

NCE P-Channel Enhancement Mode Power MOSFET



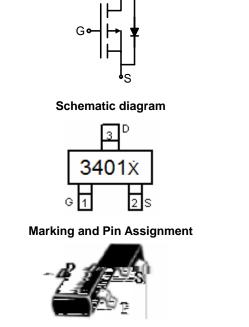
The NCE3401 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch or in PWM applications.

General Features

- V_{DS} = -30V,I_D = -4.2A
 - $R_{DS(ON)} < 90m\Omega @ V_{GS}=-2.5V$
 - $R_{DS(ON)} < 75m\Omega @ V_{GS}$ =-4.5V
 - $R_{DS(ON)} < 55m\Omega @ V_{GS}=-10V$
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

Application

- PWM applications
- Load switch
- Power management



D

SOT-23 top view

Package Marking And Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|---------|----------------|-----------|------------|------------|
| 3401 X | NCE3401 | SOT-23 | Ø180mm | 8 mm | 3000 units |

Absolute Maximum Ratings (TA=25 unless otherwise noted)

| Parameter | Symbol | Limit | Unit | |
|--|-----------------|------------|------|--|
| Drain-Source Voltage | Vds | -30 | V | |
| Gate-Source Voltage | Vgs | ±12 | V | |
| Drain Current-Continuous | I _D | -4.2 | A | |
| Drain Current-Pulsed (Note 1) | I _{DM} | -30 | A | |
| Maximum Power Dissipation | PD | 1.2 | W | |
| Operating Junction and Storage Temperature Range | TJ,TSTG | -55 To 150 | | |

Thermal Characteristic

| Thermal Resistance, Junction-to-Ambient (Note 2) | R _{0JA} | 104 | /W |
|--|------------------|-----|----|
|--|------------------|-----|----|

Electrical Characteristics (TA=25 unless otherwise noted)

| Parameter | Symbol | Condition | Min | Тур | Max | Unit |
|---------------------------------|-------------------|--|-----|-----|-----|------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V I _D =-250µA | -30 | | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =-24V,V _{GS} =0V | - | - | -1 | μA |



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| Gate-Body Leakage Current | I _{GSS} | $V_{GS}=\pm 10V, V_{DS}=0V$ | - | - | ±100 | nA |
|------------------------------------|---------------------|--|------|-----|------|----|
| On Characteristics (Note 3) | | | | | I. | |
| Gate Threshold Voltage | V _{GS(th)} | $V_{DS}=V_{GS}$, $I_{D}=-250\mu A$ | -0.7 | -1 | -1.3 | V |
| | | V _{GS} =-10V, I _D =-4.2A | - | 48 | 55 | mΩ |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =-4.5V, I _D =-4A | - | 56 | 75 | mΩ |
| | | V _{GS} =-2.5V, I _D =-1A | | 72 | 90 | mΩ |
| Forward Transconductance | g fs | V _{DS} =-5V,I _D =-4.2A | - | 10 | - | S |
| Dynamic Characteristics (Note4) | · | | | • | | |
| Input Capacitance | C _{lss} | - V _{DS} =-15V,V _{GS} =0V, F=1.0MHz | - | 880 | - | PF |
| Output Capacitance | C _{oss} | | - | 105 | - | PF |
| Reverse Transfer Capacitance | C _{rss} | | - | 65 | - | PF |
| Switching Characteristics (Note 4) | · | | | • | | |
| Turn-on Delay Time | t _{d(on)} | | - | 7 | - | nS |
| Turn-on Rise Time | tr | V _{DD} =-15V,I _D =-4.2A | - | 3 | - | nS |
| Turn-Off Delay Time | t _{d(off)} | V_{GS} =-10V, R_{GEN} =6 Ω | - | 30 | - | nS |
| Turn-Off Fall Time | t _f | | - | 12 | - | nS |
| Total Gate Charge | Qg | | - | 8.5 | - | nC |
| Gate-Source Charge | Q _{gs} | V _{DS} =-15V,I _D =-4.2A,V _{GS} =-4.5V | - | 1.8 | - | nC |
| Gate-Drain Charge | Q _{gd} | | - | 2.7 | - | nC |
| Drain-Source Diode Characteristics | | - | - | | | |
| Diode Forward Voltage (Note 3) | V _{SD} | V _{GS} =0V,I _S =-4.2A | - | - | -1.2 | V |

Notes:

