



1NNPP10

Power MOSFET

100V COMPLEMENTARY ENHANCEMENT MODE MOSFET H-BRIDGE (N-CHANNEL/P-CHANNEL)

DESCRIPTION

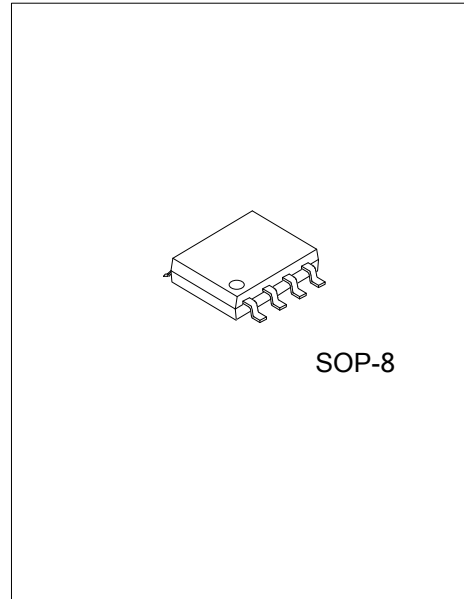
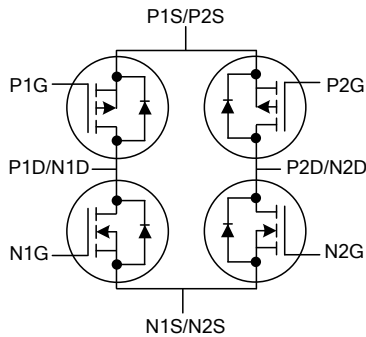
The UTC **1NNPP10** is a complementary enhancement mode MOSFET H-BRIDGE, it uses UTC advanced technology to provide customers low on resistance, low gate charge and low threshold voltage.

The UTC **1NNPP10** is universally applied in DC-AC Inverters and DC Motor control.

FEATURES

- * N-CHANNEL
 - I_D : 1A / V_{DSS} : 100V
- * P-CHANNEL
 - I_D : -0.9A / V_{DSS} : -100V
- * High switching speed

SYMBOL



ORDERING INFORMATION

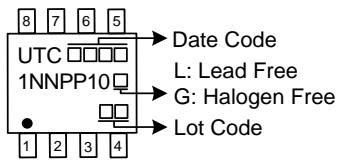
| Ordering Number | | Package | Packing |
|-----------------|----------------|---------|-----------|
| Lead Free | Halogen Free | | |
| 1NNPP10L-S08-R | 1NNPP10G-S08-R | SOP-8 | Tape Reel |

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1NNPP10G-S08-R</p> <ul style="list-style-type: none"> (1) Packing Type (2) Package Type (3) Green Package | <ul style="list-style-type: none"> (1) R: Tape Reel (2) S08: SOP-8 (3) G: Halogen Free and Lead Free, , L: Lead Free |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|

