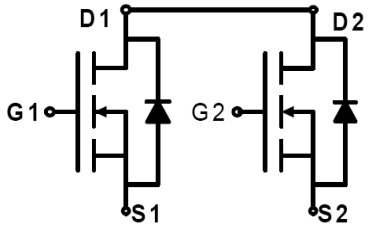
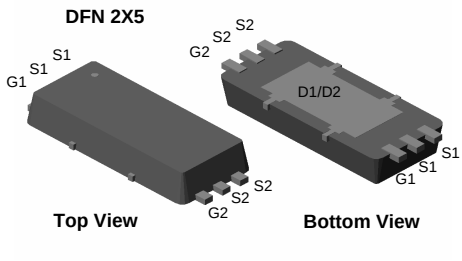
Dual N-Channel Trench Power MOSFET

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.



Schematic Diagram



Features

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

Application

- Battery protection
- Load switch
- Power management

Package Marking and Ordering Information

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

Table 1. Absolute Maximum Ratings (T_A=25℃)

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
$I_{DM\ (pluse)}$	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	℃

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

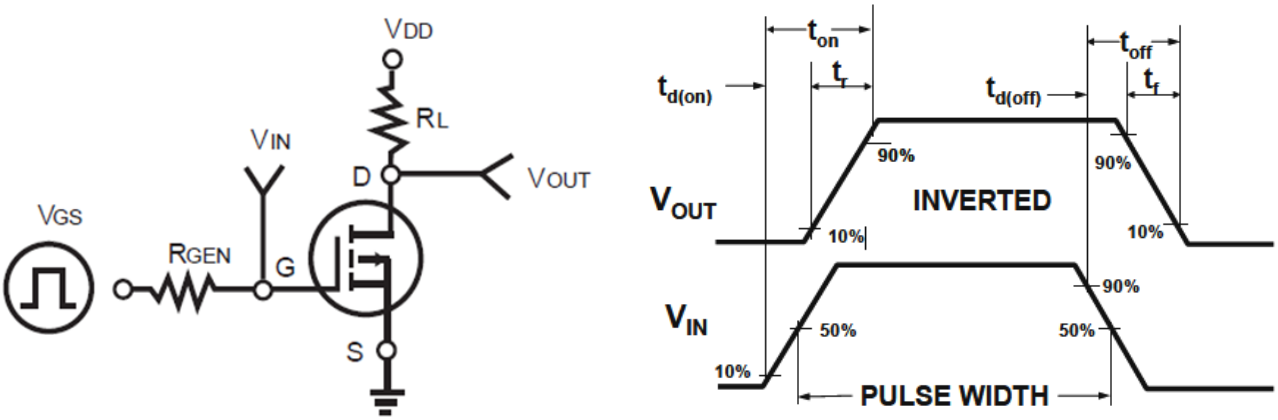
Table 2. Thermal Characteristic

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

Table 3. Electrical Characteristics (T_A=25℃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

