

UNISONIC TECHNOLOGIES CO., LTD

4N80-KA Advance Power MOSFET

4.0A, 800V N-CHANNEL POWER MOSFET

DESCRIPTION

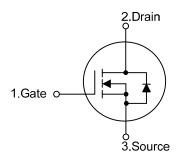
The UTC **4N80-KA** is a N-channel mode power MOSFET using UTC's advanced technology to provide costomers planar stripe and DMOS technology. This technology is specialized in allowing a minimum on-state resistance, and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **4N80-KA** is universally applied in high efficiency switch mode power supply.



- * $R_{DS(on)}$ < 3.00 @ V_{GS} =10V, I_{D} =2A
- * High switching speed
- * Improved dv/dt capability
- * 100% avalanche tested

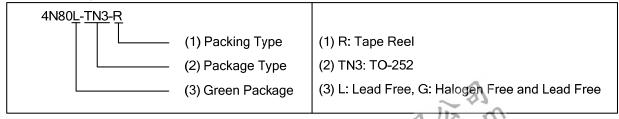




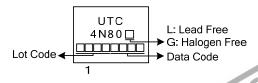
ORDERING INFORMATION

| Ordering Number | | Doolsons | Pin Assignment | | | Doolsing | |
|-----------------|--------------|----------|----------------|---|---|-----------|--|
| Lead Free | Halogen Free | Package | 1 | 2 | 3 | Packing | |
| 4N80L-TN3-R | 4N80G-TN3-R | TO-252 | G | D | S | Tape Reel | |

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



MARKING



1 TO-252

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■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|------------------------------------|------------------------|------------------|----------|------|
| Drain-Source Voltage | | V_{DSS} | 800 | V |
| Gate-Source Voltage | | V_{GSS} | ±30 | V |
| Drain Current | Continuous | I _D | 4.0 | Α |
| | Pulsed (Note 2) | I _{DM} | 16 | Α |
| Avalanche Energy | Single Pulsed (Note 3) | E _{AS} | 250 | mJ |
| Peak Diode Recovery dv/dt (Note 4) | | dv/dt | 4.0 | V/ns |
| Power Dissipation | | P_{D} | 50 | W |
| Junction Temperature | | T_J | +150 | °C |
| Storage Temperature | | T _{STG} | -55~+150 | °C |

Notes: 1. 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.

- 2. Repetitive Rating: Pulse width limited by maximum junction temperature
- 3. L=31.25mH, I_{AS} =4A, V_{DD} = 50V, R_{G} =25 Ω , Starting T_{J} =25 $^{\circ}$ C
- 4. I_{SD} ≤4A, di/dt ≤200A/µs, V_{DD} ≤BV_{DSS}, Starting T_J=25°C

■ THERMAL RESISTANCES CHARACTERISTICS

| PARAMETER | SYMBOL | RATINGS | S UNIT | |
|---------------------|---------------|---------|--------|--|
| Junction to Ambient | θ_{JA} | 110 | °C/W | |
| Junction to Case | θ_{JC} | 2.5 | °C/W | |

■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise specified)

