



DUAL ENHANCEMENT MODE (N-CHANNEL/P-CHANNEL)

DESCRIPTION

The UTC **UTT6NP10H** incorporates an N-channel MOSFET and a P-channel MOSFET, it uses UTC's advanced technology to provide customers a minimum on-state resistance and high-speed switching, thereby enabling high-density mounting.

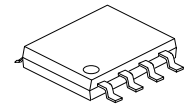
The UTC **UTT6NP10H** is universally applied in high-speed switching, motor driver.

FEATURES

* $R_{DS(on)} \leq 150 \text{ m}\Omega$ @ $V_{GS} = 10\text{V}$, $I_D = 3.0\text{A}$

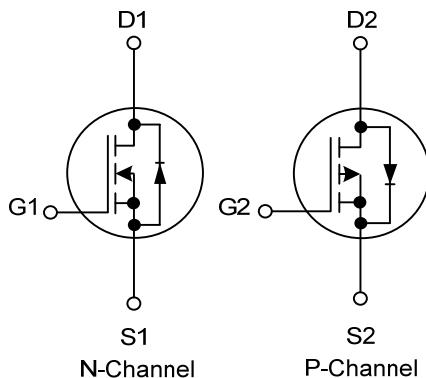
$R_{DS(on)} \leq 195 \text{ m}\Omega$ @ $V_{GS} = -10\text{V}$, $I_D = -3.0\text{A}$

* High switching speed



SOP-8

SYMBOL



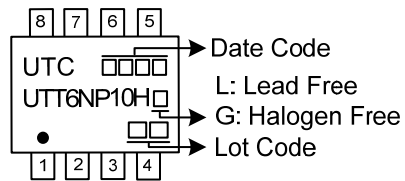
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT6NP10HL- S08-R	UTT6NP10HG- S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

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

UTT6NP10HG- S08-R		(1)Packing Type	(1) R: Tape Reel
		(2)Package Type	(2) S08: SOP-8
		(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS		UNIT
			N-CHANNEL	P-CHANNEL	
Drain-Source Voltage		V_{DSS}	100	-100	V
Gate-Source Voltage		V_{GSS}	± 20	± 20	V
Drain Current	Continuous	I_D	6	-6	A
	Pulsed	I_{DM}	12	-12	A
Avalanche Energy, Single Pulse(Note 3)		E_{AS}	5.5	34	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.9	6.9	V/ns
Power Dissipation($T_C=25^{\circ}\text{C}$)		P_D	2.1		W
Junction Temperature		T_J	+150		$^{\circ}\text{C}$
Storage Temperature Range		T_{STG}	-55 ~ +150		$^{\circ}\text{C}$

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. N-Channel: $L = 0.1\text{mH}$, $I_{AS} = 10.5\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

P-Channel: $L = 0.1\text{mH}$, $I_{AS} = -26.1\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. N-Channel: $I_{SD} \leq 6.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$.

P-Channel: $I_{SD} \leq -6.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	125	$^{\circ}\text{C}/\text{W}$
Junction to Case	θ_{JC}	59.5	$^{\circ}\text{C}/\text{W}$

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

■ 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 =250μA, V _{GS} =0V	100			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =100V, V _{GS} =0V			1	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	2.0		4.0	V
Static Drain-Source On-State Resistance (Note 2)		R _{DS(ON)}	V _{GS} =10V, I _D =3.0A			150	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =-25V, f=1.0MHz		715		pF
Output Capacitance		C _{OSS}			52		pF
Reverse Transfer Capacitance		C _{RSS}			41		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 2)		Q _G	V _{DS} =80V, V _{GS} =10V, I _D =6A (Note 1, 2)		26		nC
Gate to Source Charge		Q _{GS}			4.8		nC
Gate to Drain Charge		Q _{GD}			9.7		nC
Turn-ON Delay Time (Note 2)		t _{D(ON)}	V _{DD} =50V, V _{GS} =10V, I _D =6A, R _G =3Ω (Note 1, 2)		8		ns
Rise Time		t _R			16		ns
Turn-OFF Delay Time		t _{D(OFF)}			18		ns
Fall-Time		t _F			18		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage(Note 2)		V _{SD}	I _S =6.0A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time		t _{rr}	I _F =6.0A, V _{GS} =0V,		55		ns
Body Diode Reverse Recovery Charge		Q _{rr}	di/dt=100A/uS		102		nC

■ ELECTRICAL CHARACTERISTICS (Cont.)

