N-Channel Trench Power MOSFET

General Description

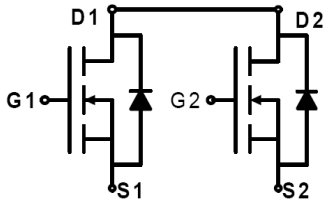
The CS8205E uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching applications.

Features

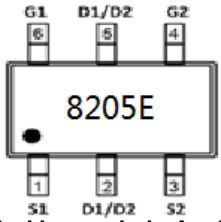
- V_{DS} = 19.5V,ID =4.2A
  $R_{DS(ON)}$ < 26mΩ @ V_{GS} =4.5V
  $R_{DS(ON)}$ < 36mΩ @ V_{GS} =2.5V
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

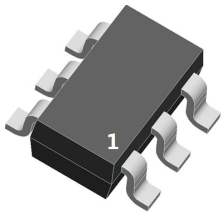
- Battery protection
- Load switch
- Power management



Schematic Diagram



Marking and pin Assignment



SOT23-6 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
8205E	CS8205E	SOT23-6	Ø180mm	8mm	3000 units

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

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage (V_{GS}=0V）	19.5	V
V_{GS}	Gate-Source Voltage (V_{DS}=0V)	±10	V
I_D	Drain Current-Continuous	4.2	A
$I_{DM\ (pluse)}$	Drain Current-Continuous@ Current-Pulsed **(Note 1)**	25	A
P_D	Maximum Power Dissipation	1.25	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

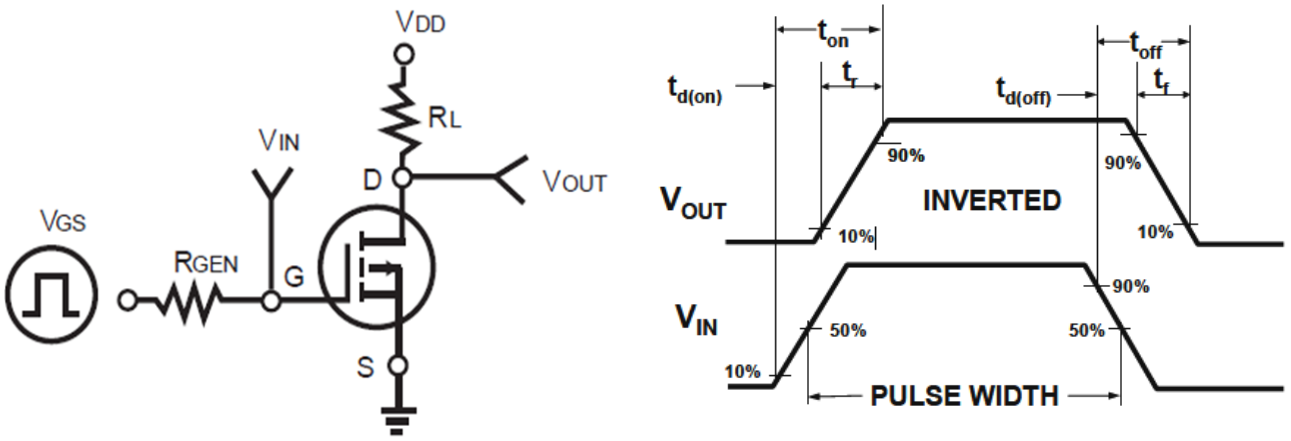
Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	100	℃/W

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	19.5	21		V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=19V,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=4.2A	4			S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=4.5V, I_D=4.2A		18	26	mΩ
		V_{GS}=2.5V, I_D=3A		24	36	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=10V,V_{GS}=0V, f=1.0MHz		450		pF
C_{oss}	Output Capacitance			230		pF
C_{rss}	Reverse Transfer Capacitance			110		pF
Switching Times						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=10V,I_D=1A, V_{GS}=4.5V,R_G=6Ω		10		nS
t_r	Turn-on Rise Time			11		nS
$t_{d(off)}$	Turn-Off Delay Time			34		nS
t_f	Turn-Off Fall Time			30		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	1.2	V

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

Switch Time Test Circuit and Switching Waveforms:



