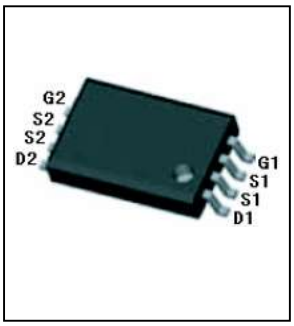
N-Channel Enhancement Mode Power MOSFET

8205A

Description

The 8205A 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.



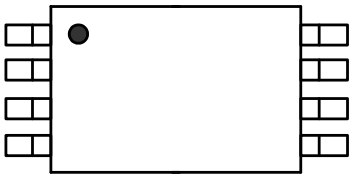
TSSOP-8 top view

General Features

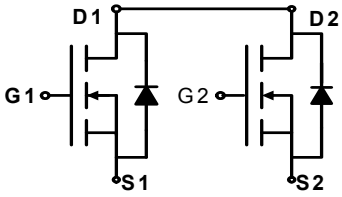
- V_{DS} = 19.5V,I_D = 6A
  $R_{DS(ON)}$ < 37mΩ @ V_{GS}=2.5V
  $R_{DS(ON)}$ < 27mΩ @ V_{GS}=4.5V
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

- Battery protection
- Load switch
- Power management



pin Assignment



Schematic diagram

Absolute Maximum Ratings (TA=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	19.5	V
Gate-Source Voltage	V_{GS}	±10	V
Drain Current-Continuous	I_D	6	A
Drain Current-Pulsed (Note 1)	I_{DM}	25	A
Maximum Power Dissipation	P_D	1.5	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	83	℃/W

Electrical Characteristics (TA=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	19.5	21		V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=19.5V,V_{GS}=0V			1	μA

Gate-Body Leakage Current	I_{GSS}	V_{GS}=±10V,V_{DS}=0V			±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	0.5	0.7	1.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=4.5A		21	27	mΩ
		V_{GS}=2.5V, I_D=3.5A		27	37	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=4.5A		10		S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=8V,V_{GS}=0V, F=1.0MHz		600		PF
Output Capacitance	C_{oss}			330		PF
Reverse Transfer Capacitance	C_{rss}			140		PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V,I_D=1A V_{GS}=4.5V,R_{GEN}=6Ω		10	20	nS
Turn-on Rise Time	t_r			11	25	nS
Turn-Off Delay Time	$t_{d(off)}$			35	70	nS
Turn-Off Fall Time	t_f			30	60	nS
Total Gate Charge	Q_g	V_{DS}=10V,I_D=6A, V_{GS}=4.5V		10	15	nC
Gate-Source Charge	Q_{gs}			2.3		nC
Gate-Drain Charge	Q_{gd}			1.5		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=1.7A		0.75	1.2	V
Diode Forward Current (Note 2)	I_S				1.7	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