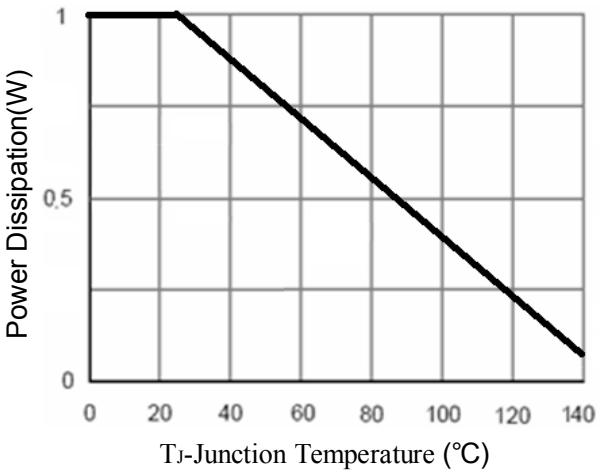


Figure2. Drain Current

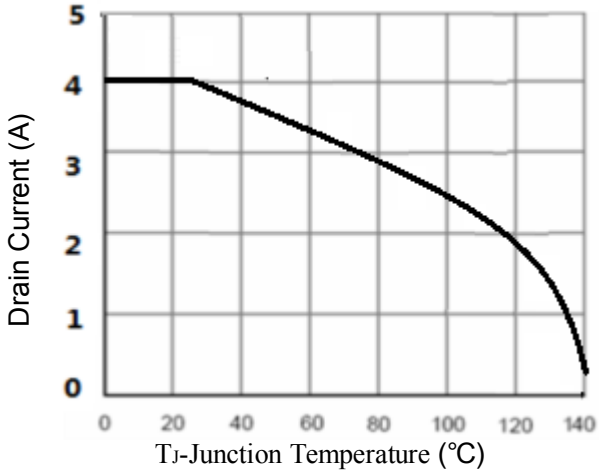


Figure3. Output Characteristics

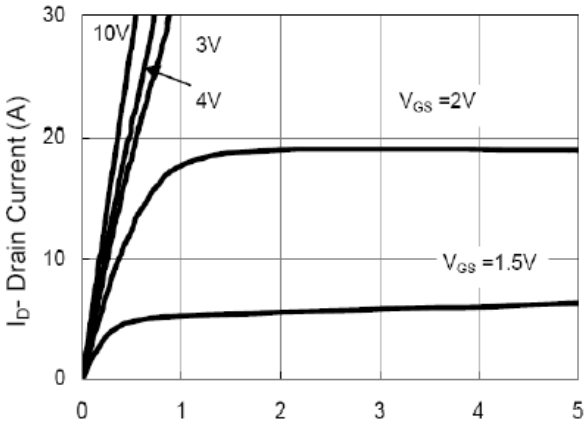


Figure4. Transfer Characteristics

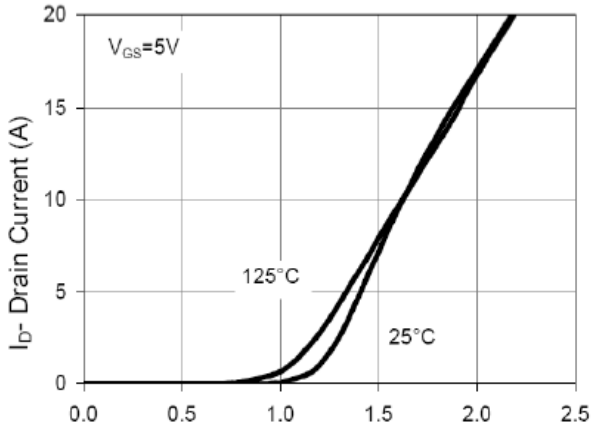