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

Figure1. Power Dissipation

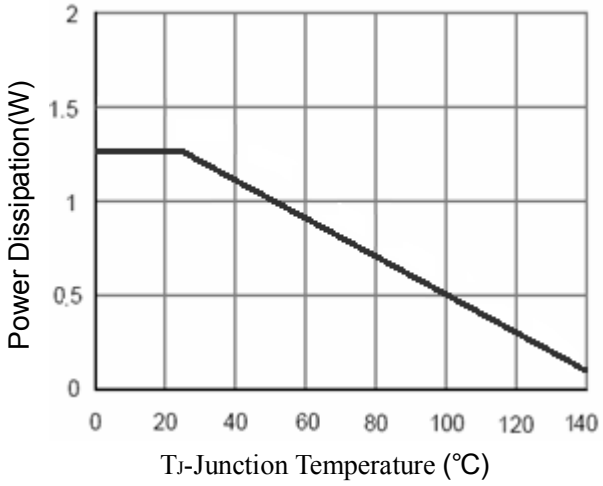


Figure2. Drain Current

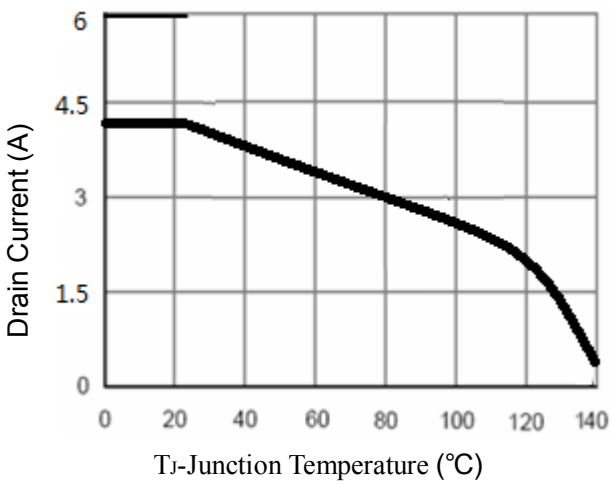


Figure3. Output Characteristics

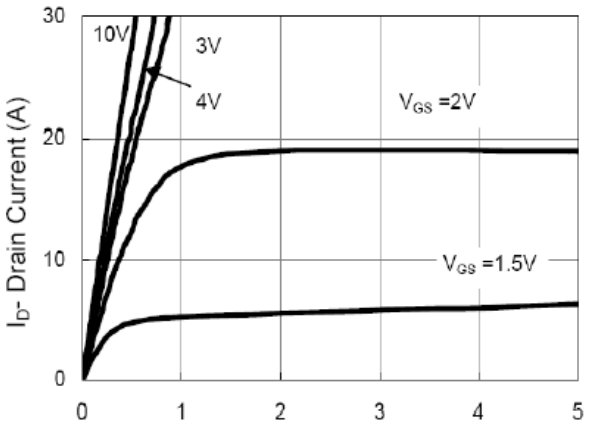


Figure4. Transfer Characteristics

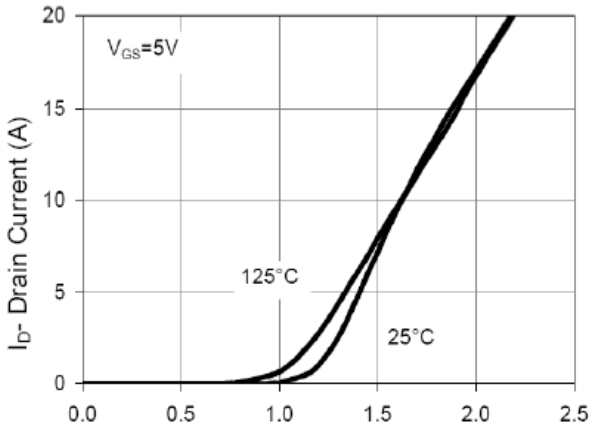


Figure5. Capacitance