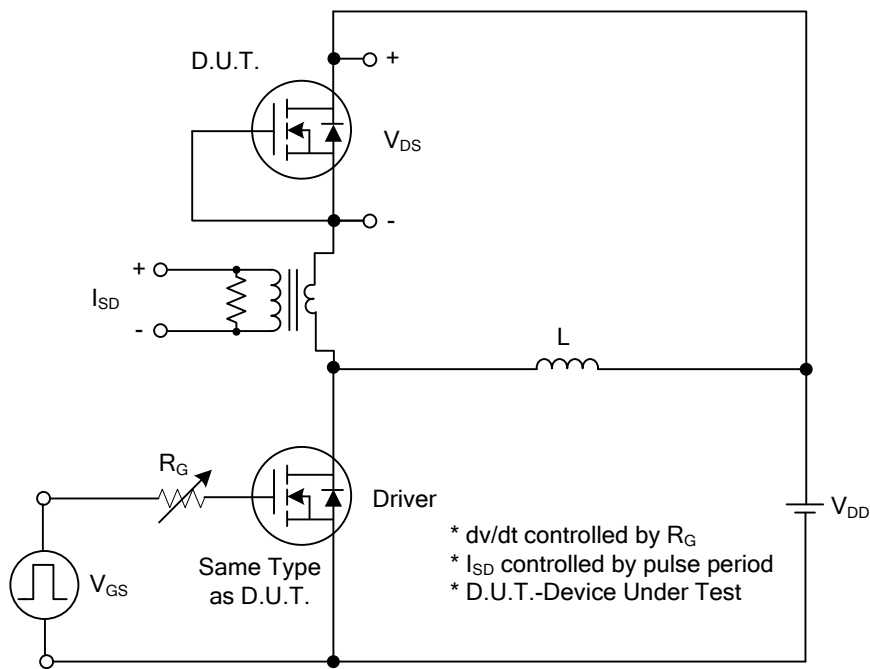
P-Channel

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			-1	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	-2.0		-4.0	V
Static Drain-Source On-State Resistance (Note 2)		R _{DS(ON)}	V _{GS} =-10V, I _D =-3.0A			195	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =-25V, f=1.0MHz		1315		pF
Output Capacitance		C _{OSS}			82		pF
Reverse Transfer Capacitance		C _{RSS}			60		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 2)		Q _G	V _{DS} =-80V, V _{GS} =-10V, I _D =-6A (Note 1, 2)		26		nC
Gate to Source Charge		Q _{GS}			6		nC
Gate to Drain Charge		Q _{GD}			9		nC
Turn-ON Delay Time (Note 2)		t _{D(ON)}	V _{DD} =-50V, V _{GS} =-10V, I _D =-6A, R _G =3Ω (Note 1, 2)		9		ns
Rise Time		t _R			16		ns
Turn-OFF Delay Time		t _{D(OFF)}			24		ns
Fall-Time		t _F			18		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage(Note 2)		V _{SD}	I _S =-6.0A, V _{GS} =0V			-1.4	V
Body Diode Reverse Recovery Time		t _{rr}	I _F =-6.0A,V _{GS} =0V,		60		ns
Body Diode Reverse Recovery Charge		Q _{rr}	di/dt=100A/uS		94		nC