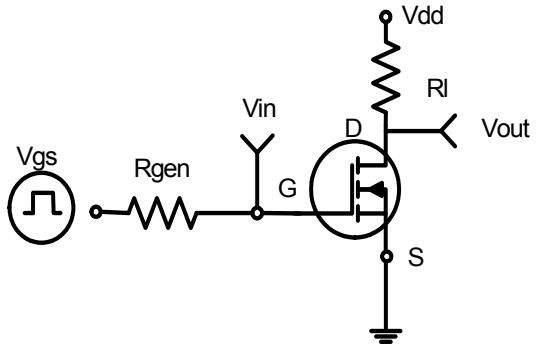


Figure 1:Switching Test Circuit

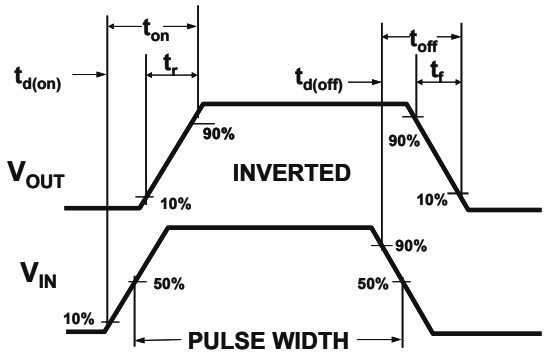


Figure 2:Switching Waveforms

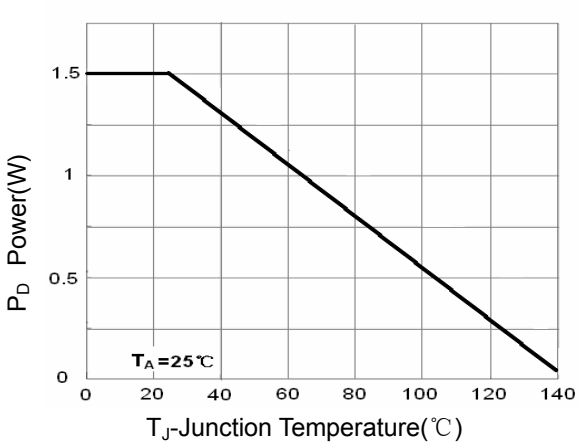


Figure 3 Power Dissipation

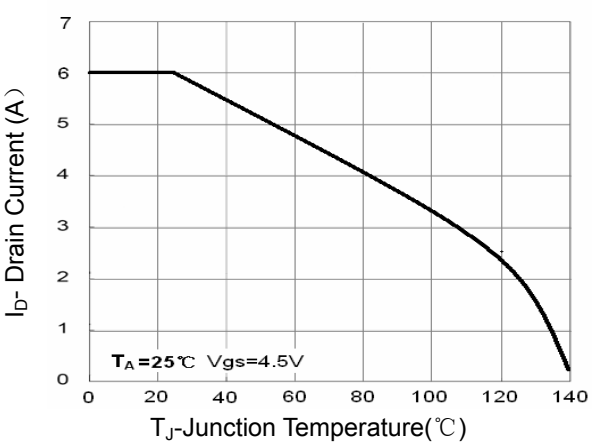


Figure 4 Drain Current

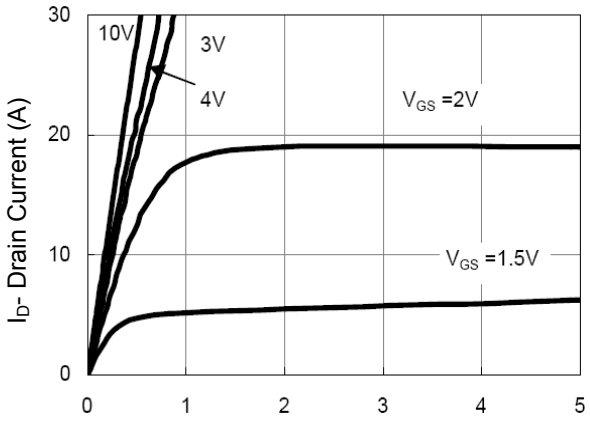


Figure 5 Output CHARACTERISTICS

