



Dual N-Channel MOSFET

GENERAL DESCRIPTION

The 8205A is a dual N-channel MOS Field Effect Transistor which uses advanced trench technology to provide excellent $R_{DS(on)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch.

FEATURES

- $V_{DS} = 20\text{ V}$
- $I_D = 6\text{ A}$
- Low on-state resistance Fast switching
 - $R_{DS(on)} = 45\text{ m}\Omega$ (typ.) ($V_{GS} = 4.5\text{ V}$, $I_D = 2.0\text{ A}$)
 - $R_{DS(on)} = 48\text{ m}\Omega$ (typ.) ($V_{GS} = 3.85\text{ V}$, $I_D = 2.0\text{ A}$)
 - $R_{DS(on)} = 60\text{ m}\Omega$ (typ.) ($V_{GS} = 2.5\text{ V}$, $I_D = 2.0\text{ A}$)
- Lead free product is acquired
- Surface Mount Package

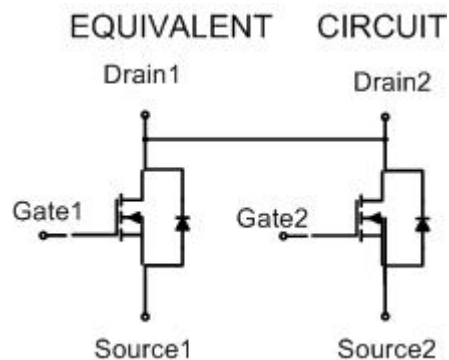
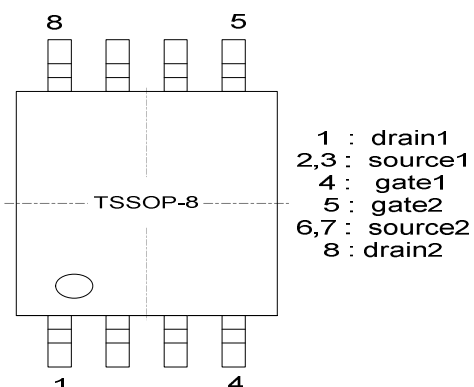
APPLICATION

- Battery protection
- Load switch
- Power management

PACKAGE MARKING AND ORDERING INFORMATION

| Device Marking | Device | Device Package | Reel size | Tape width | Quantity |
|----------------|--------|----------------|----------------------|------------|------------|
| 8205A | 8250A | TSSOP8 | $\Phi 180\text{ mm}$ | 8mm | 3000 units |

PIN DESCRIPTION



| PIN NUM | PIN NAME | PIN FUNCTION |
|---------|----------|--------------|
| 1 | D | DRAIN |
| 2 | S1 | SOURCE1 |
| 3 | S1 | SOURCE1 |
| 4 | G1 | GATE2 |
| 5 | G2 | GATE2 |
| 6 | S2 | SOURCE2 |
| 7 | S2 | SOURCE2 |
| 8 | D | DRAIN |

ABSOLUTE MAXIMUM RATINGS (TA = 25°C)

| Symbol | Parameter | Value | Unit |
|-----------------|--|-------------|------|
| V _{DS} | Drain-source Voltage | 20 | V |
| I _D | Drain Current(continuous)at T _c =25°C (Note1) | 6 | A |
| I _{DM} | Drain Current (pulsed) (Note2) | 24 | A |
| V _{GS} | Gate-source Voltage | ± 12 | V |
| P _D | Power Dissipation (T _C = 25°C) (Note1) | 1.25 | W |
| Tstg | Operating and Storage Temperature Rang | -55 to +150 | °C |

Notes a. PW<10us,Duty Cycle<1%,V_{GS}=4.5V

b. Mounted on ceramic substrate of 45 cm²x 2.2mm.

Caution: These values must not be exceeded under any conditions.

