

NCE8205E

NCE N-Channel Enhancement Mode Power MOSFET

Description

The NCE8205E 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.

General Features

• $V_{DS} = 20V, I_D = 6A$

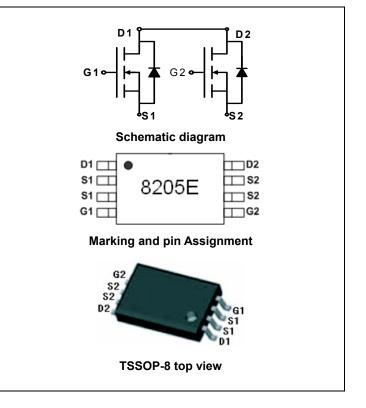
 $R_{DS(ON)}$ < 30m Ω @ V_{GS} =2.5V

 $R_{DS(ON)}$ < 22m Ω @ 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



Package Marking And Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|----------|----------------|-----------|------------|------------|
| 8205E | NCE8205E | TSSOP-8 | Ø330mm | 12mm | 3000 units |

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

| Parameter | Symbol | Limit | Unit |
|--|------------------|------------|----------------------|
| Drain-Source Voltage | V _{DS} | 20 | V |
| Gate-Source Voltage | V _G s | ±10 | V |
| Drain Current-Continuous | I _D | 6 | Α |
| Drain Current-Pulsed (Note 1) | I _{DM} | 25 | Α |
| Maximum Power Dissipation | P _D | 1.5 | W |
| Operating Junction and Storage Temperature Range | T_{J}, T_{STG} | -55 To 150 | $^{\circ}\mathbb{C}$ |

Thermal Characteristic

| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{	heta JA}$ | 83 | °C/W |
|--|----------------|----|------|

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

| Parameter | Symbol | Condition | Min | Тур | Max | Unit |
|---------------------------------|-------------------|--|-----|-----|-----|------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V I _D =250μA | 20 | 21 | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =19.5V,V _{GS} =0V | - | - | 1 | μΑ |



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NCE8205E

| 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 =250 μ A | | 0.5 | 0.7 | 1.2 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =4.5V, I _D =4.5A | - | 17 | 22 | mΩ |
| Drain-Source On-State Resistance | | V _{GS} =2.5V, I _D =3.5A | - | 21 | 30 | mΩ |
| Forward Transconductance | g FS | V _{DS} =5V,I _D =4.5A | - | 10 | - | S |
| Dynamic Characteristics (Note4) | | | | | | |
| Input Capacitance | C _{lss} | \/ -9\/\/ -0\/ | - | 600 | - | PF |
| Output Capacitance | Coss | V_{DS} =8V, V_{GS} =0V, F=1.0MHz | - | 330 | - | PF |
| Reverse Transfer Capacitance | C _{rss} | F-1.UIVITZ | - | 140 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| Turn-on Delay Time | t _{d(on)} | | - | 10 | 20 | nS |
| Turn-on Rise Time | t _r | V _{DD} =10V,I _D =1A | - | 11 | 25 | nS |
| Turn-Off Delay Time | t _{d(off)} | V_{GS} =4.5 V , R_{GEN} =6 Ω | - | 35 | 70 | nS |
| Turn-Off Fall Time | t _f | | - | 30 | 60 | nS |
| Total Gate Charge | Qg | \/ -40\/ L -CA | - | 10 | 15 | nC |
| Gate-Source Charge | Q_{gs} | V_{DS} =10V, I_{D} =6A, V_{GS} =4.5V | - | 2.3 | - | nC |
| Gate-Drain Charge | Q_{gd} | VGS-4.5V | - | 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 | Α |

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 \leq 300 μ s, Duty Cycle \leq 2%.
- 4. Guaranteed by design, not subject to production

NCE8205E

Typical Electrical and Thermal Characteristics

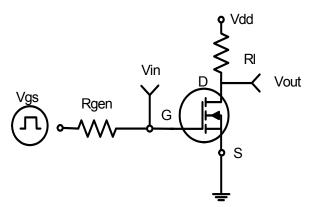


Figure 1:Switching Test Circuit

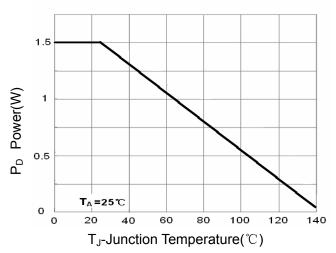


Figure 3 Power Dissipation

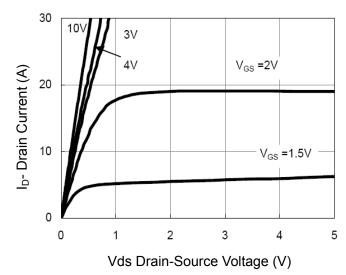


Figure 5 Output CHARACTERISTICS

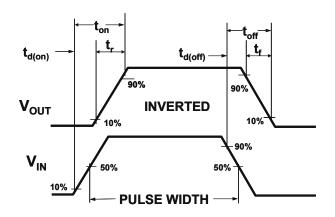


Figure 2:Switching Waveforms

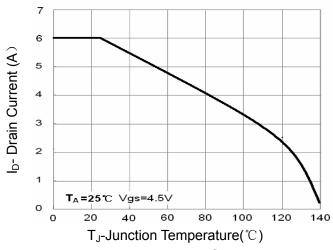


Figure 4 Drain Current

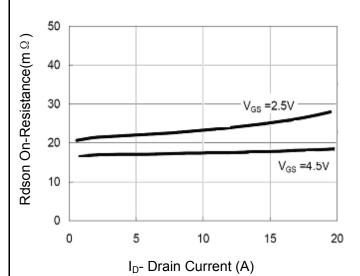
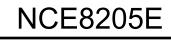
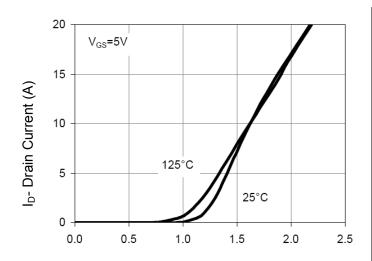


