



1NNPP10

Power MOSFET

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

DESCRIPTION

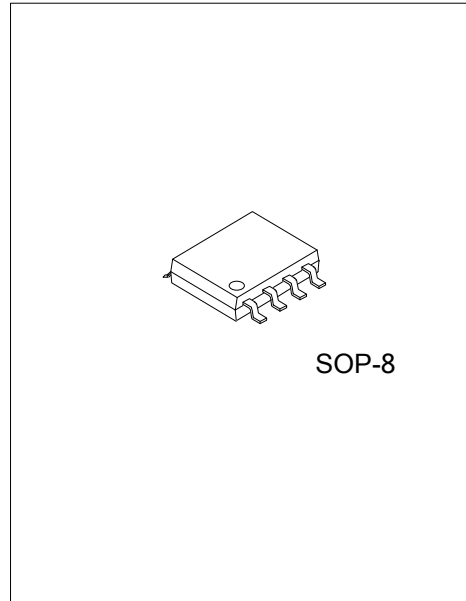
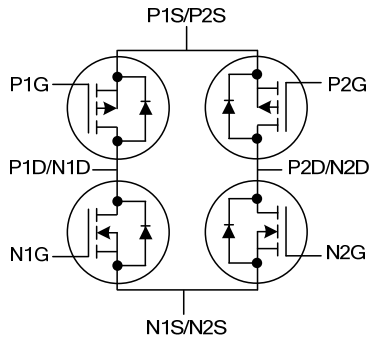
The UTC **1NNPP10** is a complementary enhancement mode MOSFET H-BRIDGE, it uses UTC advanced technology to provide customers low on resistance, low gate charge and low threshold voltage.

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

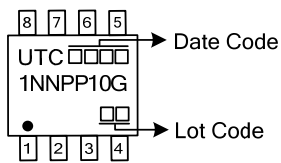
Ordering Number	Package	Packing
1NNPP10G-S08-R	SOP-8	Tape Reel

<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
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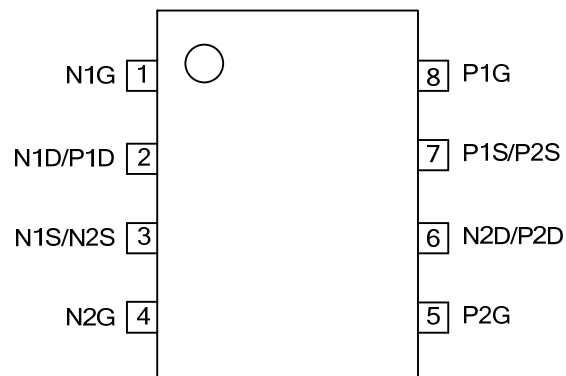
1NNPP10

Power MOSFET

MARKING



PIN CONFIGURATION



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

PARAMETER			SYMBOL	RATINGS		UNIT
				N-CHANNEL	P-CHANNEL	
Gate-Source Voltage			V_{GS}	± 20	± 20	V
Drain-Source Voltage			V_{DS}	100	-100	V
Drain Current	Continuous	$V_{GS}=10\text{V}, T_A=25^\circ\text{C}, t \leq 10 \text{ sec}$	I_D	1	-0.9	A
	Pulsed	$V_{GS}=10\text{V}, T_A=25^\circ\text{C}$ (Note1)	I_{DM}	4.3	-3.64	A
Power Dissipation			P_D	$T_A=25^\circ\text{C}$		0.87
				Derating		6.94
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 $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$. The pulse current is limited by the maximum junction temperature.