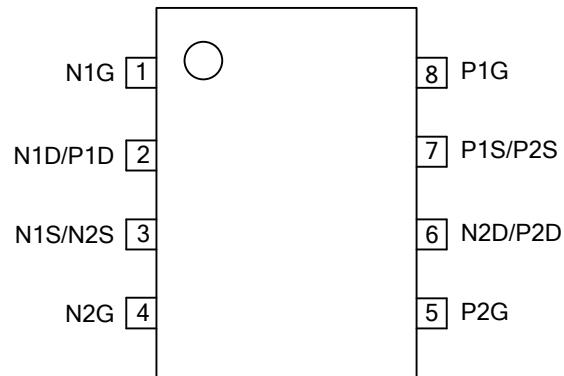
1NNPP10

Power MOSFET

MARKING



PIN CONFIGURATION



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

| PARAMETER | | | SYMBOL | RATINGS | | UNIT |
|---------------------------|------------|-------------------------------------------------------|------------------|------------|-----------|-------|
| | | | | N-CHANNEL | P-CHANNEL | |
| Gate-Source Voltage | | | V _{GSS} | ±20 | ±20 | V |
| Drain-Source Voltage | | | V _{DSS} | 100 | -100 | V |
| Drain Current | Continuous | V _{GS} =10V, T _A =25°C, t ≤10 sec | I _D | 1 | -0.9 | A |
| | Pulsed | V _{GS} =10V, T _A =25°C (Note1) | I _{DM} | 4.3 | -3.64 | A |
| Power Dissipation | | | P _D | 0.87 | | W |
| | | | | 6.94 | | mW/°C |
| Junction Temperature | | | T _J | -55 ~ +150 | | °C |
| Storage Temperature Range | | | T _{STG} | -55 ~ +150 | | °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 | RATINGS | UNIT |
|---------------------|-----------------|---------|------|
| Junction to Ambient | θ _{JA} | 144 | °C/W |

Note: Pulse width ≤ 300µs; duty cycle ≤ 2%. The pulse current is limited by the maximum junction temperature.

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

N-CHANNEL

| PARAMETER | | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------------------------------------|---------|---------------------|---------------------------------------------------------------------------------------|-----|------|------|------|
| OFF CHARACTERISTICS | | | | | | | |
| Drain-Source Breakdown Voltage | | BV _{DSS} | I _D =250µA, V _{GS} =0V | 100 | | | V |
| Drain-Source Leakage Current | | I _{DSS} | V _{DS} =100V, V _{GS} =0V | | | 0.5 | µA |
| Gate-Source Leakage Current | Forward | I _{GSS} | V _{GS} =+20V, V _{DS} =0V | | | +100 | nA |
| | Reverse | | V _{GS} =-20V, V _{DS} =0V | | | -100 | nA |
| ON CHARACTERISTICS | | | | | | | |
| Gate Threshold Voltage | | V _{GS(TH)} | V _{DS} =V _{GS} , I _D =250µA | 1.0 | | 3.0 | V |
| Static Drain-Source On-State Resistance (Note 1) | | R _{DS(ON)} | V _{GS} =10V, I _D =1.5A | | | 0.7 | Ω |
| | | | V _{GS} =6V, I _D =1.0A | | | 0.9 | Ω |
| DYNAMIC PARAMETERS | | | | | | | |
| Input Capacitance (Note 3) | | C _{ISS} | V _{GS} =0V, V _{DS} =25V, f=1.0MHz | | 225 | | pF |
| Output Capacitance (Note 3) | | C _{OSS} | | | 30 | | pF |
| Reverse Transfer Capacitance (Note 3) | | C _{RSS} | | | 17 | | pF |
| SWITCHING PARAMETERS | | | | | | | |
| Total Gate Charge (Note 3) | | Q _G | V _{GS} =10V, V _{DS} =50V, I _D =1A | | 20 | | nC |
| Gate to Source Charge (Note 3) | | Q _{GS} | | | 2 | | nC |
| Gate to Drain Charge (Note 3) | | Q _{GD} | | | 3 | | nC |
| Turn-ON Delay Time (Note 2, 3) | | t _{D(ON)} | V _{DD} =30V, I _D =1A, R _G ≈6Ω, V _{GS} =10V | | 25.6 | | ns |
| Rise Time (Note 2, 3) | | t _R | | | 15 | | ns |
| Turn-OFF Delay Time (Note 2, 3) | | t _{D(OFF)} | | | 55 | | ns |
| Fall-Time (Note 2, 3) | | t _F | | | 13.6 | | ns |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | | |
| Maximum Body-Diode Continuous Current | | I _S | T _A =25°C (Note 2) | | | 1 | A |
| Maximum Body-Diode Pulsed Current | | I _{SM} | T _A =25°C (Note 3) | | | 4.3 | A |
| Drain-Source Diode Forward Voltage (Note 1) | | V _{SD} | I _S =1.5A, V _{GS} =0V | | 0.88 | 1.00 | V |

■ ELECTRICAL CHARACTERISTICS(CONT.)

