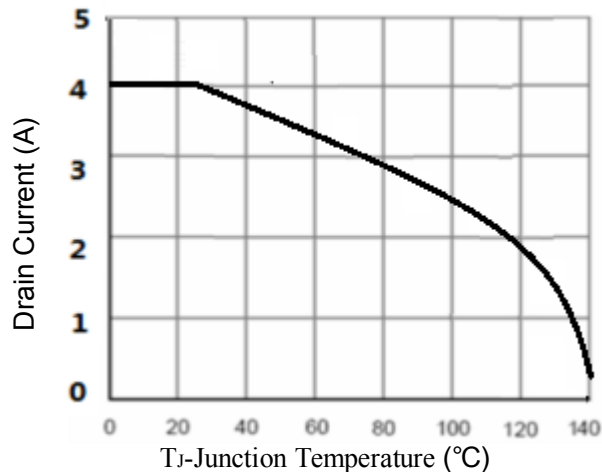


Figure3. Output Characteristics

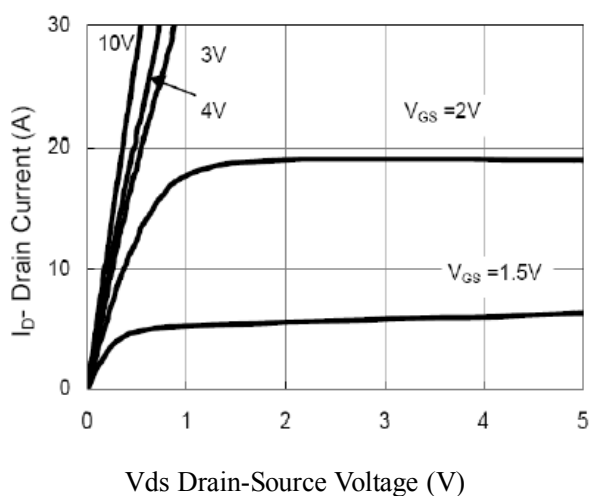


Figure4. Transfer Characteristics

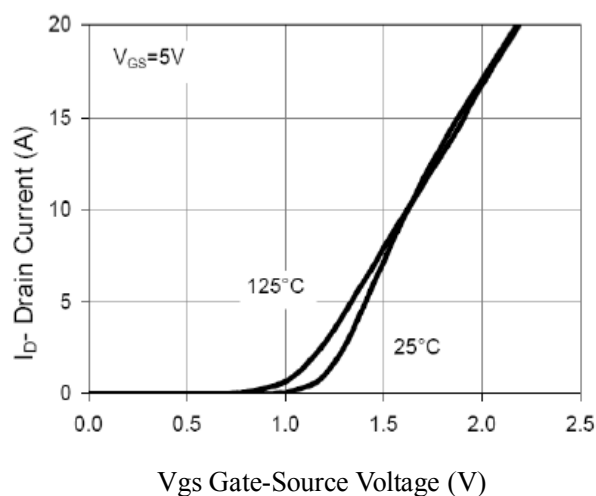


Figure5. Capacitance

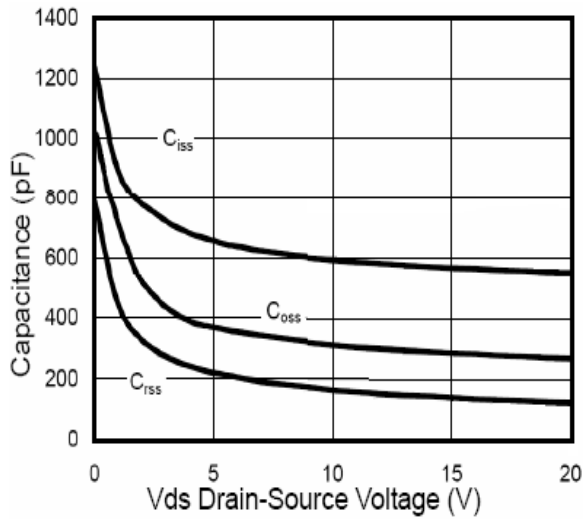


