



UT30NP06M

Preliminary

Power MOSFET

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

The UTC **UT30NP06M** incorporates a 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 **UT30NP06M** is universally applied in low voltage applications.

FEATURES***N-CHANNEL**

$R_{DS(ON)} \leq 30 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=15\text{A}$

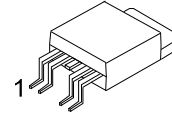
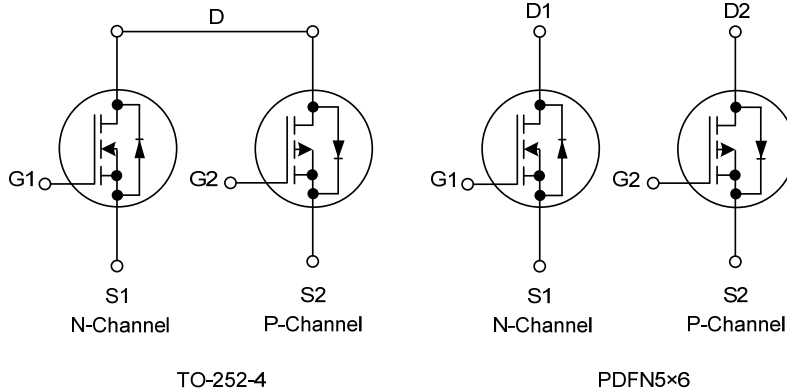
$R_{DS(ON)} \leq 38 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=15\text{A}$

***P-CHANNEL**

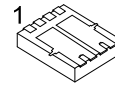
$R_{DS(ON)} \leq 40 \text{ m}\Omega$ @ $V_{GS}=-10\text{V}$, $I_D=-15\text{A}$

$R_{DS(ON)} \leq 50 \text{ m}\Omega$ @ $V_{GS}=-4.5\text{V}$, $I_D=-15\text{A}$

* High switching speed

SYMBOL

TO-252-4



PDFN5x6

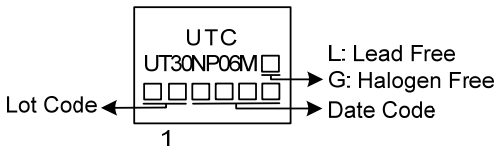
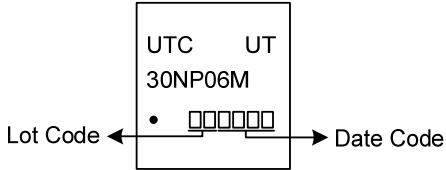
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT30NP06ML-TN4-R	UT30NP06MG-TN4-R	TO-252-4	S1	G1	D	S2	G2	-	-	-	Tape Reel
UT30NP06ML-P5060-R	UT30NP06MG-P5060-R	PDFN5x6	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

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

UT30NP06MG-TN4-R	(1)Packing Type	(1) R: Tape Reel
	(2)Package Type	(2) TN4: TO-252-4, P5060: PDFN5x6
	(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

MARKING

TO-252-4	PDFN5x6
 Diagram of TO-252-4 marking: A rectangular package with 'UTC' and 'UT30NP06M' printed on top. Below the part number is a 5-digit code in boxes. An arrow labeled 'Lot Code' points to the first three digits, and an arrow labeled 'Date Code' points to the last two digits. A small '1' is printed below the 5-digit code. UTC UT30NP06M [][][][][] Lot Code → [][][] → Date Code 1	 Diagram of PDFN5x6 marking: A rectangular package with 'UTC' and 'UT 30NP06M' printed on top. Below the part number is a 5-digit code in boxes preceded by a dot. An arrow labeled 'Lot Code' points to the first three digits, and an arrow labeled 'Date Code' points to the last two digits. UTC UT 30NP06M • [][][][][] Lot Code → [][][] → Date Code

