



UTT10NP06

Power MOSFET

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

■ DESCRIPTION

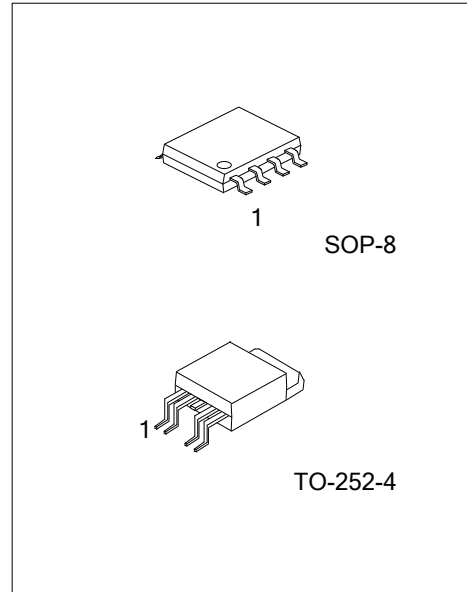
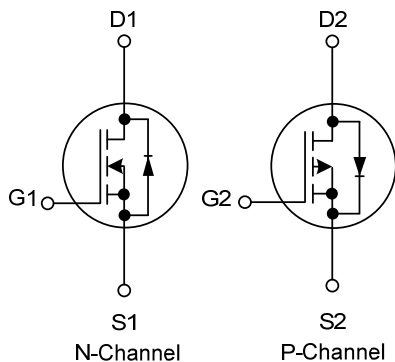
The UTC **UTT10NP06** incorporates an N-channel MOSFET and a P-channel MOSFET, it uses UTC's advanced technology to provide customers a minimum on-state resistance, high switching speed, low gate charge and cost effectiveness.

The UTC **UTT10NP06** is universally applied in low voltage applications.

■ FEATURES

- * $R_{DS(on)} < 56m\Omega @ V_{GS}=10V, I_D=4A$
- $R_{DS(on)} < 64m\Omega @ V_{GS}=4.5V, I_D=2A$
- * $R_{DS(on)} < 68m\Omega @ V_{GS}= -10V, I_D= -3A$
- $R_{DS(on)} < 88m\Omega @ V_{GS}= -4.5V, I_D= -2A$
- * High switching speed

■ SYMBOL



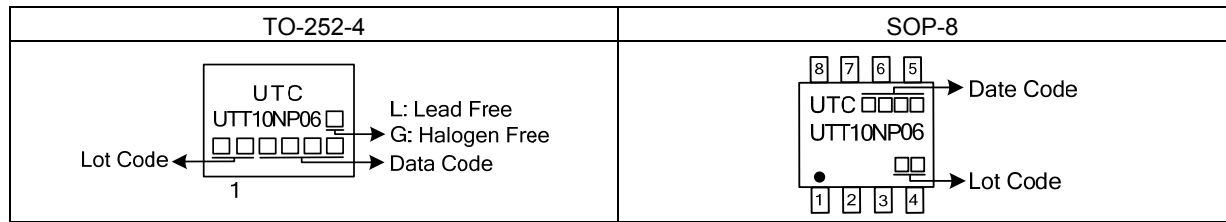
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT10NP06L-TN4-R	UTT10NP06G-TN4-R	TO-252-4	S1	G1	D1D2	S2	G2	-	-	-	Tape Reel
-	UTT10NP06G-S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

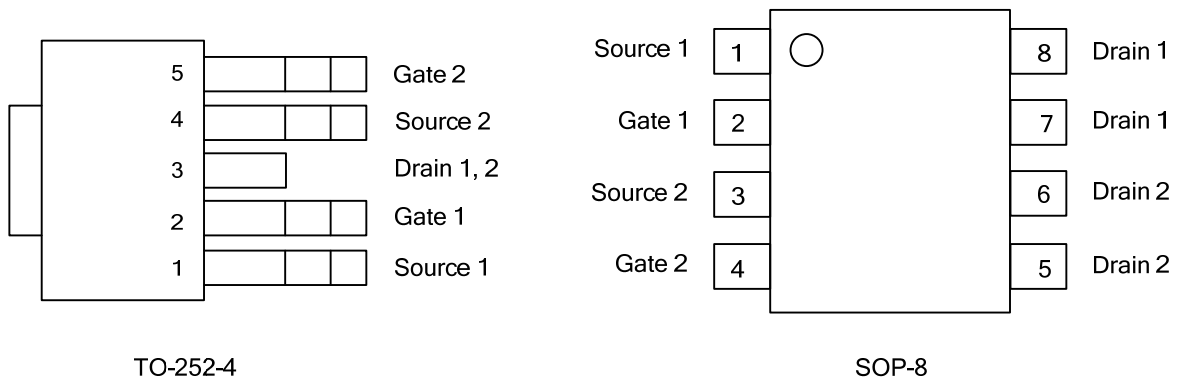
Note: Pin Assignment: G: Gate D: Drain S: Source