Figure6. $R_{DS(ON)}$ vs Junction Temperature

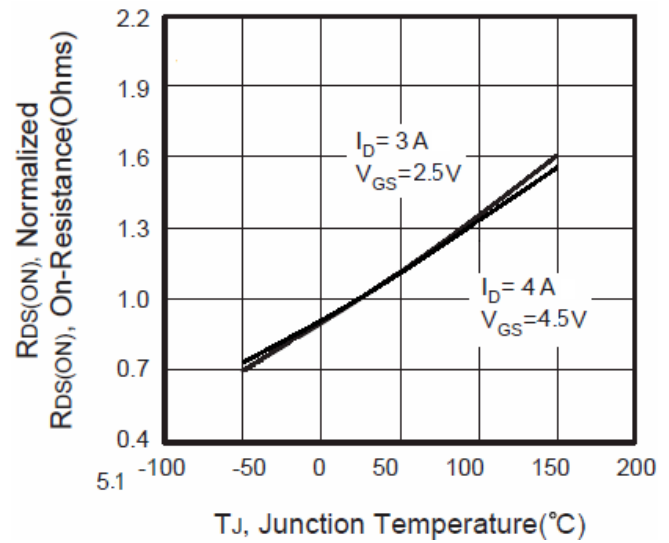


Figure7. Max BV_{DSS} vs Junction Temperature

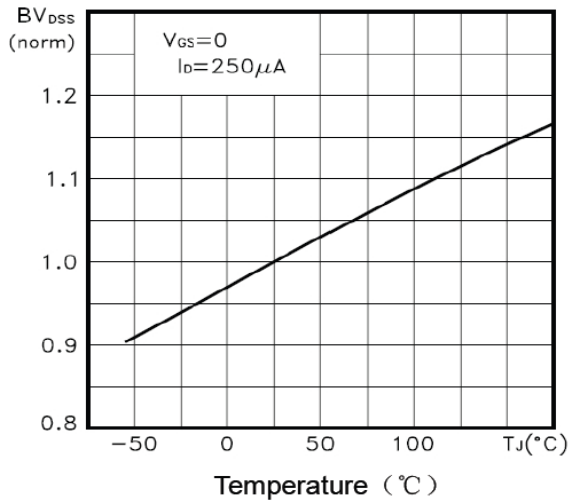


Figure8. $V_{GS(th)}$ vs Junction Temperature

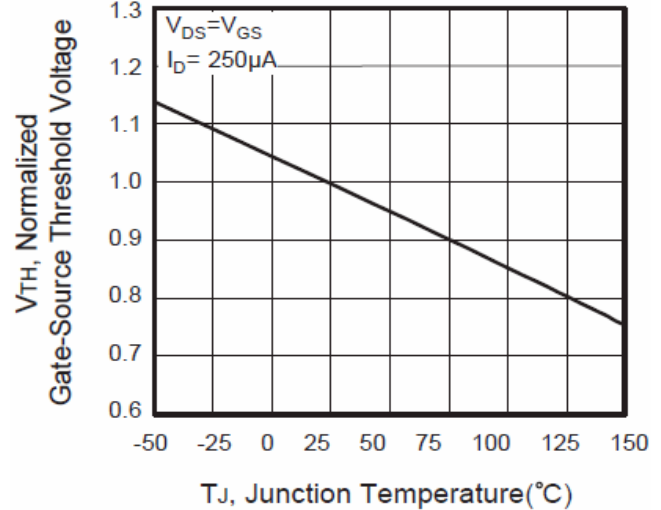


Figure9. Gate Charge Waveforms

