



UDN302

Power MOSFET

P-CHANNEL 2.5V SPECIFIED POWER TRENCH MOSFET

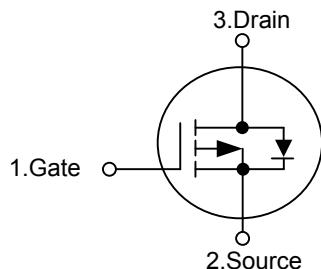
■ DESCRIPTION

The **UDN302** 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 or in PWM applications.

■ FEATURES

- * $R_{DS(ON)} \leq 55m\Omega$ @ $V_{GS}=-4.5V$, $I_D=-2.4A$
- * $R_{DS(ON)} \leq 80m\Omega$ @ $V_{GS}=-2.5V$, $I_D=-2A$
- * Low capacitance
- * Low gate charge
- * Fast switching capability
- * Avalanche energy specified

■ SYMBOL



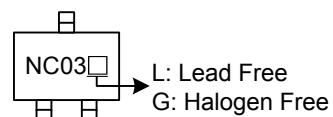
■ ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | Packing |
|-----------------|---------------|---------|----------------|---|---|-----------|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| UDN302L-AE3-R | UDN302G-AE3-R | SOT-23 | G | S | D | Tape Reel |

Note: Pin Assignment: G: Gate S: Source D: Drain

| | |
|-------------------|---|
| UDN302G-AE3-R | (1)Packing Type (2)AE3: SOT-23 (3)G: Halogen Free and Lead Free, L: Lead Free |
|-------------------|---|

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$, unless otherwise specified)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---------------------------|-----------|------------|------------------|
| Drain-Source Voltage | V_{DSS} | -20 | V |
| Gate-Source Voltage | V_{GSS} | ± 12 | V |
| Continuous Drain Current | I_D | -2.4 | A |
| Pulsed Drain Current | I_{DM} | -10 | A |
| Maximum Power Dissipation | P_D | 0.5 | W |
| Junction Temperature | T_J | +150 | $^\circ\text{C}$ |
| Storage Temperature | T_{STG} | -55 ~ +150 | $^\circ\text{C}$ |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL CHARACTERISTICS

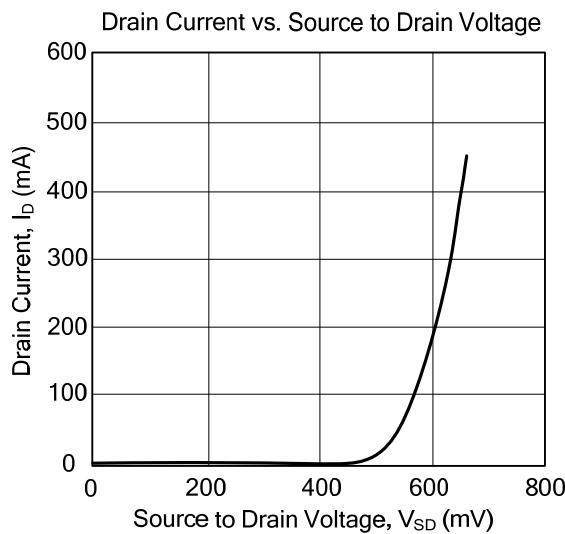
| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT |
|---------------------|---------------|-----|-----|-----|---------------------------|
| Junction-to-Ambient | θ_{JA} | | | 250 | $^\circ\text{C}/\text{W}$ |
| Junction-to-Case | θ_{JC} | | | 75 | $^\circ\text{C}/\text{W}$ |

■ ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise specified)