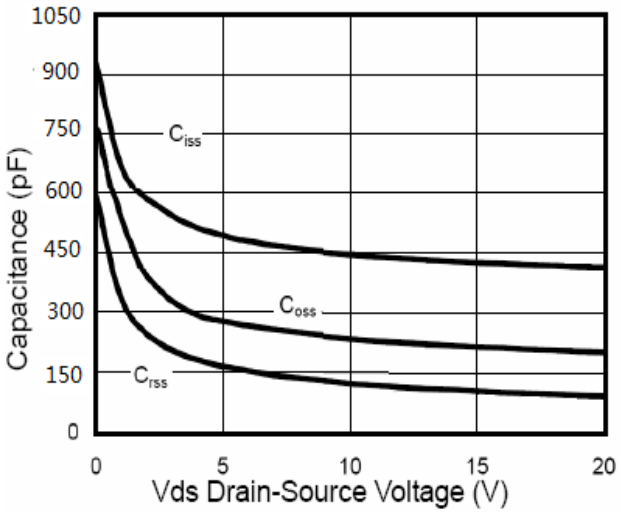


Figure6. $R_{DS(ON)}$ vs Junction Temperature

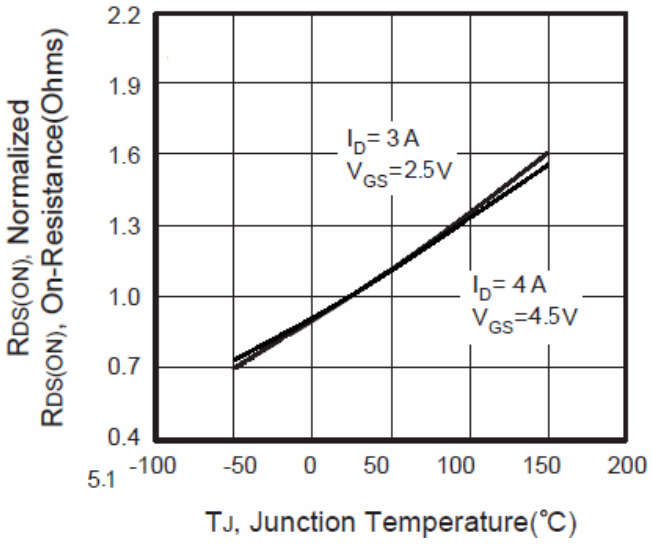


Figure7. Max BV_{DSS} vs Junction Temperature

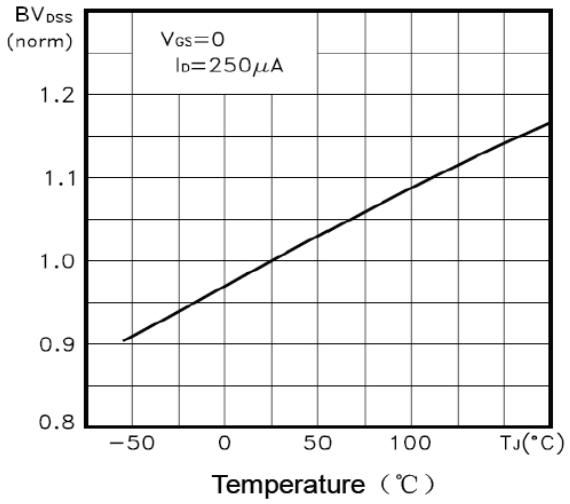


Figure8. $V_{GS(th)}$ vs Junction Temperature

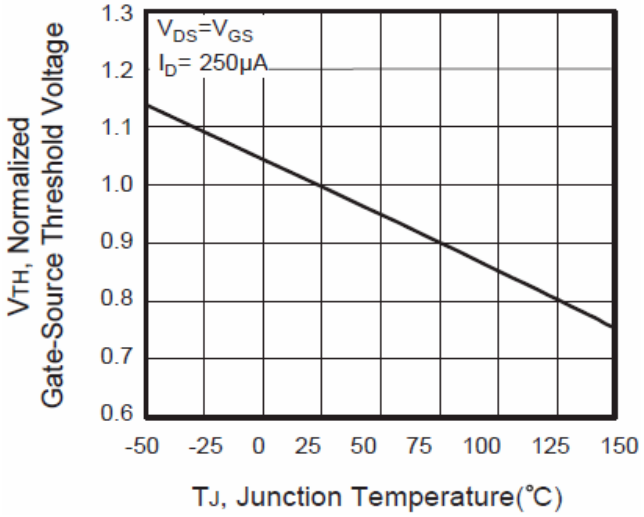


Figure9. Gate Charge Waveforms

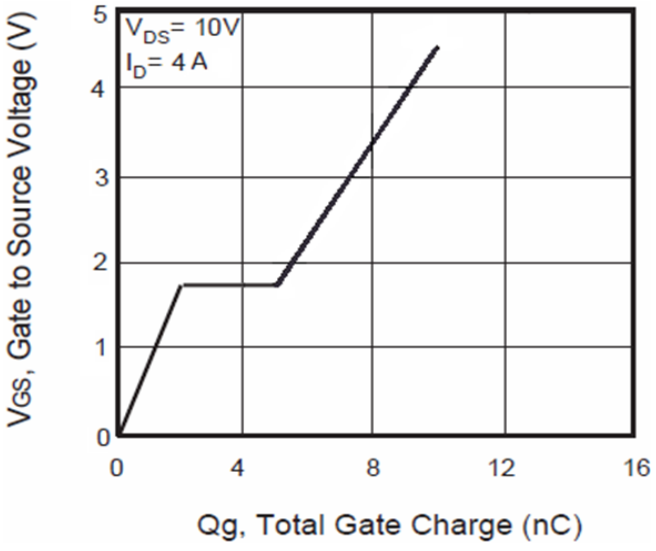