Remark: The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

Thermal Data

| Symbol | Parameter | Max. | Unit |
|----------|--------------------------------------|------|------|
| Rthj-amb | Thermal Resistance Junction- ambient | 83 | °C/W |

Electrical Characteristics (T_C = 25°C)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|----------------------|-------------------------------------|---|------|------|------|------|
| V _{(BR)DSS} | Drain-source Breakdown Voltage | I _D =250uA, V _{GS} =0V | 20 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =20V,V _{GS} =0V | | | 1 | μA |
| I _{GSS} | Gate Leakage Current | V _{GS} =±10V,V _{DS} =0V | | | ±1 | μA |
| V _{GS(th)} | Gate threshold voltage | V _{DS} =V _{GS} ,I _D = 250uA | 0.5 | | 1.15 | V |
| R _{DS(on)} | Drain to Source On-state Resistance | V _{GS} =4.5V,I _D =2A | | 45 | 50 | mΩ |
| | | V _{GS} =3.85V,I _D =2A | | 48 | 52 | mΩ |
| | | V _{GS} =2.5V,I _D =2A | | 60 | 70 | mΩ |
| C _{iss} | Input Capacitance | V _{DS} =15V,V _{GS} =0V,f=1MHz | | 370 | | pF |
| C _{oss} | Output Capacitance | | | 89 | | pF |
| C _{rss} | Reverse Transfer Capacitance | | | 9.7 | | pF |
| t _{d(on)} | Turn-on Delay Time | V _{DD} =10V,I _D =3A, V _{GS} =4.5V,R _G =4.7 | | 200 | | ns |
| t _r | Rise Time | (Note2,3) | | 236 | | ns |

| | | | | | |
|--------------|----------------------------|--|------|-----|----|
| $t_{d(off)}$ | Turn-off Delay Time | | 36 | | ns |
| t_f | Fall Time | | 165 | | ns |
| Q_g | Total Gate Charge | $V_{DD}=16V, V_{GS}=4.5V, I_D=6A$ (Note2,3) | 7.5 | | nC |
| Q_{gs} | Gate to Source Charge | | 2.5 | | nC |
| Q_{gd} | Gate to Drain Charge | | 1.3 | | nC |
| V_{SD}^* | Body Diode Forward Voltage | $I_F=6A, V_{GS}=0V$ | 0.74 | 1.2 | V |
| T_{rr} | Reverse Recovery Time | $V_{DD}=10V, I_F=6A, di/dt=100A/us$ (Note2) | 80 | | ns |

Notes:

1. Surface Mounted on FR4 Board, $t \leq 10sec$
 2. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
 3. Essentially independent of operating temperature
- (*)Pulsed: Pulse duration

Typical characteristics (25°C unless noted)