<p>UTT10NP06L-TN4-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) TN4: TO-252-4, S08: SOP-8 (3) L: Lead Free, G: Halogen Free and Lead Free
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■ MARKING



■ PIN CONFIGURATION



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS		UNIT
			N-CHANNEL	P-CHANNEL	
Drain-Source Voltage		V_{DSS}	60	-60	V
Gate-Source Voltage		V_{GSS}	± 20	± 20	V
Drain Current	Continuous $T_A=25^\circ\text{C}$	I_D	4.5	-3	A
	Pulsed (Note 1)	I_{DM}	20	-20	A
Power Dissipation	$T_A=25^\circ\text{C}$	P_D	2.0		W
Junction Temperature		T_J	-55~+150		$^\circ\text{C}$
Storage Temperature Range		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	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	$^\circ\text{C/W}$

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

N-Channel

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	60			V
Drain-Source Leakage Current		I_{DSS}	$V_{DS}=60\text{V}, V_{GS}=0\text{V}, T_J=25^\circ\text{C}$			1	μA
			$V_{DS}=48\text{V}, V_{GS}=0\text{V}, T_J=125^\circ\text{C}$			10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	$V_{GS}=+20\text{V}$			+100	nA
	Reverse		$V_{GS}=-20\text{V}$			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1		3	V
Static Drain-Source On-State Resistance (Note 2)		$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=4\text{A}$		36	56	m Ω
			$V_{GS}=4.5\text{V}, I_D=2\text{A}$		44	64	m Ω
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	$V_{GS}=0\text{V}, V_{DS}=25\text{V}, f=1.0\text{MHz}$		1100	1500	pF
Output Capacitance		C_{OSS}			80		pF
Reverse Transfer Capacitance		C_{RSS}			60		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 2)		Q_G	$V_{GS}=4.5\text{V}, V_{DS}=48\text{V}, I_D=4\text{A}$		120	150	nC
Gate to Source Charge		Q_{GS}			12		nC
Gate to Drain Charge		Q_{GD}			60		nC
Turn-ON Delay Time (Note 2)		$t_{D(ON)}$	$V_{DS}=30\text{V}, I_D=1\text{A}, R_G=3.3\Omega,$ $V_{GS}=10\text{V}, R_D=30\Omega$		33		ns
Rise Time		t_R			26		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			140		ns
Fall-Time		t_F			64		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage(Note 2)		V_{SD}	$I_S=1.7\text{A}, V_{GS}=0\text{V}$			1.2	V

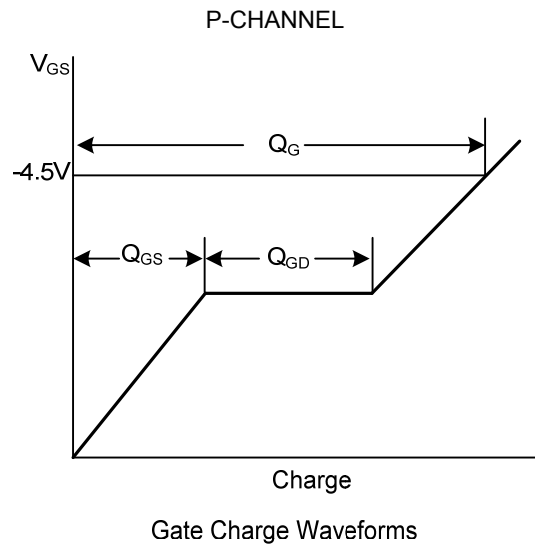
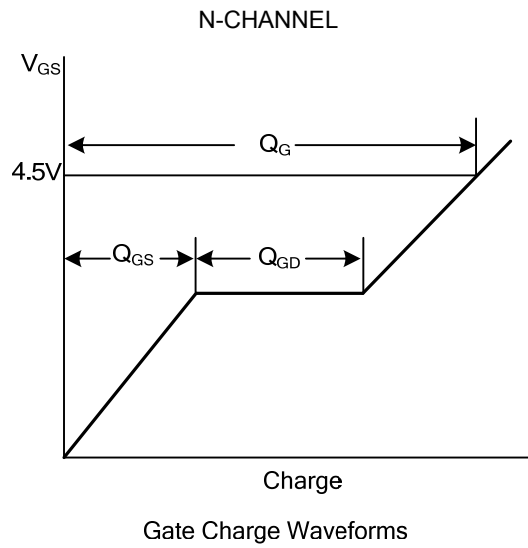
■ ELECTRICAL CHARACTERISTICS(Cont.)