Figure5. Capacitance

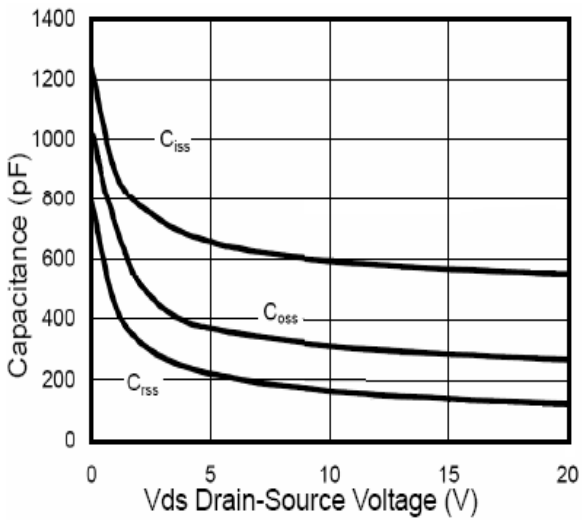


Figure6. $R_{DS(ON)}$ vs Junction Temperature

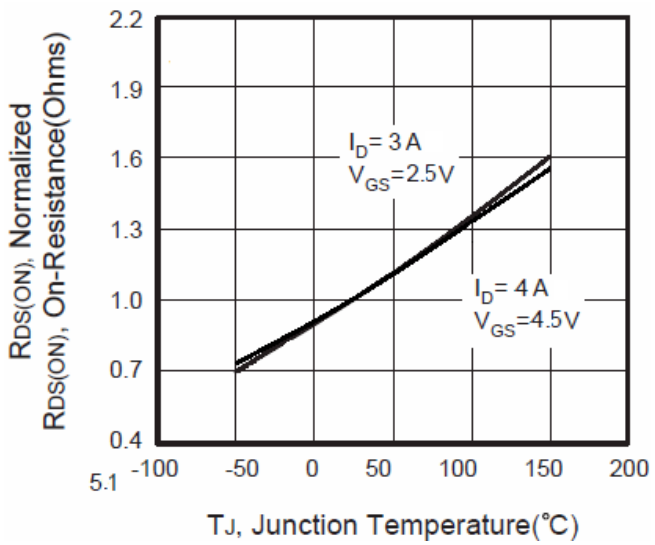


Figure7. Max BV_{DSS} vs Junction Temperature

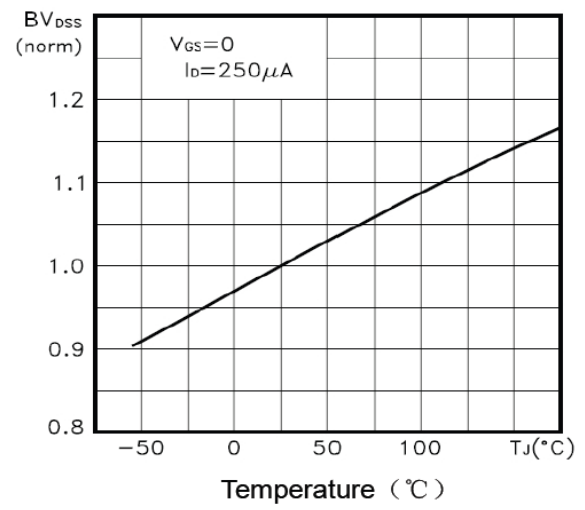


Figure8. $V_{GS(th)}$ vs Junction Temperature