Figure 1 Output Characteristics

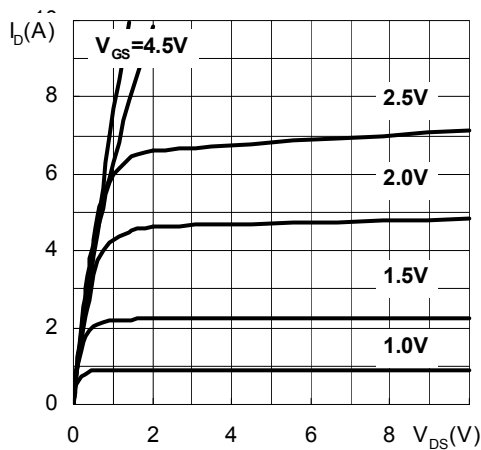


Figure 2 Transfer Characteristics

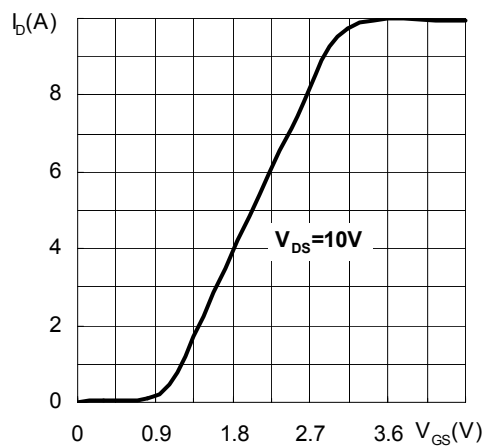


Figure 3 Threshold Voltage vs. Temperature

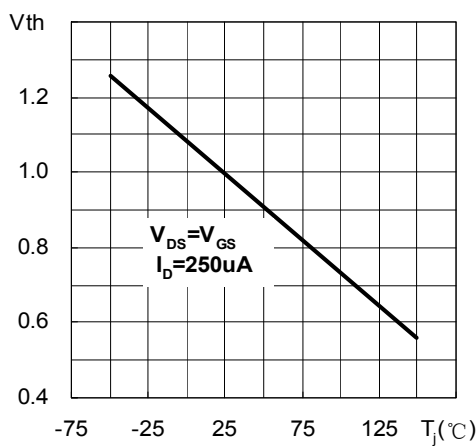


Figure 4 BVDSS vs. Temperature

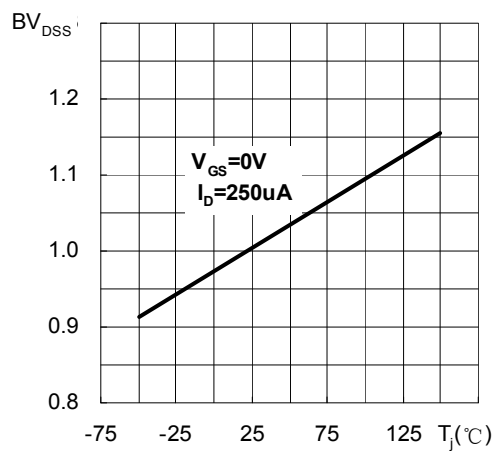


Figure 5 RDSON vs. Temperature

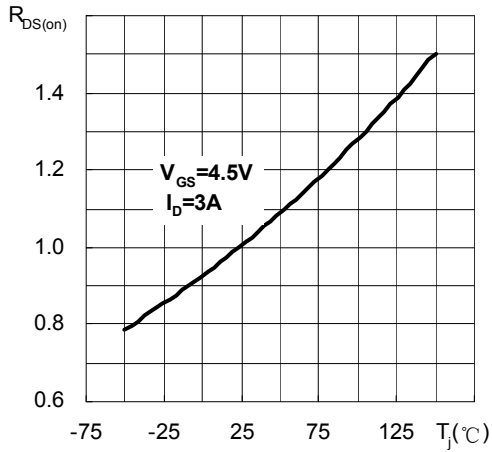


Figure 6 Source-drain diode forward characteristics

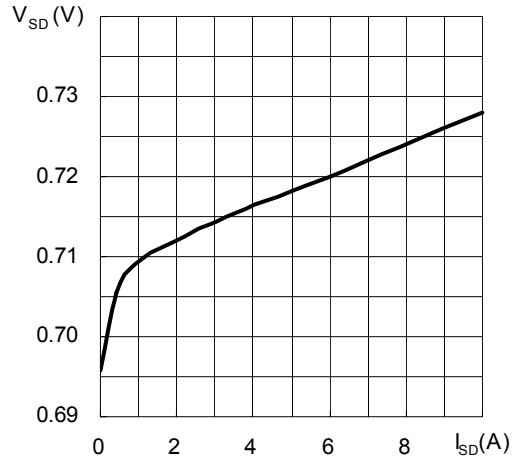


Figure 7 Capacitance