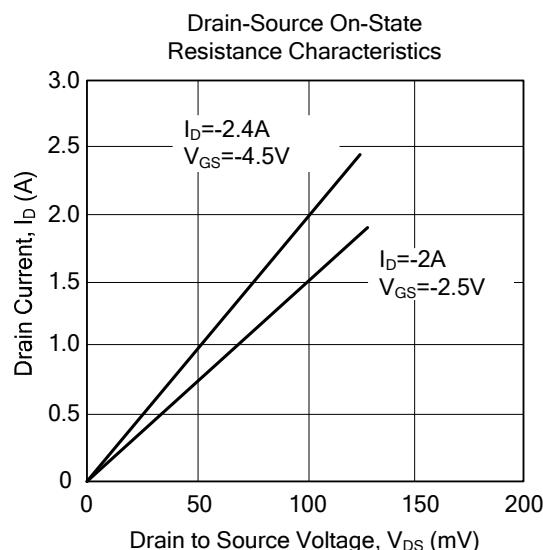
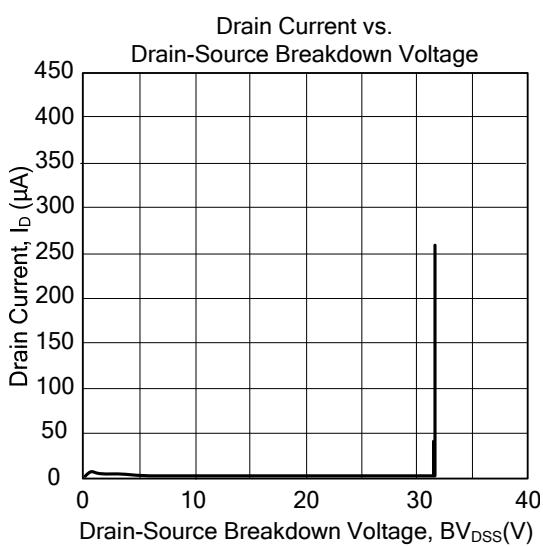
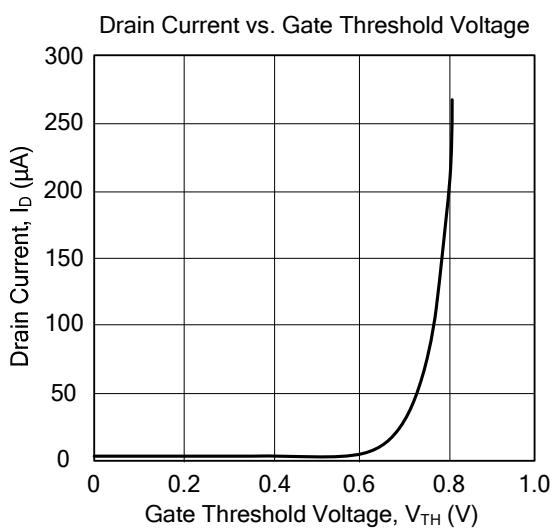
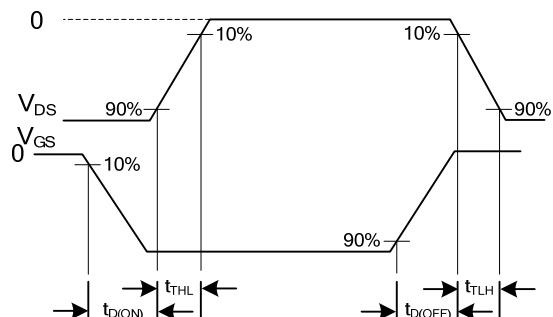
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---------------------------------------|--|------|------|-----------|----------------------------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0\text{V}, I_D=-250\mu\text{A}$ | -20 | | | V |
| Breakdown Voltage Temperature Coefficient | $\Delta BV_{DSS}/\Delta T_J$ | $I_D=-250\mu\text{A},$ Referenced to 25°C | | -12 | | $\text{mV}/^\circ\text{C}$ |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS}=-16\text{V}, V_{GS}=0\text{V}$ | | | -1 | μA |
| Gate-Source Leakage Current | I_{GSS} | $V_{GS}=\pm 12\text{V}, V_{DS}=0\text{V}$ | | | ± 100 | nA |
| ON CHARACTERISTICS (Note) | | | | | | |
| Gate Threshold Voltage | $V_{GS(\text{TH})}$ | $V_{DS}=V_{GS}, I_D=-250\mu\text{A}$ | -0.6 | -1.0 | -1.5 | V |
| Gate Threshold Voltage Temperature Coefficient | $\Delta V_{GS(\text{TH})}/\Delta T_J$ | $I_D=-250 \mu\text{A},$ Referenced to 25°C | | 3 | | $\text{mV}/^\circ\text{C}$ |
| Static Drain-Source On-Resistance | $R_{DS(\text{ON})}$ | $V_{GS}=-4.5\text{V}, I_D=-2.4\text{A}$ | | 44 | 55 | $\text{m}\Omega$ |
| | | $V_{GS}=-2.5\text{V}, I_D=-2\text{A}$ | | 64 | 80 | |
| On-State Drain Current | $I_{D(\text{ON})}$ | $V_{GS}=-4.5\text{V}, V_{DS}=-5\text{V}$ | -10 | | | A |
| Forward Transconductance | g_{FS} | $V_{DS}=-5\text{V}, I_D=-2.4\text{A}$ | | 10 | | S |
| DYNAMIC PARAMETERS | | | | | | |
| Input Capacitance | C_{ISS} | $V_{DS}=-10\text{V}, V_{GS}=0\text{V}, f=1.0\text{MHz}$ | | 882 | | pF |
| Output Capacitance | C_{OSS} | | | 211 | | pF |
| Reverse Transfer Capacitance | C_{RSS} | | | 112 | | pF |
| SWITCHING PARAMETERS (Note) | | | | | | |
| Total Gate Charge | Q_G | $V_{DS}=-10\text{V}, I_D=-2.4\text{A},$ $V_{GS}=-4.5\text{V}$ | | 9 | 14 | nC |
| Gate Source Charge | Q_{GS} | | | 2 | | nC |
| Gate Drain Charge | Q_{GD} | | | 3 | | nC |
| Turn-ON Delay Time | $t_{D(\text{ON})}$ | $V_{DD}=-10\text{V}, I_D=-1\text{A}, V_{GS}=-4.5\text{V}$ $R_G=6\Omega$ | | 13 | 23 | ns |
| Turn-ON Rise Time | t_R | | | 11 | 20 | ns |
| Turn-OFF Delay Time | $t_{D(\text{OFF})}$ | | | 25 | 40 | ns |
| Turn-OFF Fall-Time | t_F | | | 15 | 27 | ns |
| SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Diode Forward Voltage | V_{SD} | $V_{GS}=0\text{V}, I_S=-0.42\text{A}$ (Note) | | -0.7 | -1.2 | V |
| Maximum Body-Diode Continuous Current | I_S | | | | -0.42 | A |

Note: Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

■ TYPICAL CHARACTERISTICS



Switching Time Waveforms



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