P-CHANNEL

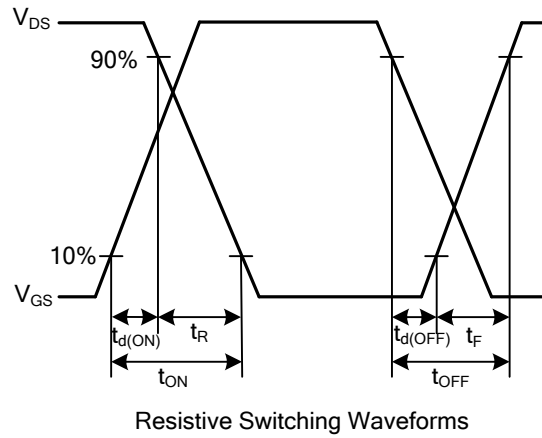
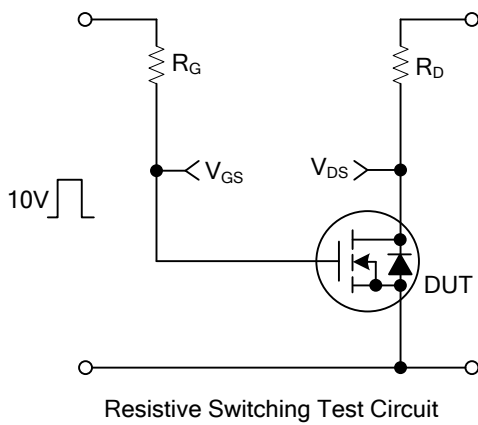
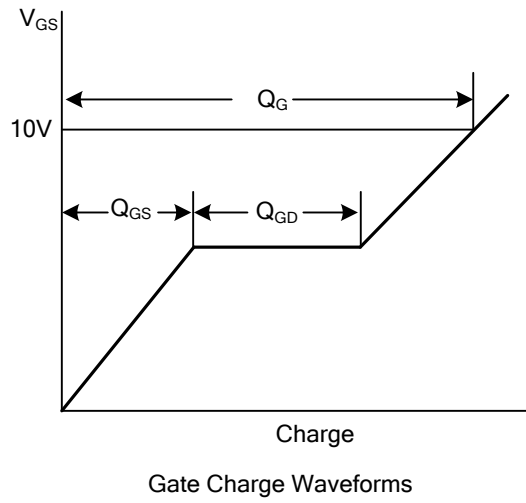
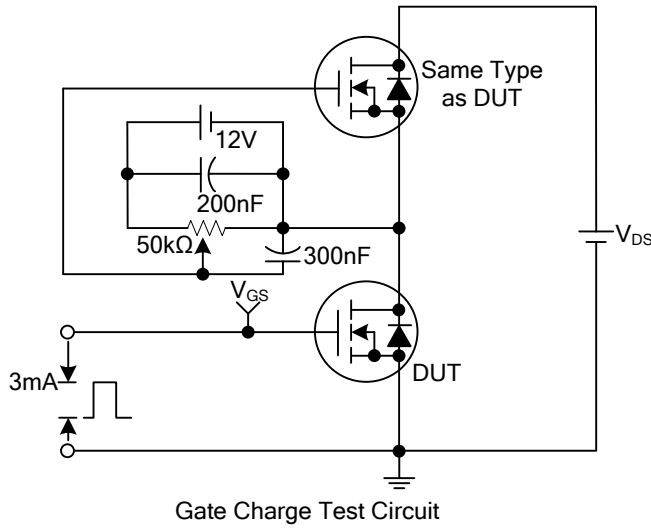
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------------------------------------|--------------|--------------------------------------------------------------|------|-------|-------|----------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $I_D=-250\mu A, V_{GS}=0V$ | -100 | | | V |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS}=-100V, V_{GS}=0V$ | | | -0.5 | μA |
| Gate-Source Leakage Current | Forward | $V_{GS}=+20V, V_{DS}=0V$ | | | +100 | nA |
| | Reverse | $V_{GS}=-20V, V_{DS}=0V$ | | | -100 | nA |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -1.0 | | -3.0 | V |
| Static Drain-Source On-State Resistance(Note 1) | $R_{DS(ON)}$ | $V_{GS}=-10V, I_D=-1.0A$ | | | 1 | Ω |
| | | $V_{GS}=-6V, I_D=-0.5A$ | | | 1.45 | Ω |
| DYNAMIC PARAMETERS | | | | | | |
| Input Capacitance (Note 3) | C_{ISS} | $V_{GS}=0V, V_{DS}=-25V,$ $f=1.0MHz$ | | 370 | | pF |
| Output Capacitance (Note 3) | C_{OSS} | | | 32 | | pF |
| Reverse Transfer Capacitance (Note 3) | C_{RSS} | | | 20 | | pF |
| SWITCHING PARAMETERS | | | | | | |
| Total Gate Charge (Note 3) | Q_G | $V_{GS}=-10V, V_{DS}=-50V,$ $I_D=-0.6A$ | | 24 | | nC |
| Gate to Source Charge (Note 3) | Q_{GS} | | | 1.5 | | nC |
| Gate to Drain Charge (Note 3) | Q_{GD} | | | 1.8 | | nC |
| Turn-ON Delay Time (Note 2, 3) | $t_{D(ON)}$ | $V_{DD}=-30V, I_D=-1A, R_G\approx 6\Omega,$ $V_{GS}=-10V$ | | 30 | | ns |
| Rise Time (Note 2, 3) | t_R | | | 21 | | ns |
| Turn-OFF Delay Time (Note 2, 3) | $t_{D(OFF)}$ | | | 150 | | ns |
| Fall-Time (Note 2, 3) | t_F | | | 48 | | ns |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Maximum Body-Diode Continuous Current | I_S | $T_A=25^\circ C$ (Note 2) | | | -0.90 | A |
| Maximum Body-Diode Pulsed Current | I_{SM} | $T_A=25^\circ C$ (Note 3) | | | -3.64 | A |
| Drain-Source Diode Forward Voltage (Note 1) | V_{SD} | $I_S=-1A, V_{GS}=0V$ | | -0.88 | -1.00 | V |