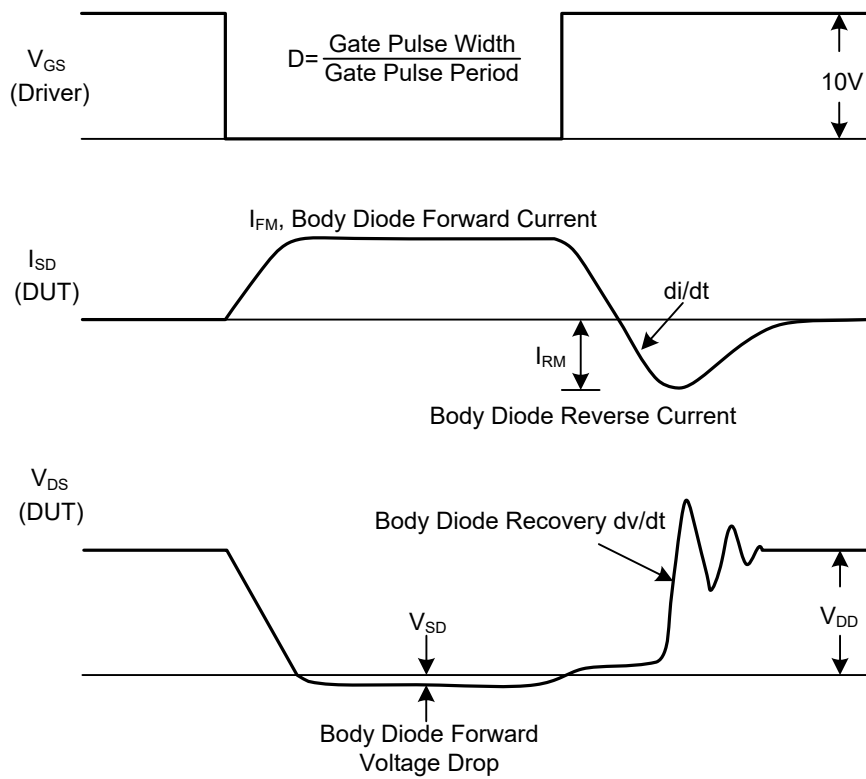
Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

2. N-CH, P-CH are same, mounted on 2oz FR4 board $t \leq 10s$.

■ TEST CIRCUITS AND WAVEFORMS



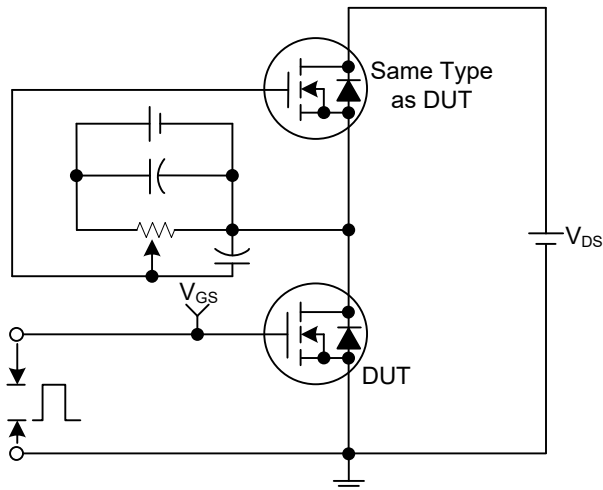
Peak Diode Recovery dv/dt Test Circuit



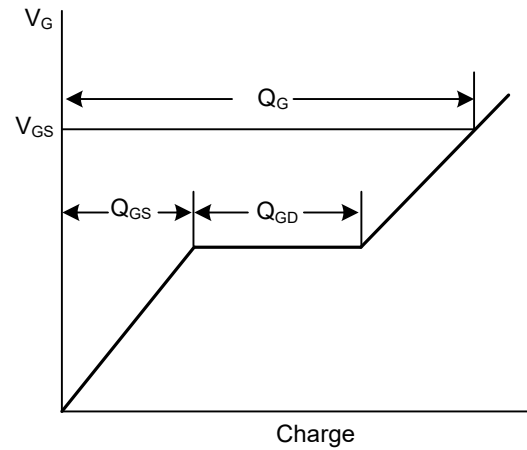
Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS

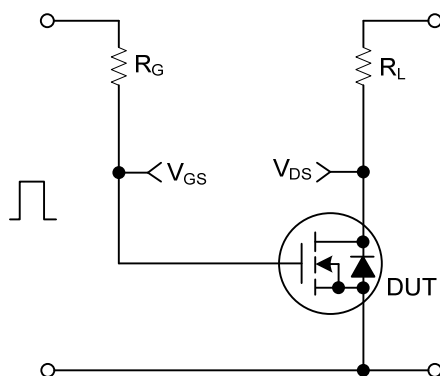
N-CHANNEL



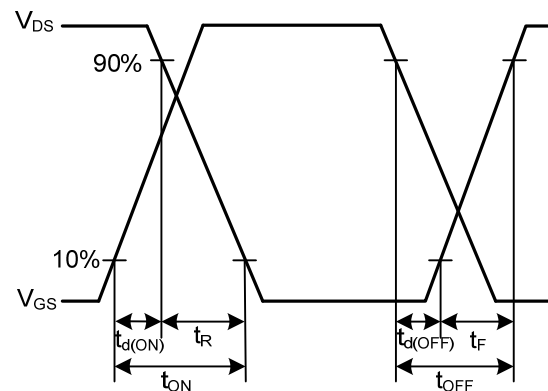
Gate Charge Test Circuit



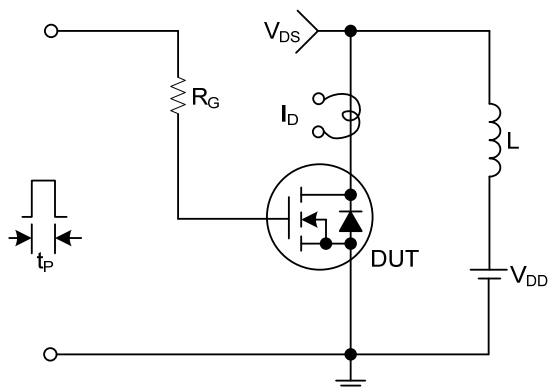
Gate Charge Waveforms



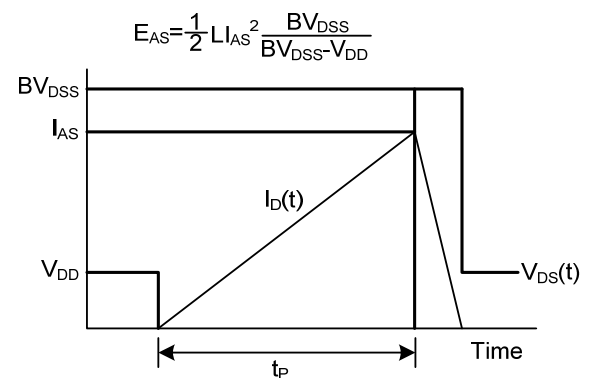
Resistive Switching Test Circuit



Resistive Switching Waveforms



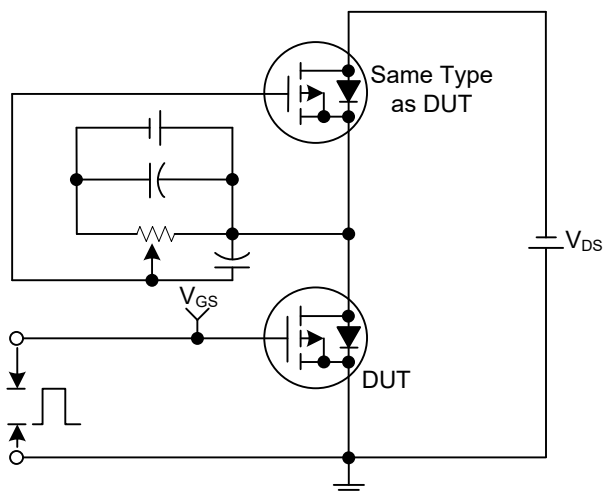
Unclamped Inductive Switching Test Circuit