P-Channel

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=-250\mu A, V_{GS}=0V$	-60			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-60V, V_{GS}=0V, T_J=25^\circ C$			-1	μA
		$V_{DS}=-48V, V_{GS}=0V, T_J=125^\circ C$			-10	μA
Gate-Source Leakage Current	Forward	I_{GSS}			+100	nA
	Reverse					
		$V_{GS}=-20V$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1		-3	V
Static Drain-Source On-State Resistance (Note 2)	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-3A$		48	68	m Ω
		$V_{GS}=-4.5V, I_D=-2A$		68	88	m Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=-25V, f=1.0MHz$		1900	2300	pF
Output Capacitance	C_{OSS}			90		pF
Reverse Transfer Capacitance	C_{RSS}			75		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 2)	Q_G	$V_{GS}=-4.5V, V_{DS}=-48V, I_D=-3A$		200	230	nC
Gate to Source Charge	Q_{GS}			30		nC
Gate to Drain Charge	Q_{GD}			70		nC
Turn-ON Delay Time (Note 2)	$t_{D(ON)}$	$V_{DS}=-30V, I_D=-1A, R_G=3.3\Omega$ $V_{GS}=-10V, R_D=30\Omega$		48		ns
Rise Time	t_R			42		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			280		ns
Fall-Time	t_F			150		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage(Note 2)	V_{SD}	$I_S=-1.7A, V_{GS}=0V$			-1.2	V

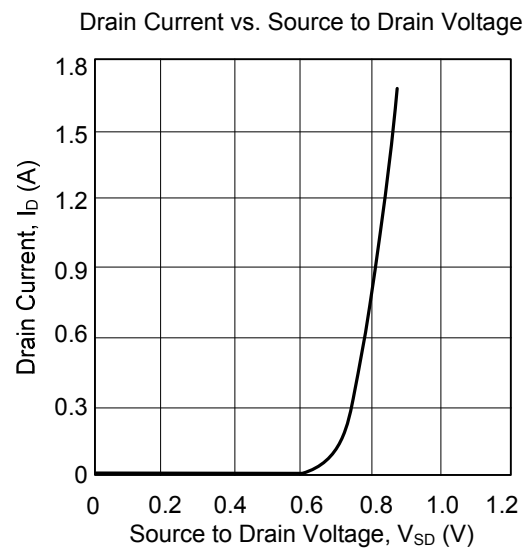
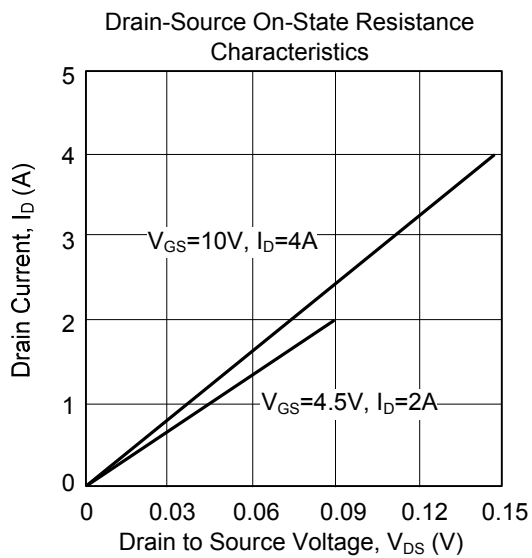
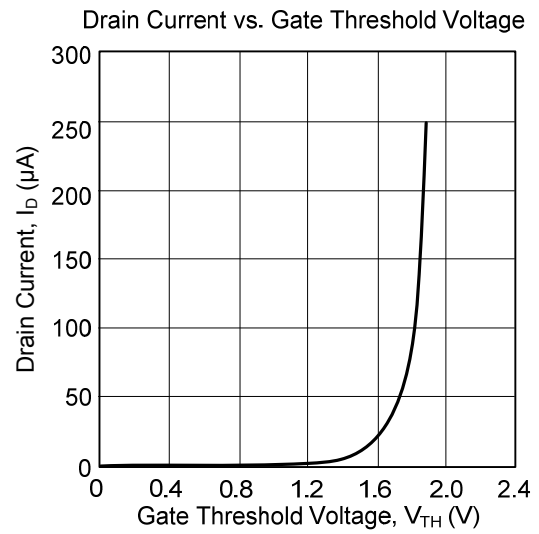
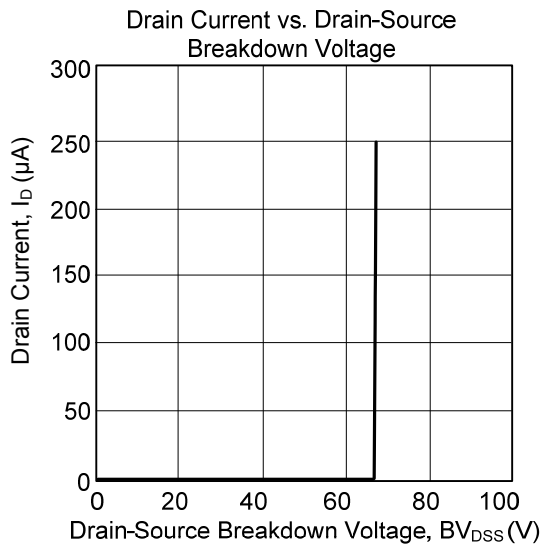
- Notes: 1. Pulse width limited by maximum junction temperature
 2. Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