Figure10. Maximum Safe Operating Area

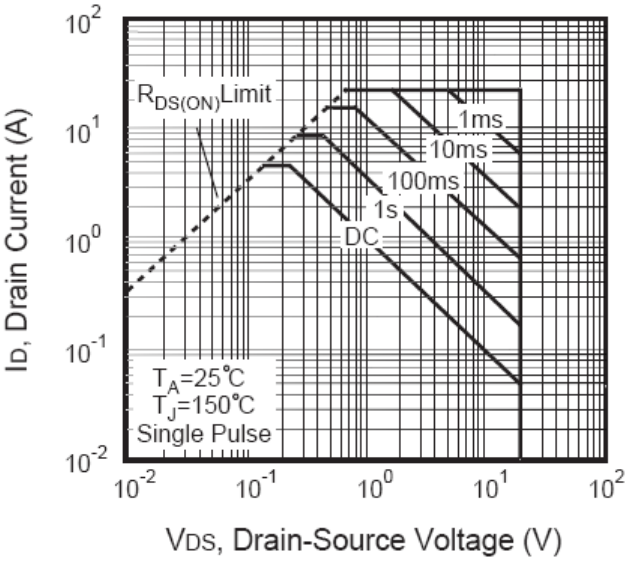
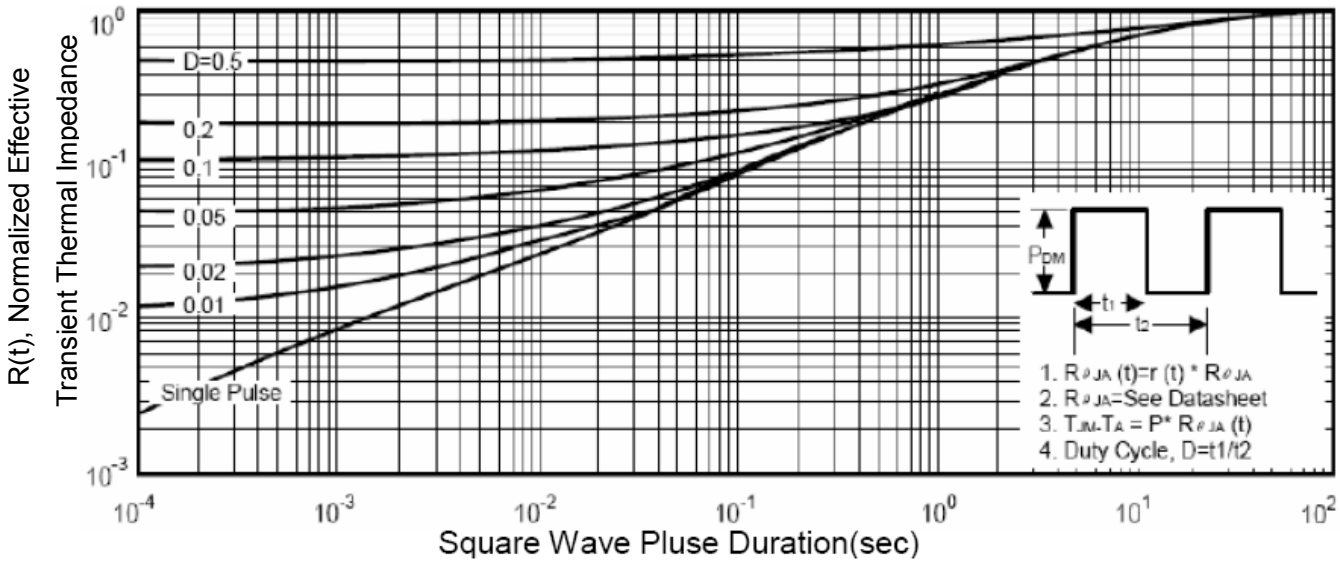
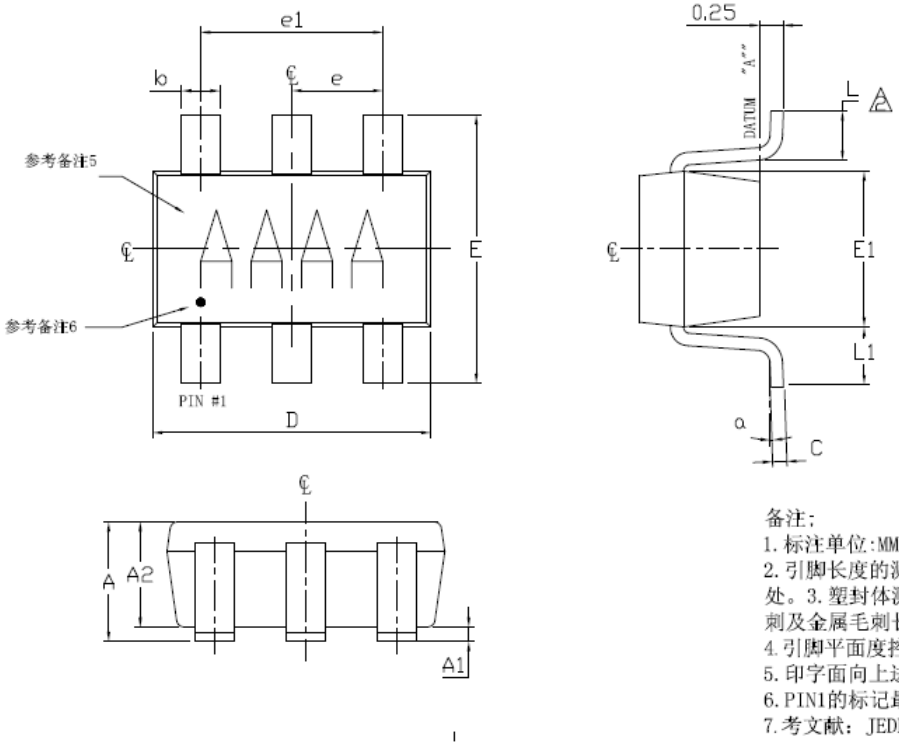


Figure11. Normalized Maximum Transient Thermal Impedance



SOT23-6 Package Information



SYMBOL	MIN	NOM	MAN
A	0.90	1.25	1.45
A1	0.00	0.05	0.15
A2	0.90	1.10	1.30
b	0.35	0.40	0.50
C	0.08	0.15	0.20
D	2.80	2.90	3.00
E	2.60	2.80	3.00
E1	1.50	1.625	1.75
L	0.35	0.45	0.60
L1		0.60 REF.	
e1		1.90 BSC.	
e		0.95 BSC.	
a	0°	2.5°	8°
PKG CODES: U6-1, U6-2, U6-4, U6CN-2, U6SN-1, U6F-6, U6FH-6			

备注:
1. 标注单位:MM.
2. 引脚长度的测量点为引脚与塑封体接触点及引脚边缘最长处。3. 塑封体测量尺寸不包括毛刺及金属毛刺，另塑封体毛刺及金属毛刺长度不超过0.25mm.
4. 引脚平面度控制小于0.1mm.
5. 印字面向上进行读取时，PIN1 位于左下方（参考图解）.
6. PIN1的标记最小为⌀0.3mm，并位于PIN1脚位上方.
7. 考文献：JEDEC TO236-VARIATION AB.