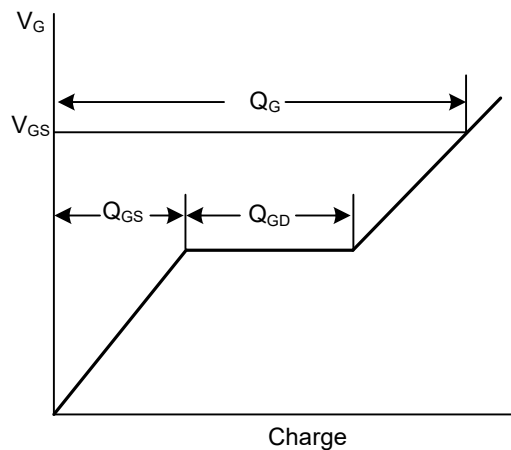
Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS

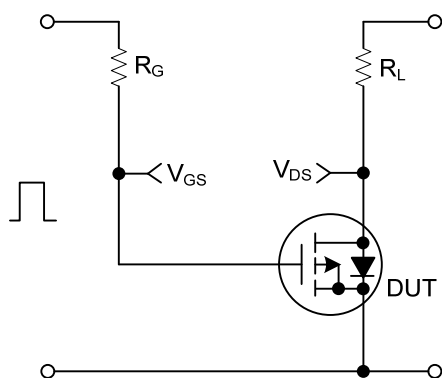
P-CHANNEL



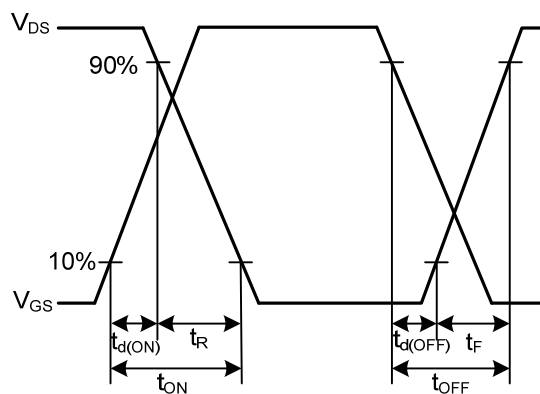
Gate Charge Test Circuit



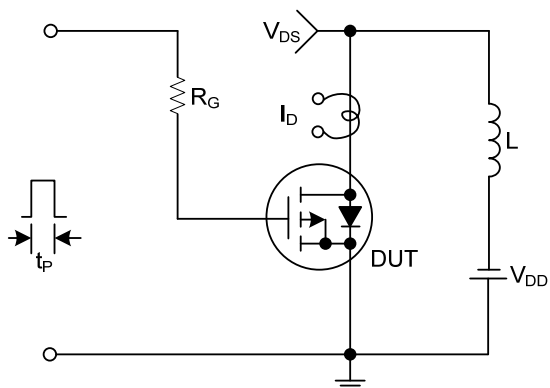
Gate Charge Waveforms



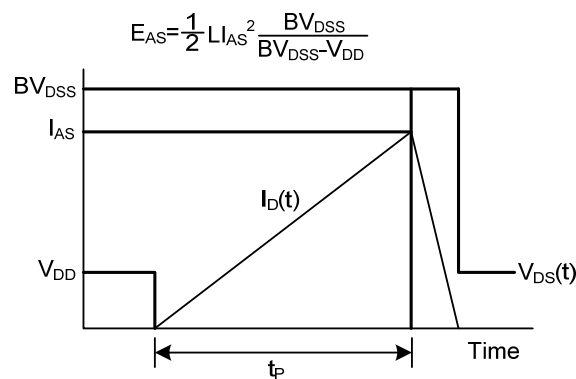
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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