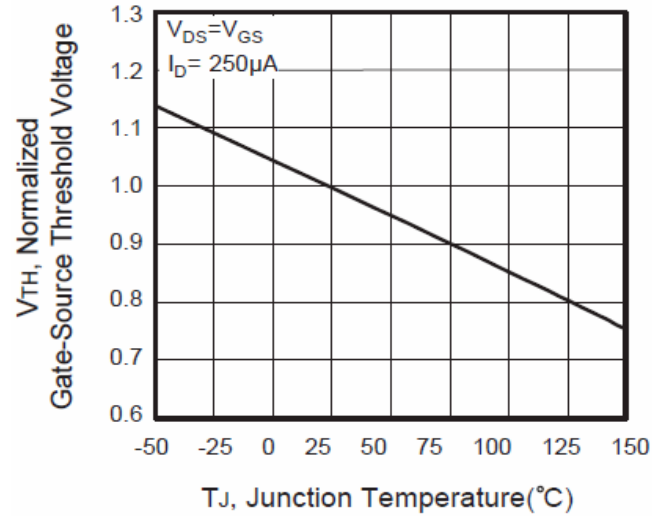


Figure9. Gate Charge Waveforms

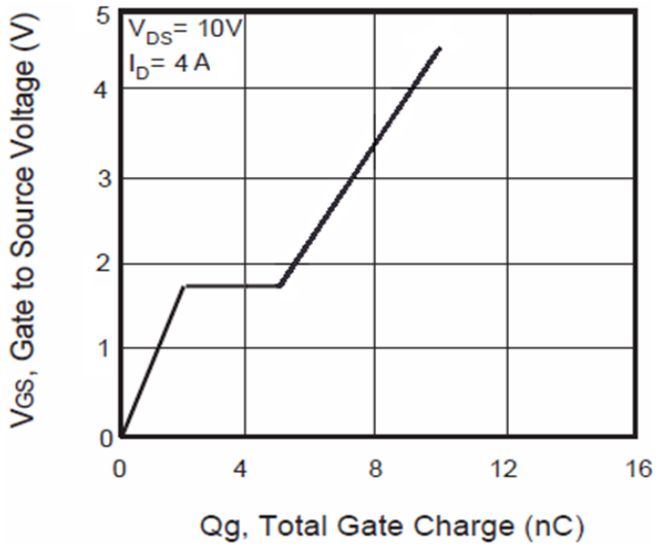


Figure10. Maximum Safe Operating Area

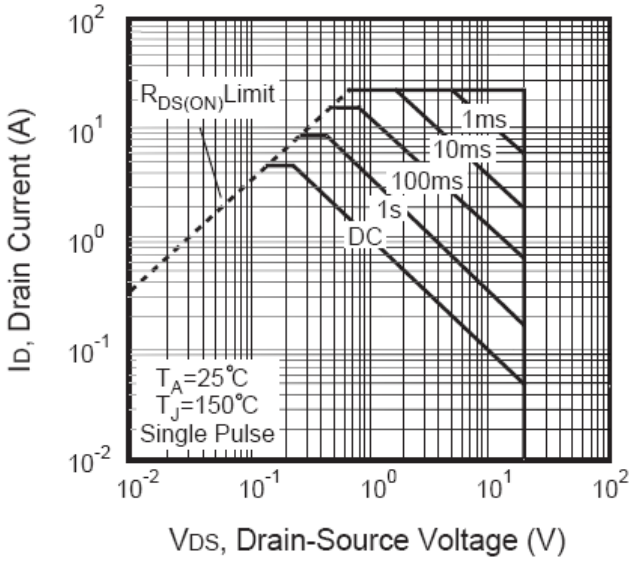
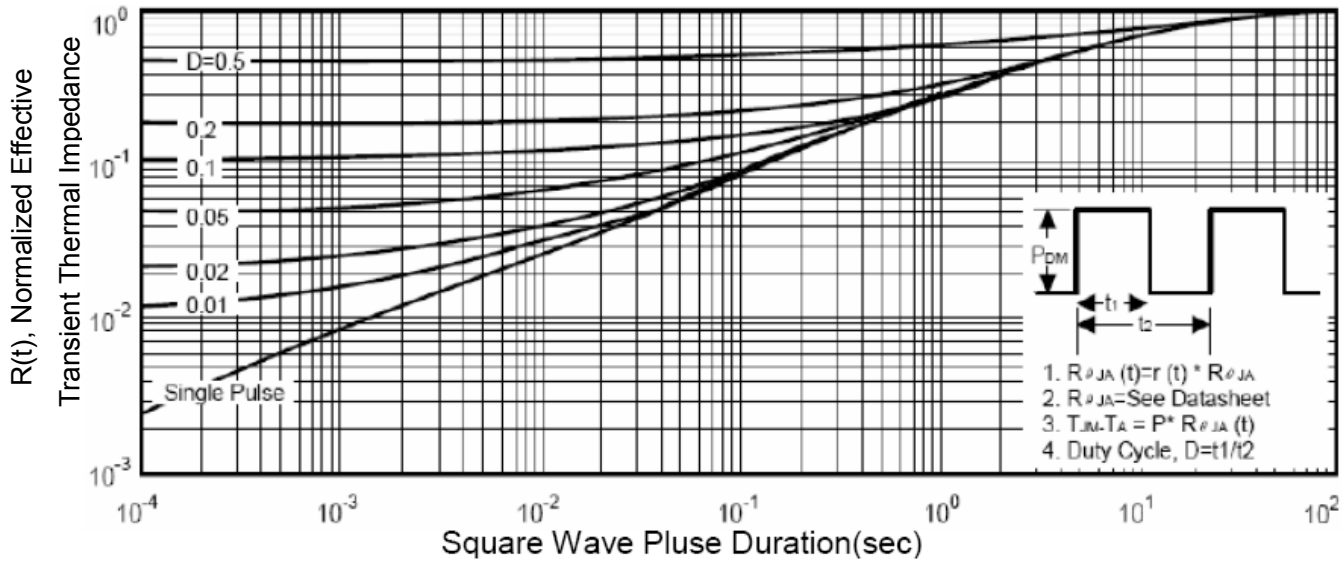
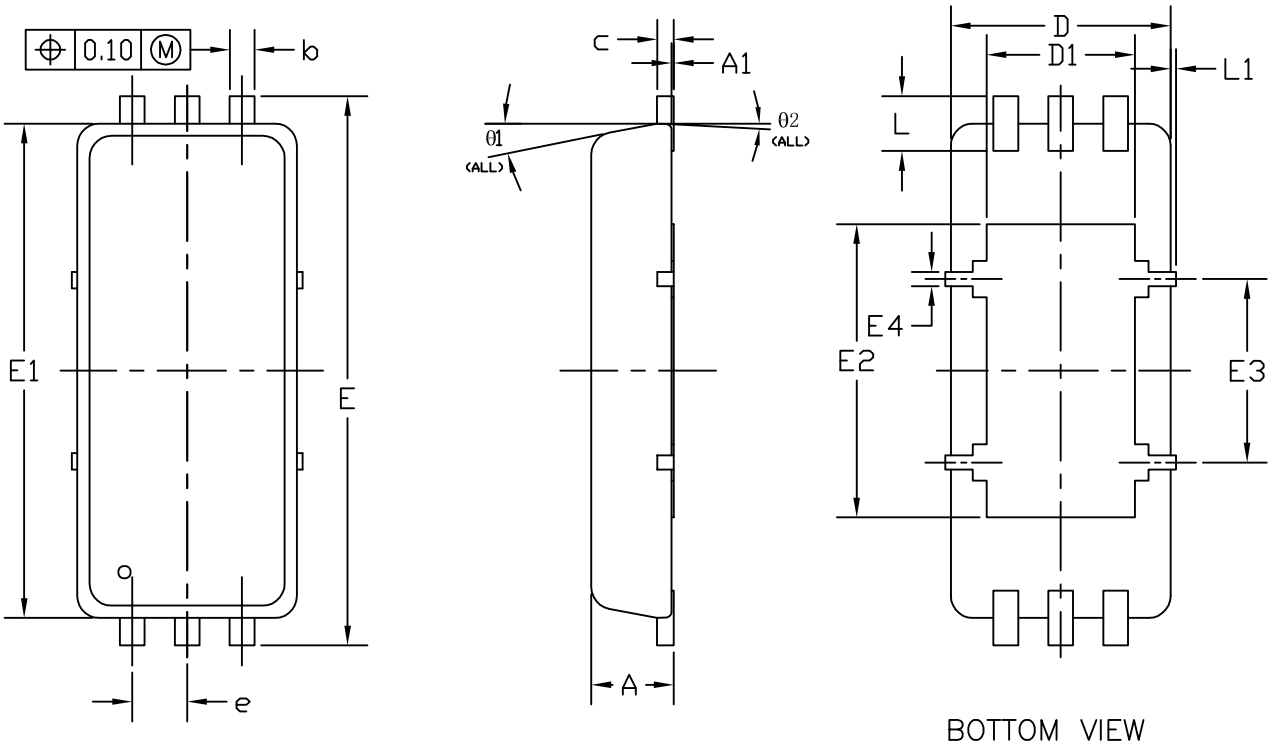


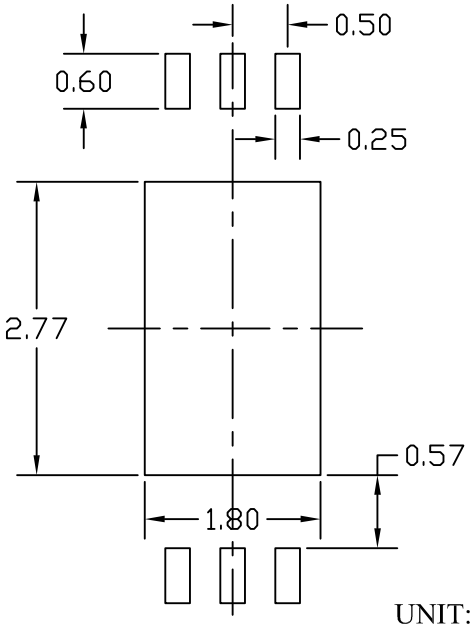
Figure11. Normalized Maximum Transient Thermal Impedance



DFN2x5_6L_EP1_P PACKAGE OUTLINE



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. PAKCAGE 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.