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

2. Surface Mounted on FR4 Board, $t \le 10$ sec.

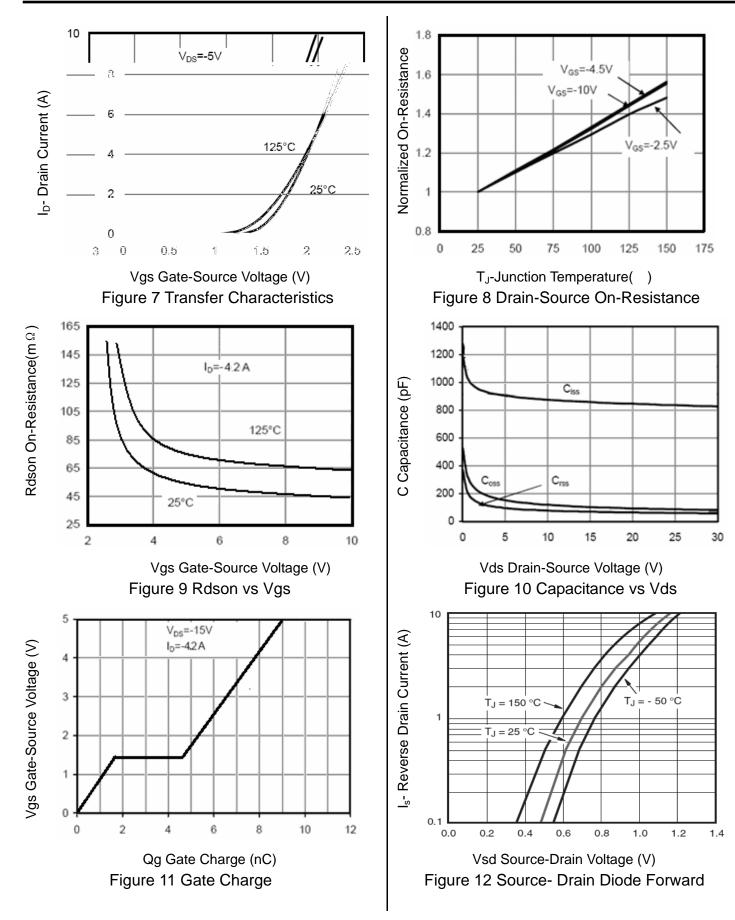
3. Pulse Test: Pulse Width \leq 300µs, Duty Cycle \leq 2%.

4. Guaranteed by design, not subject to production

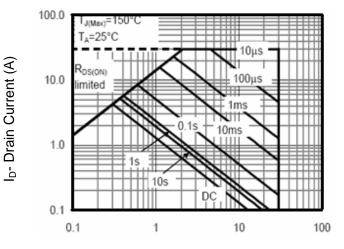


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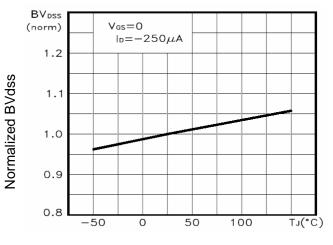




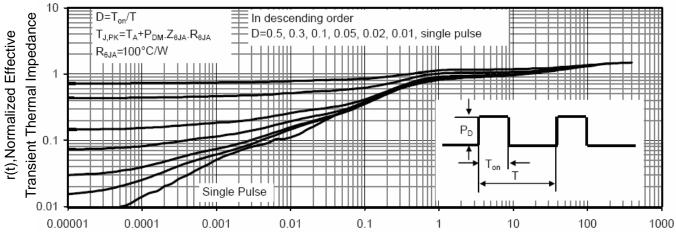


Vds Drain-Source Voltage (V)





T_J-Junction Temperature() Figure 14BV_{DSS} vs Junction Temperature

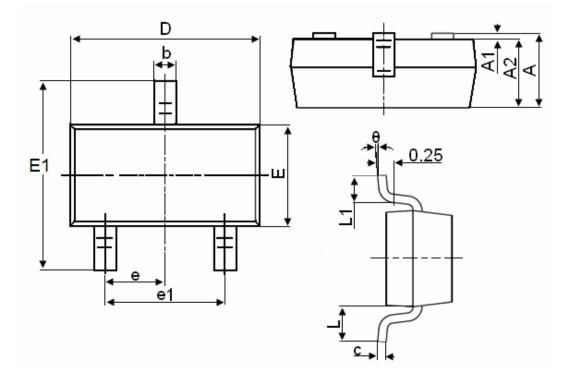


Square Wave Pluse Duration(sec)

Figure 15Normalized Maximum Transient Thermal Impedance



SOT-23 Package Information



| Symbol | | Dimensions in Millimeters | | |
|--------|-------|---------------------------|--|--|
| Symbol | MIN. | MAX. | | |
| A | 0.900 | 1.150 | | |
| A1 | 0.000 | 0.100 | | |
| A2 | 0.900 | 1.050 | | |
| b | 0.300 | 0.500 | | |
| с | 0.080 | 0.150 | | |
| D | 2.800 | 3.000 | | |
| E | 1.200 | 1.400 | | |
| E1 | 2.250 | 2.550 | | |
| е | | 0.950TYP | | |
| e1 | 1.800 | 2.000 | | |
| L | | 0.550REF | | |
| L1 | 0.300 | 0.500 | | |
| θ | 0° | 8° | | |

Notes

- 1. All dimensions are in millimeters.
- 2. Tolerance ±0.10mm (4 mil) unless otherwise specified
- 3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
- 4. Dimension L is measured in gauge plane.
- 5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.



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