■ TEST CIRCUITS AND WAVEFORMS



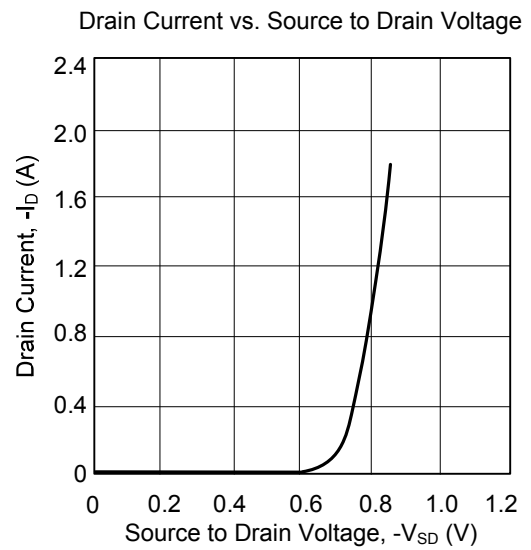
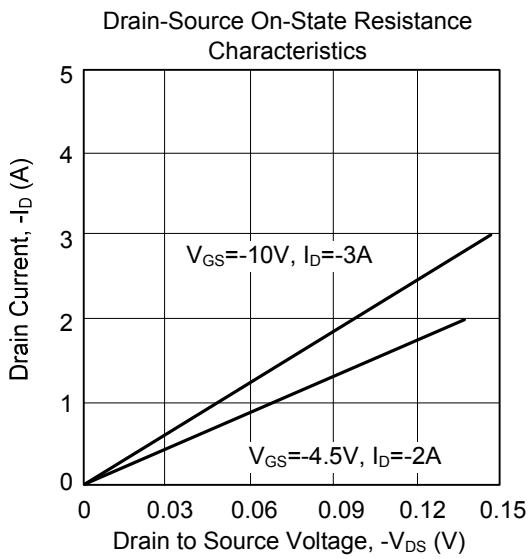
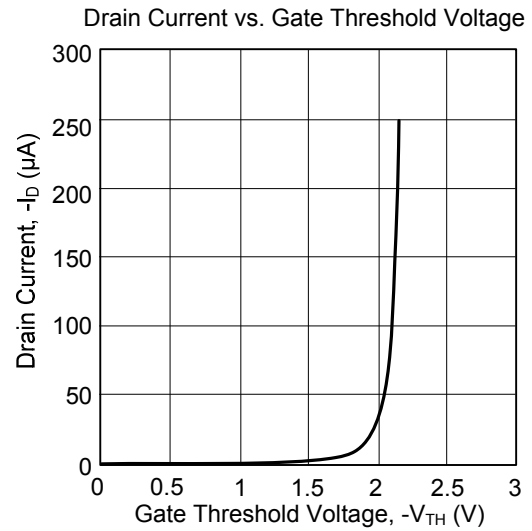
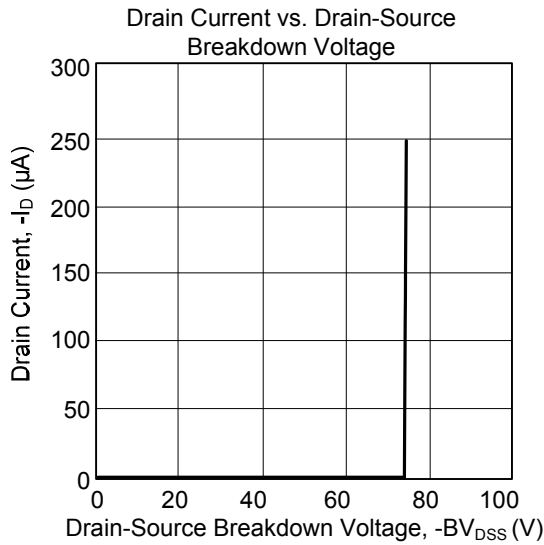
■ TYPICAL CHARACTERISTICS

N-CHANNEL



■ TYPICAL CHARACTERISTICS(Cont.)

P-CHANNEL



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