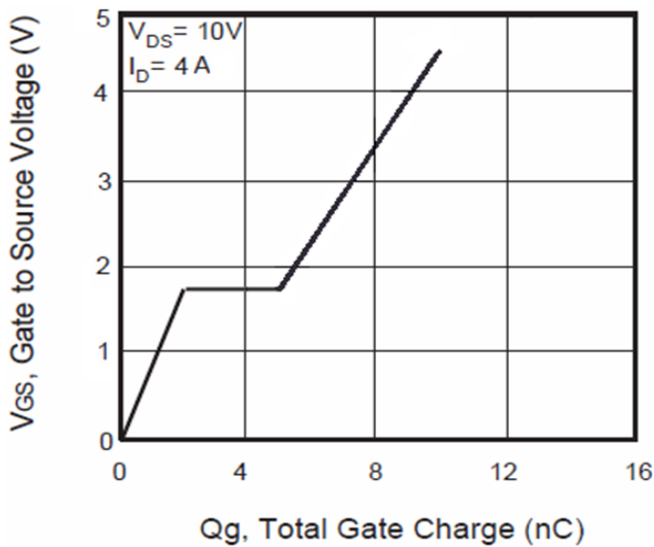


Figure10. Maximum Safe Operating Area

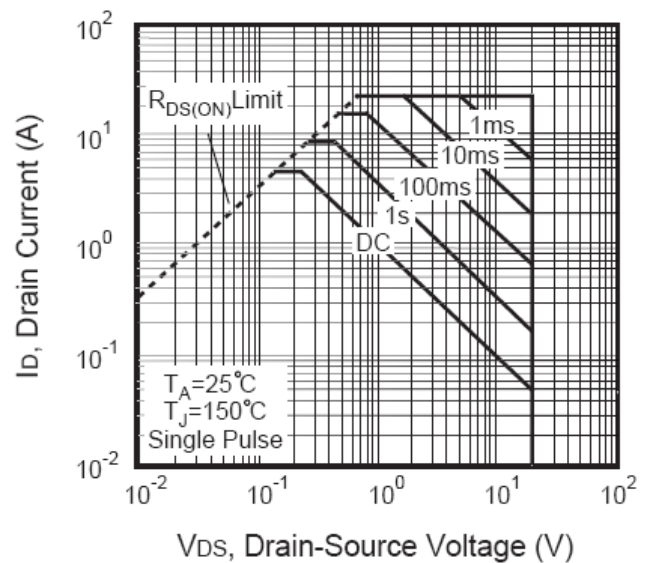
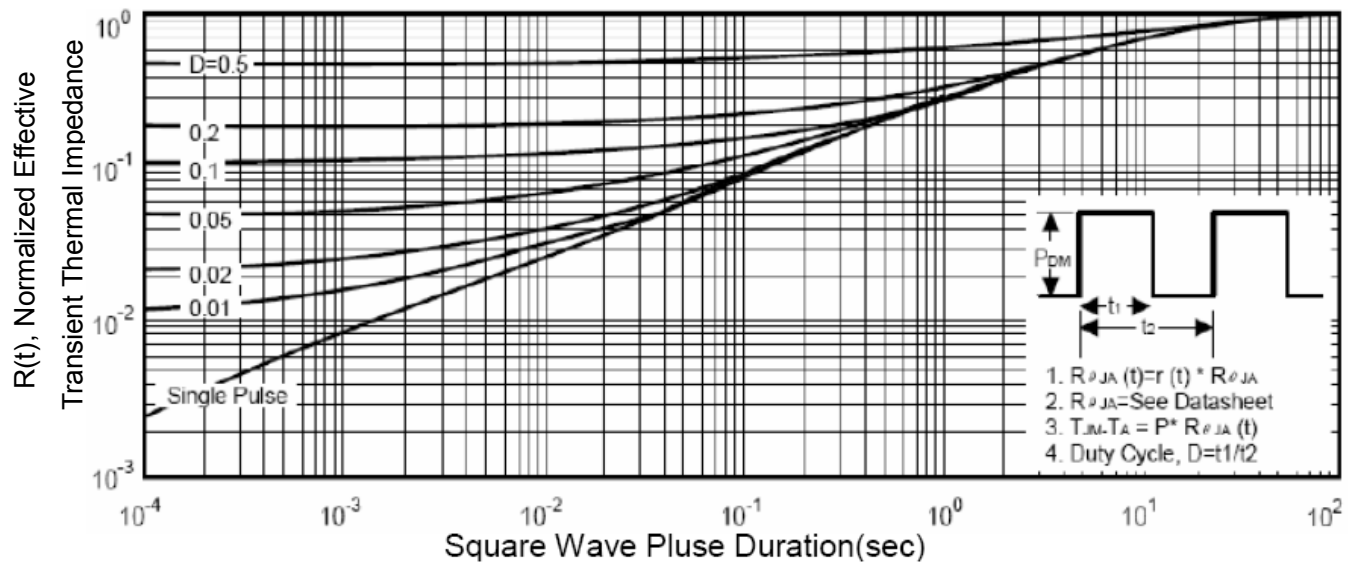
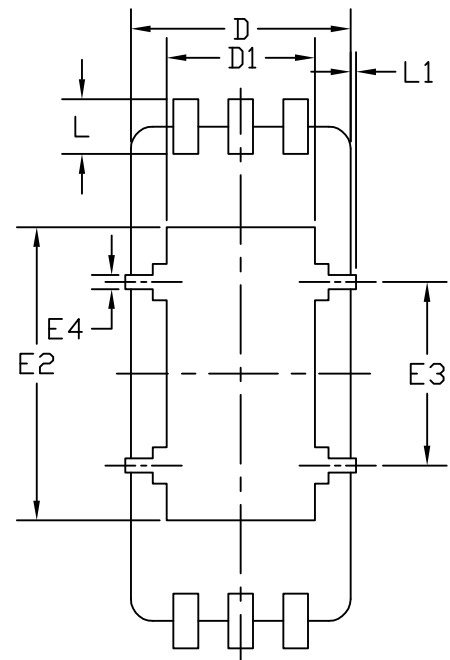
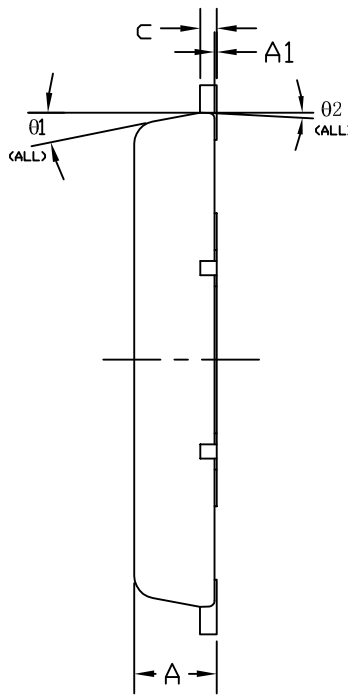
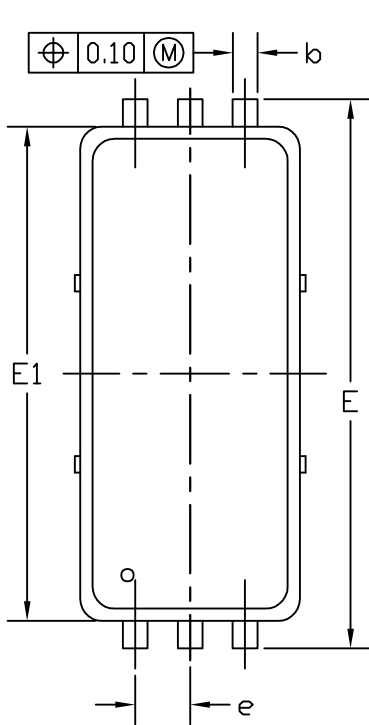