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

N-CHANNEL

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	100			V
Drain-Source Leakage Current		I_{DSS}	$V_{DS}=100\text{V}, V_{GS}=0\text{V}$			0.5	μA
Gate-Source Leakage Current	Forward	I_{GSS}	$V_{GS}=+20\text{V}, V_{DS}=0\text{V}$			+100	nA
	Reverse		$V_{GS}=-20\text{V}, V_{DS}=0\text{V}$			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	2		4	V
Static Drain-Source On-State Resistance(Note 1)		$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=1.5\text{A}$			0.7	Ω
			$V_{GS}=6\text{V}, I_D=1\text{A}$			0.9	Ω
DYNAMIC PARAMETERS							
Input Capacitance (Note 3)		C_{ISS}	$V_{GS}=0\text{V}, V_{DS}=25\text{V}, f=1.0\text{MHz}$		225		pF
Output Capacitance (Note 3)		C_{OSS}			30		pF
Reverse Transfer Capacitance (Note 3)		C_{RSS}			17		pF
SWITCHING PARAMETERS							
Turn-ON Delay Time (Note 2, 3)		$t_{D(ON)}$	$V_{DD}=30\text{V}, I_D=1\text{A}, R_G \approx 6\Omega, V_{GS}=10\text{V}$		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
Total Gate Charge (Note 3)		Q_G	$V_{GS}=10\text{V}, V_{DS}=50\text{V}, I_D=1\text{A}$		20		nC
Gate to Source Charge (Note 3)		Q_{GS}			2		nC
Gate to Drain Charge (Note 3)		Q_{GD}			3		nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S	$T_A=25^\circ\text{C}$ (Note 2)			1	A
Maximum Body-Diode Pulsed Current		I_{SM}	$T_A=25^\circ\text{C}$ (Note 3)			4.3	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	$I_S=1.5\text{A}, V_{GS}=0\text{V}$		0.88	1.00	V

■ ELECTRICAL CHARACTERISTICS(CONT.)

P-CHANNEL

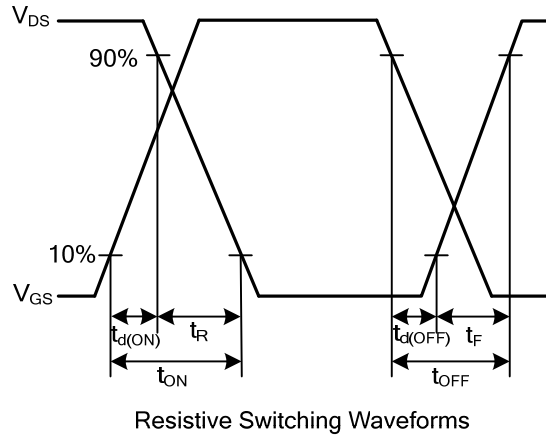
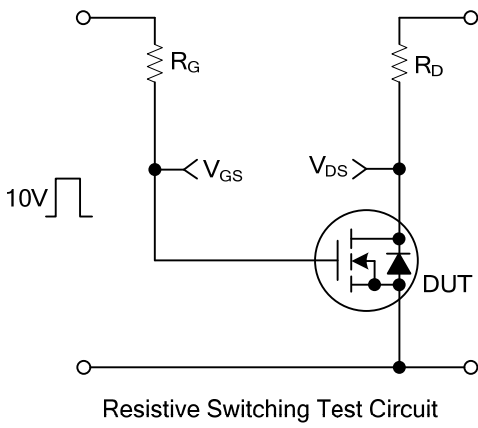
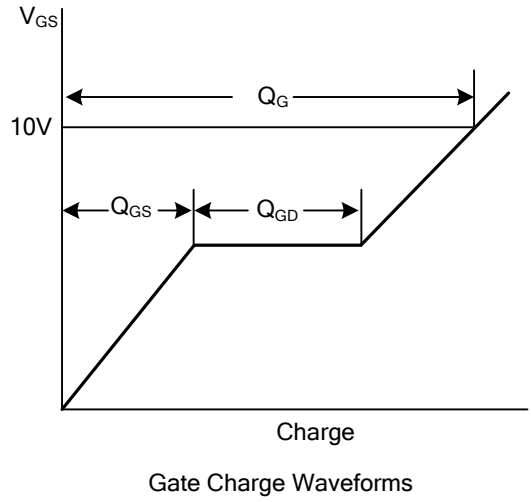
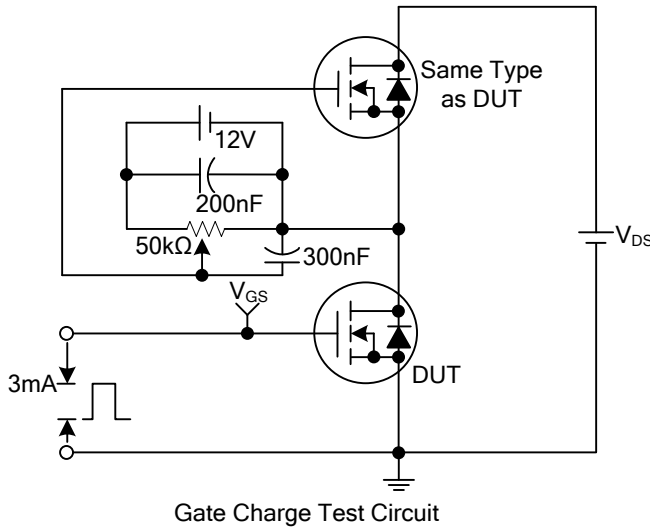
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=-250\mu A, V_{GS}=0V$	-100			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-100V, V_{GS}=0V$			-0.5	μA
Gate-Source Leakage Current	Forward	$V_{GS}=+20V, V_{DS}=0V$			+100	nA
	Reverse	$V_{GS}=-20V, V_{DS}=0V$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.5		-3.5	V
Static Drain-Source On-State Resistance(Note 1)	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-1A$			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						
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
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
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 $\leq 2\%$.