Notes: 1. Measured under pulsed conditions. Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

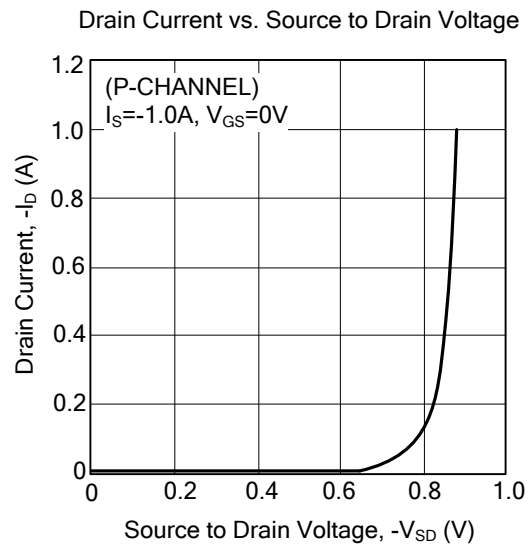
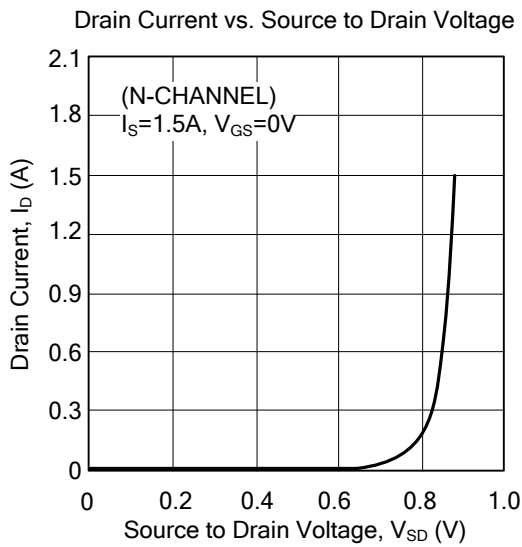
2. Switching characteristics are independent of operating junction temperature.

3. For design aid only, not subject to production testing

■ TEST CIRCUITS AND WAVEFORMS



■ TYPICAL CHARACTERISTICS



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