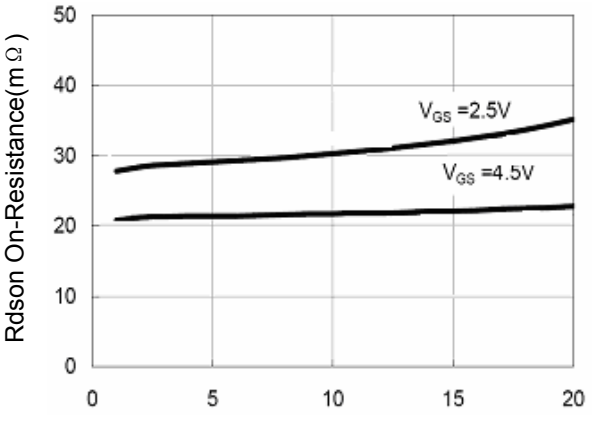


Figure 6 Drain-Source On-Resistance

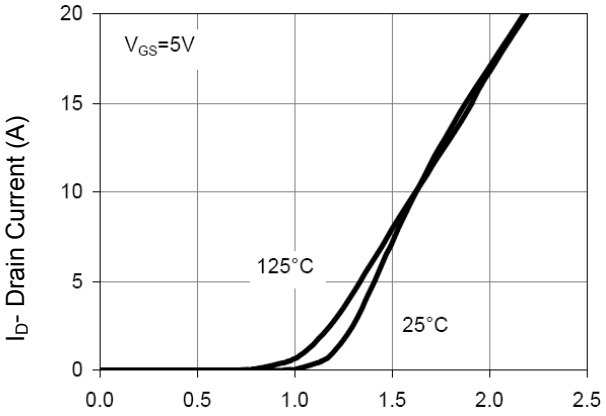


Figure 7 Transfer Characteristics

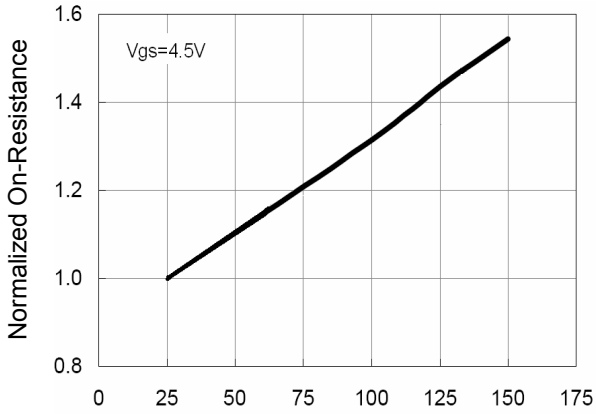


Figure 8 Drain-Source On-Resistance

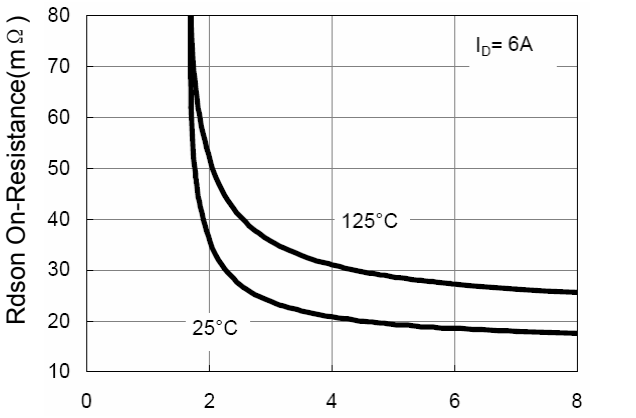


Figure 9 Rdson vs Vgs

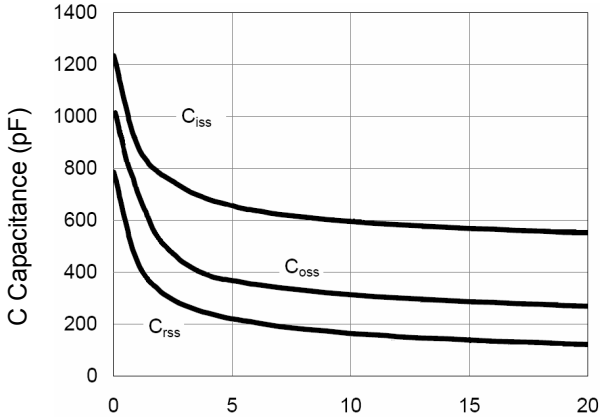