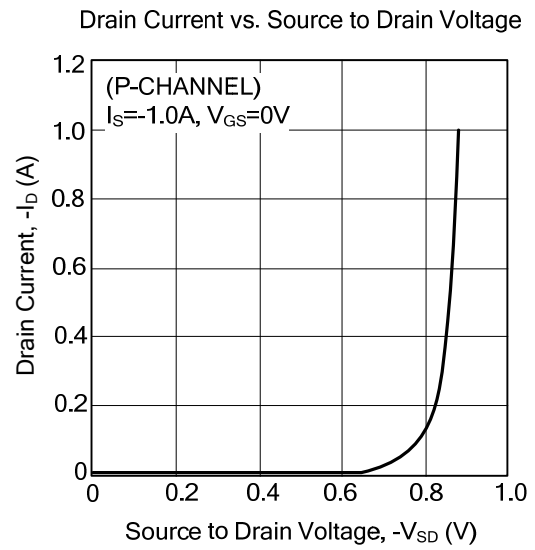
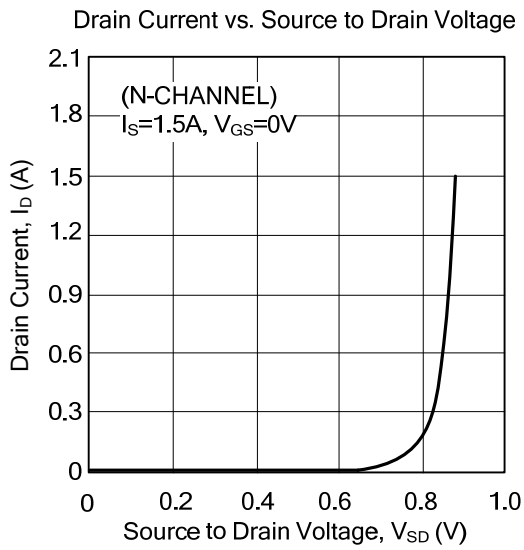
2. Switching characteristics are independent of operating junction temperature.

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

■ TEST CIRCUITS AND WAVEFORMS



TYPICAL CHARACTERISTICS



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