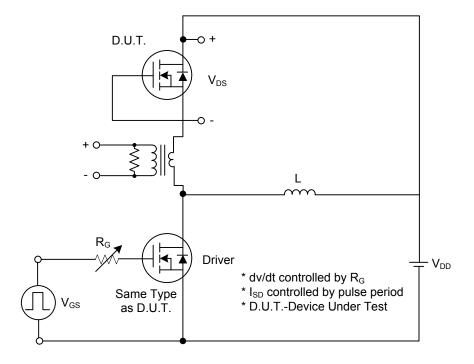
| PARAMETER | | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|----------------------------------|--------------------------------|---|-----|------|------|-------|
| OFF CHARACTERISTICS | | | | | | | |
| Drain-Source Breakdown Voltage | | BV _{DSS} | V_{GS} =0 V , I_D =250 μ A | 800 | | | V |
| Breakdown Voltage Temperature Coefficient | | $\Delta BV_{DSS}/\Delta T_{J}$ | I _D =250μA,Referenced to 25°C | | 950 | | mV/°C |
| Drain-Source Leakage Current | | I _{DSS} | V _{DS} =800V, V _{GS} =0V | | | 10 | μΑ |
| | | | V _{DS} =640V, T _C =125°C | | | 100 | μA |
| Gate-Source Leakage Current | Forward | I _{GSS} | V_{DS} =0V , V_{GS} =30V | | | 100 | nΑ |
| | Reverse | | V _{DS} =0V ,V _{GS} =-30V | | | -100 | nA |
| ON CHARACTERISTICS | | | | | | | |
| Gate Threshold Voltage | | $V_{GS(TH)}$ | $V_{DS}=V_{GS}$, $I_D=250\mu A$ | 3.0 | | 5.0 | V |
| Drain-Source On-State Resistan | Drain-Source On-State Resistance | | V _{GS} =10V, I _D =2A | | 2.58 | 3.0 | Ω |
| Drain-Source On-State Resistance $R_{DS(ON)}$ V_{GS} =10V, I_D =2A 2.58 3.0 Ω DYNAMIC PARAMETERS | | | | | | | |
| Input Capacitance | nput Capacitance | | V _{DS} =25V,V _{GS} =0V,f=1.0MHz | | 570 | 880 | pF |
| Output Capacitance | | Coss | | | 65 | 100 | pF |
| Reverse Transfer Capacitance | | C _{RSS} | | | 9.5 | 12 | pF |
| SWITCHING PARAMETERS | | | | | | | |
| Total Gate Charge | | Q_G | V _{DS} =640V, V _{GS} =10V, | | 24 | 35 | nC |
| Gate-Source Charge | | Q_GS | I _D =4A (Note 1,2) | | 7.3 | | nC |
| Gate-Drain Charge | | Q_GD | 1D-4A (Note 1,2) | | 7.25 | | nC |
| Turn-ON Delay Time | N Delay Time | | | | 50 | 60 | ns |
| Turn-ON Rise Time | | t_R | V_{DD} =400V, I_{D} =4A, R_{G} =25Ω (Note 1,2) | | 110 | 130 | ns |
| Turn-OFF Delay Time | | t _{D(OFF)} | | | 95 | 110 | ns |
| Turn-OFF Fall Time | | t_{F} | | | 70 | 90 | ns |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | | |
| Maximum Body-Diode Continuo | us Current | Is | K BY CC |), | | 4 | Α |
| Maximum Body-Diode Pulsed Current | | I _{SM} | 18 680. | | | 16 | Α |
| Drain-Source Diode Forward Voltage | | V_{SD} | I_S =4A, V_{GS} =0V | | | 1.4 | V |
| Body Diode Reverse Recovery Time | | t _{rr} | V _{GS} =0V, I _S =4A, | | 575 | | ns |
| Body Diode Reverse Recovery Charge | | Q_{RR} | dl _F /dt=100A/μs (Note 1) | | 3.65 | | μC |

Notes: 1. Pulse Test: Pulse width ≤ 300µs, Duty cycle ≤ 2%.

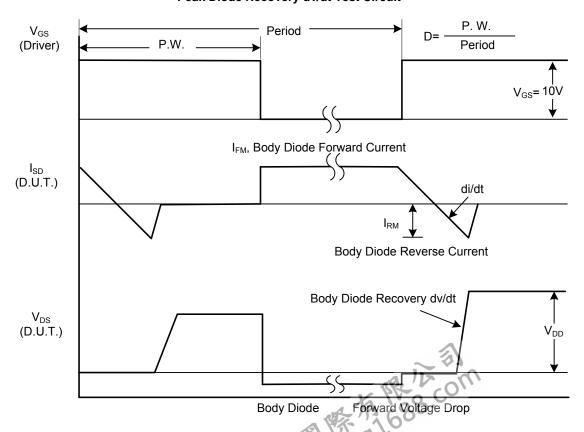
2. Essentially independent of operating temperature.



■ TEST CIRCUITS AND WAVEFORMS

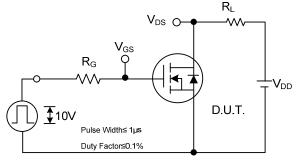


Peak Diode Recovery dv/dt Test Circuit

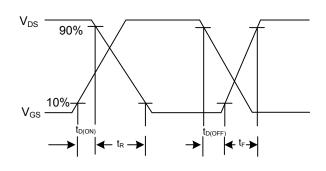


Peak Diode Recovery dv/dt Waveforms

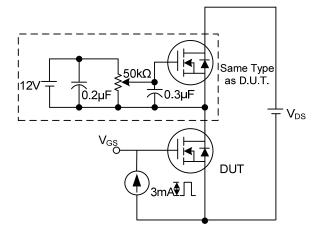
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



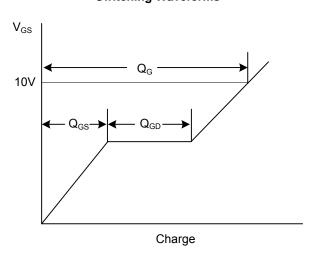
Switching Test Circuit



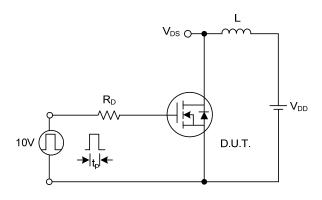
Switching Waveforms



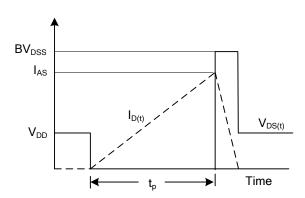
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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