Figure 6 Drain-Source On-Resistance







Vgs Gate-Source Voltage (V)

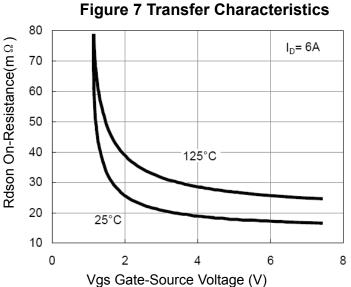


Figure 9 Rdson vs Vgs

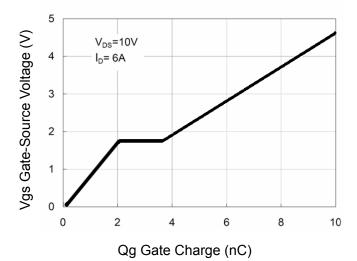
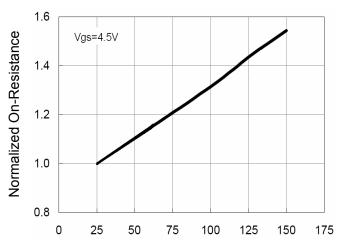


Figure 11 Gate Charge



 T_J -Junction Temperature($^{\circ}$ C)



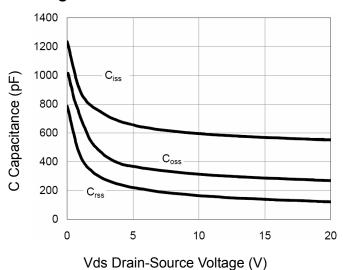
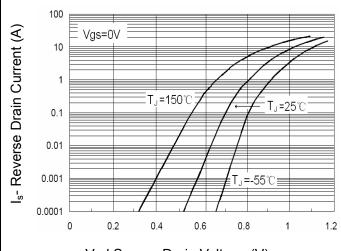
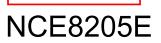


Figure 10 Capacitance vs Vds



Vsd Source-Drain Voltage (V)

Figure 12 Source- Drain Diode Forward



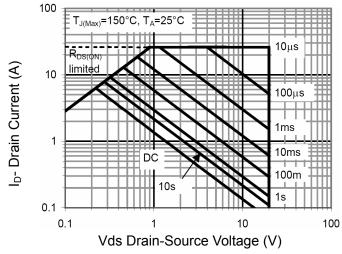


Figure 13 Safe Operation Area

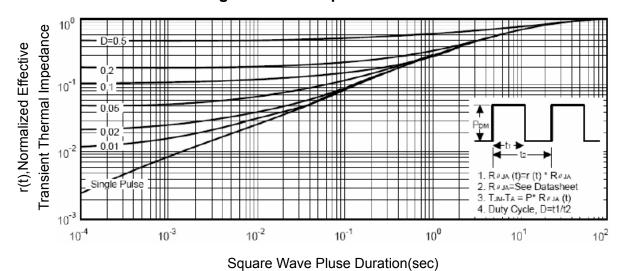
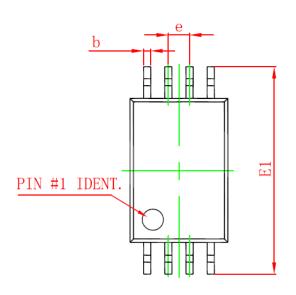


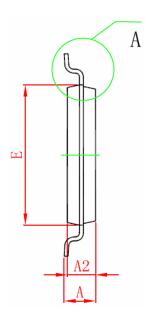
Figure 14 Normalized Maximum Transient Thermal Impedance

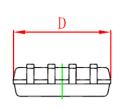


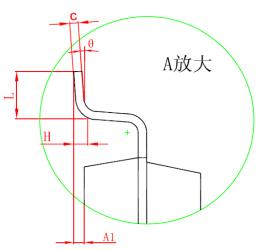
NCE8205E

TSSOP-8 Package Information









| Symbol | Dimensions In Millimeters | | | |
|--------|---------------------------|-------|--|--|
| Symbol | Min | Max | | |
| D | 2.900 | 3.100 | | |
| E | 4.300 | 4.500 | | |
| b | 0.190 | 0.300 | | |
| С | 0.090 | 0.200 | | |
| E1 | 6.250 | 6.550 | | |
| Α | | 1.100 | | |
| A2 | 0.800 | 1.000 | | |
| A1 | 0.020 | 0.150 | | |
| е | 0.65(BSC) | | | |
| L | 0.500 | 0.700 | | |
| Н | 0.25(TYP) | | | |
| Θ | 1° 7° | | | |



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