Figure11. Normalized Maximum Transient Thermal Impedance

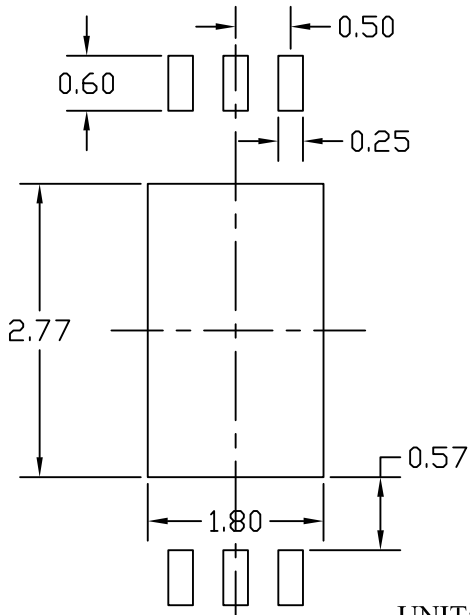


DFN2x5_6L_EP1_P PACKAGE OUTLINE



BOTTOM VIEW

RECOMMENDED LAND PATTERN



UNIT: mm

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031
A1	0.00	—	0.05	0.000	—	0.002
b	0.20	0.23	0.30	0.008	0.009	0.012
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.00 BSC			0.079 BSC		
D1	1.30	1.35	1.55	0.051	0.053	0.061
E	5.00 BSC			0.197 BSC		
E1	4.50 BSC			0.177 BSC		
E2	2.60	2.67	2.95	0.102	0.105	0.116
E3	1.67 BSC			0.066 BSC		
E4	0.13 BSC			0.005 BSC		
e	0.50 BSC			0.020 BSC		
L	0.40	0.50	0.60	0.016	0.020	0.024
L1	0	—	0.10	0	—	0.004
θ1	0°	10°	12°	0°	10°	12°
θ2	3° BSC			3° BSC		

NOTE

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 6 MIL EACH.
2. CONTROLLING DIMENSION IS MILLIMETER.
CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.