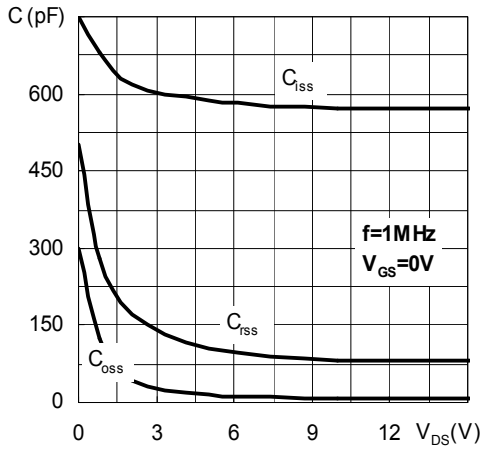


Figure 8 Gate Charge

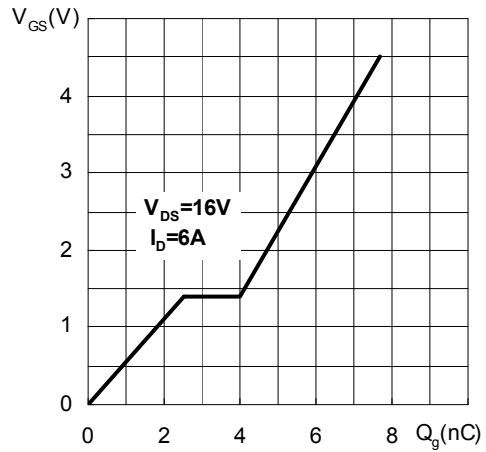


Figure 9 Safe Operating Area

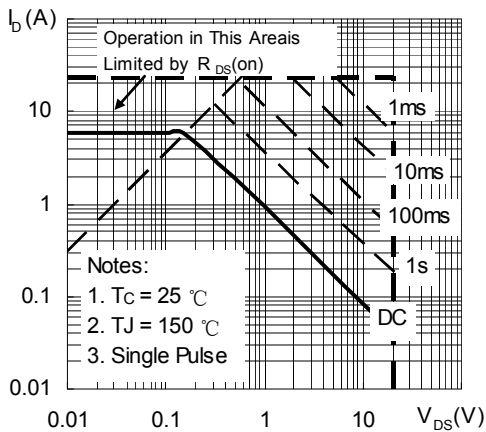


Figure 10 Maximum Drain Current vs Case Temperature

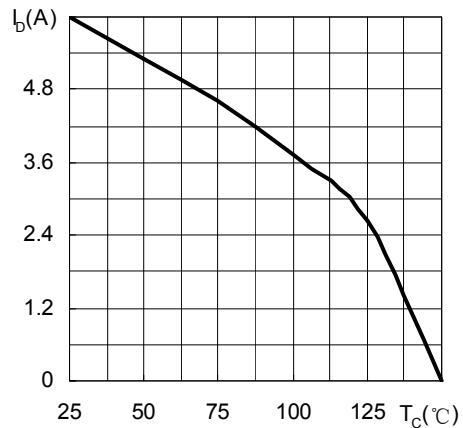
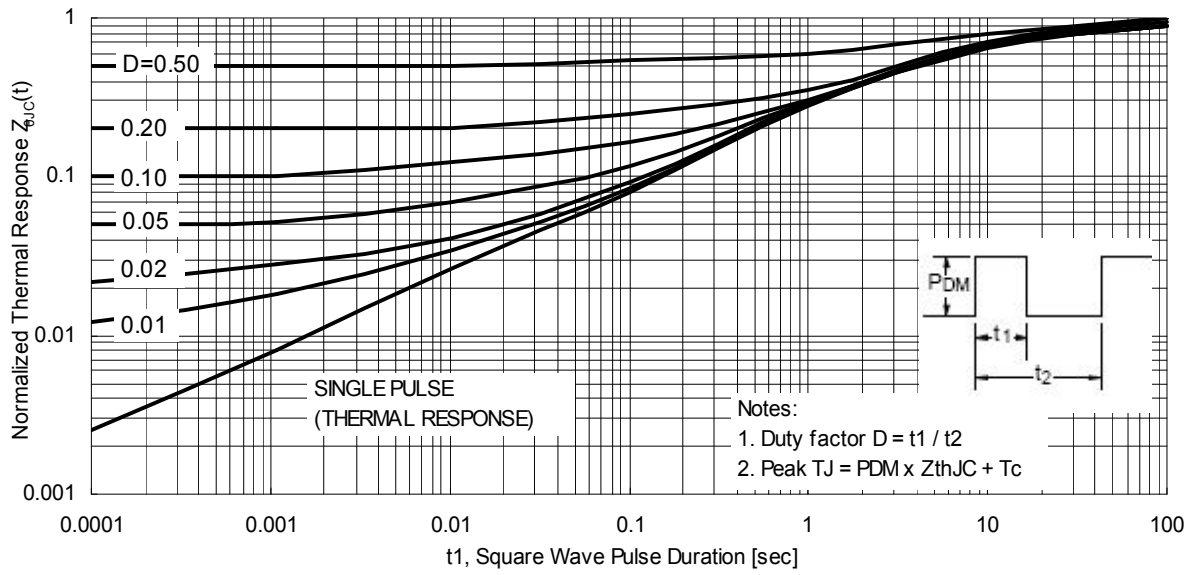
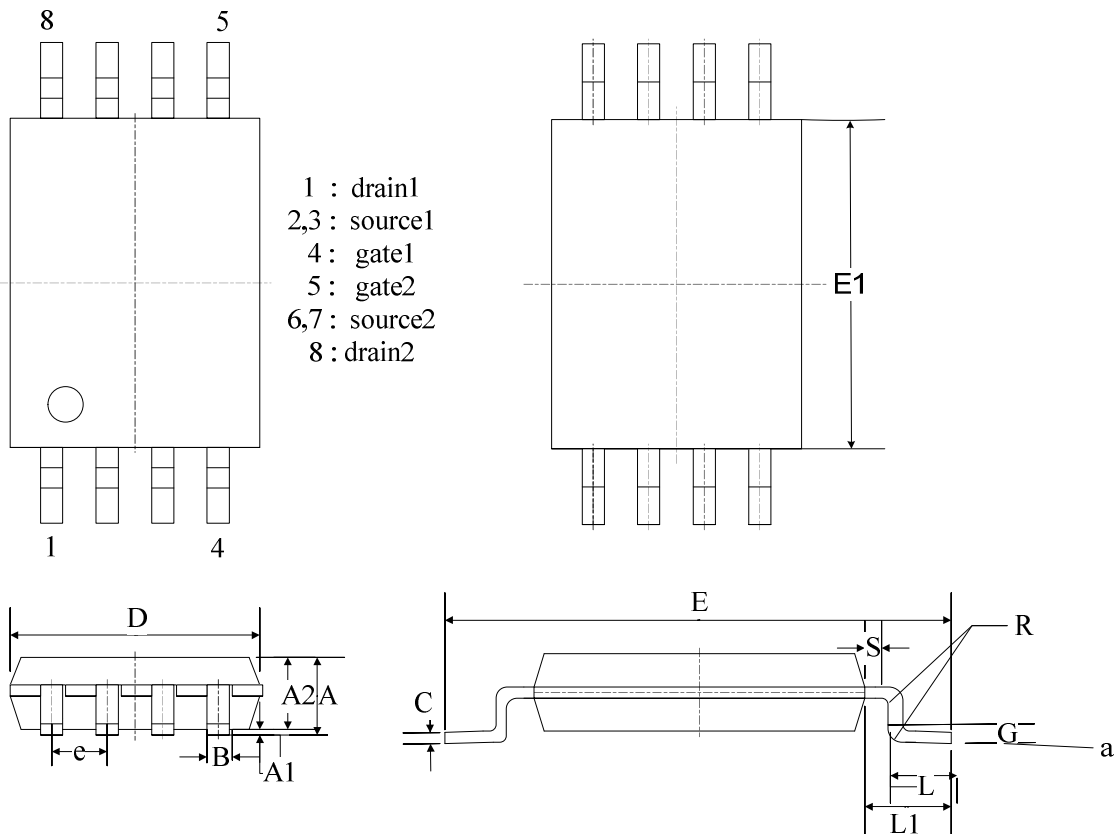


Figure 11 Maximum Transient Thermal impedance



Package Drawing



Dimensions (unit: mm)

| DIM | | A | A(1) | A(2) | B | C | D | E | E1 | e | G | L | L1 | a | R | S | |
|-----|------|------|------|------|------|-------|-----|-----|-----|-------------|------------------------|------|-----|----|------|-----|--|
| MM | Min. | 1.05 | 0.05 | 0.99 | 0.19 | | 2.9 | 6.2 | 4.3 | 0.65 BSC | 0.254 GAGE PLANE | 0.45 | 0.9 | 0° | 0.09 | 0.2 | |
| | Nom. | 1.1 | 0.1 | 1.02 | 0.25 | 0.127 | 3 | 6.4 | 4.4 | | | 0.6 | 1 | 4° | | | |
| | Max. | 1.2 | 0.15 | 1.05 | 0.3 | | 3.2 | 6.6 | 4.5 | | | 0.75 | 1.1 | 8° | | | |

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