Figure 10 Capacitance vs Vds

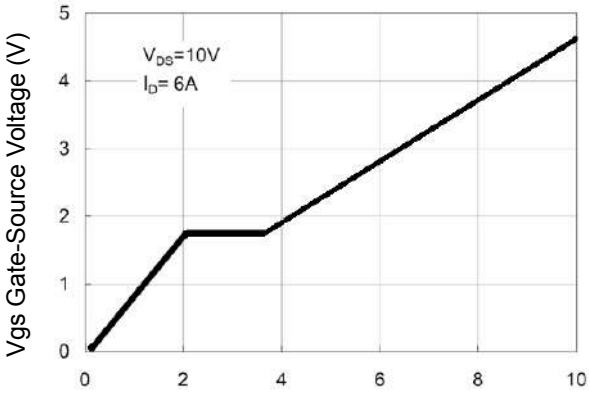


Figure 11 Gate Charge

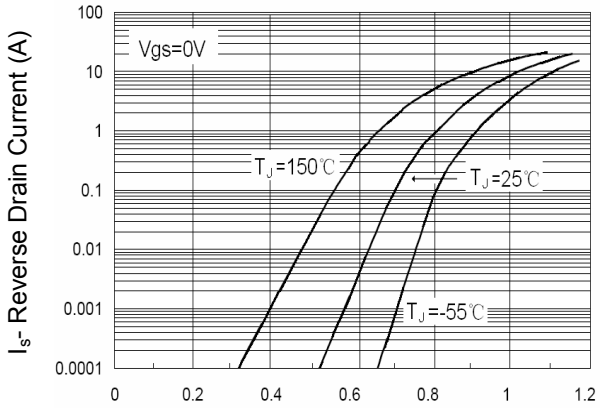


Figure 12 Source- Drain Diode Forward

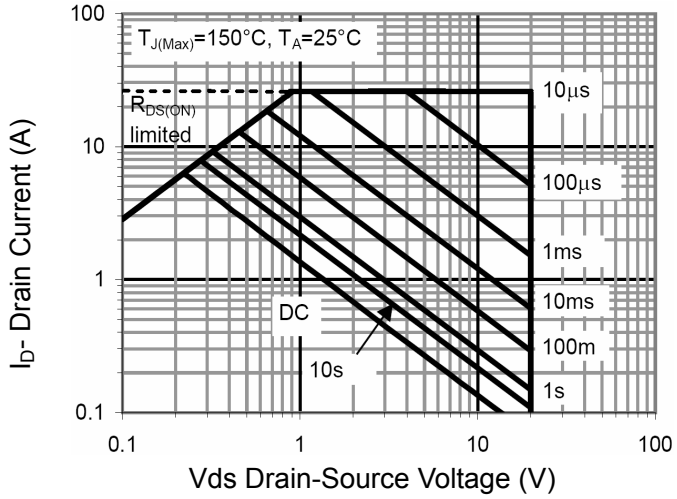


Figure 13 Safe Operation Area

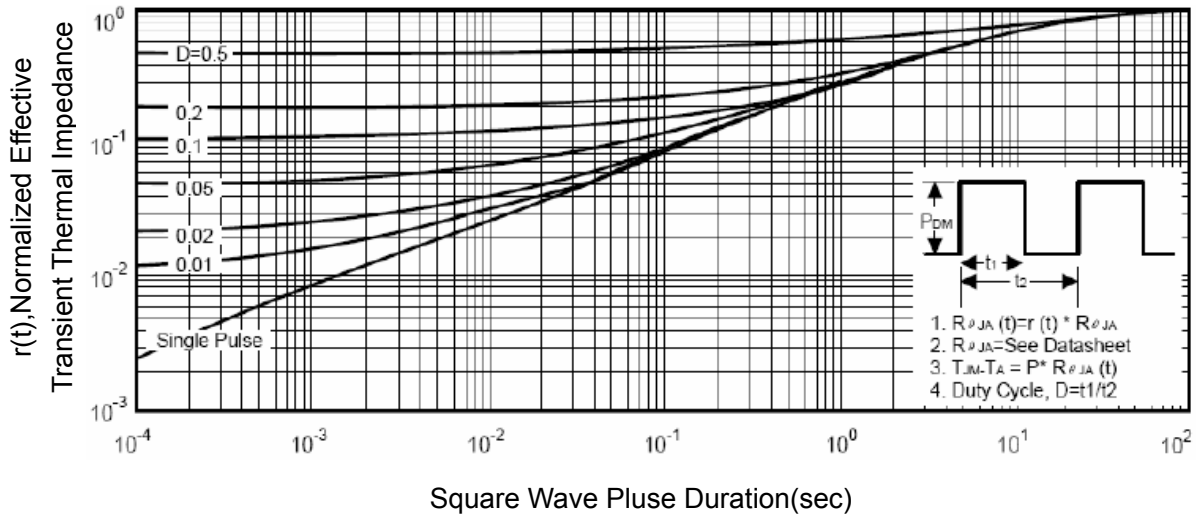


Figure 14 Normalized Maximum Transient Thermal Impedance