■ **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}	60	-60	V
Gate-Source Voltage		V_{GSS}	± 20	± 20	V
Drain Current	Continuous $T_C=25^{\circ}\text{C}$	I_D	30	-30	A
	Pulsed (Note 1)	I_{DM}	60	-60	A
Avalanche Energy, Single Pulse (Note 2)		E_{AS}	38	55	mJ
Power Dissipation	TO-252-4	P_D	48		W
	PDFN5x6		40		W
Junction Temperature		T_J	$-55 \sim +150$		$^{\circ}\text{C}$
Storage Temperature Range		T_{STG}	$-55 \sim +150$		$^{\circ}\text{C}$

Note: 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. N-Channel: $L = 0.1\text{mH}$, $I_{AS} = 19.6\text{A}$, $V_{DD} = 60\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

P-Channel: $L = 0.1\text{mH}$, $I_{AS} = -33.2\text{A}$, $V_{DD} = -60\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-252-4	θ_{JA}	110	$^{\circ}\text{C/W}$
	PDFN5x6		65 (Note)	$^{\circ}\text{C/W}$
Junction to Case	TO-252-4	θ_{JC}	2.6 (Note)	$^{\circ}\text{C/W}$
	PDFN5x6		3.125 (Note)	$^{\circ}\text{C/W}$

Note: The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

■ **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}	V _{GS} =0V, I _D =250μA	60			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	I _{GSS}	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
Drain to Source On-state Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =15A			30	mΩ
		V _{GS} =4.5V, I _D =15A			38	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		1660		pF
Output Capacitance	C _{OSS}			105		pF
Reverse Transfer Capacitance	C _{RSS}			83		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =48V, V _{GS} =10V, I _D =30A		59		nC
Gate Source Charge	Q _{GS}			7.8		nC
Gate Drain Charge	Q _{GD}			20		nC
Turn-ON Delay Time (Note 1)	t _{D(ON)}	V _{DD} =30V, V _{GS} =10V, I _D =30A, R _G =3Ω		8.4		ns
Turn-ON Rise Time	t _R			16		ns
Turn-OFF Delay Time	t _{D(OFF)}			29		ns
Turn-OFF Fall-Time	t _F			19		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	I _S =30A, V _{GS} =0V			1.4	V

Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ ELECTRICAL CHARACTERISTICS (Cont.)

P-Channel

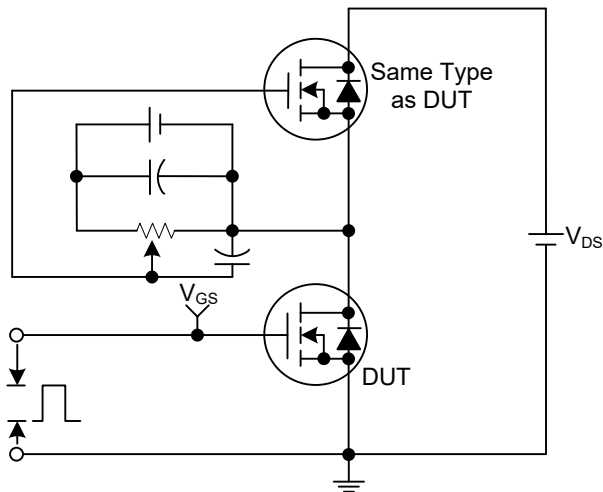
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250μA	-60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-60V, V _{GS} =0V			-1	μA
Gate-to-Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Cutoff Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =-250μA	-1.0		-3.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-15A			40	mΩ
		V _{GS} =-4.5V, I _D =-15A			50	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =-25V, V _{GS} =0V, f=1.0MHz		1996		pF
Output Capacitance	C _{OSS}			168		pF
Reverse Transfer Capacitance	C _{RSS}			138		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{DS} =-48V, V _{GS} =-10V, I _D =-30A		37		nC
Gate to Source Charge	Q _{GS}			4.6		nC
Gate to Drain Charge	Q _{GD}			9.6		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DS} =-30V, V _{GS} =-10V, I _D =-30A, R _G =3Ω		6.8		ns
Rise Time	t _R			17		ns
Turn-OFF Delay Time	t _{D(OFF)}			59		ns
Fall-Time	t _F			32		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Diode Forward Voltage	V _{SD}	I _S =-30A, V _{GS} =0V			-1.4	V

Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

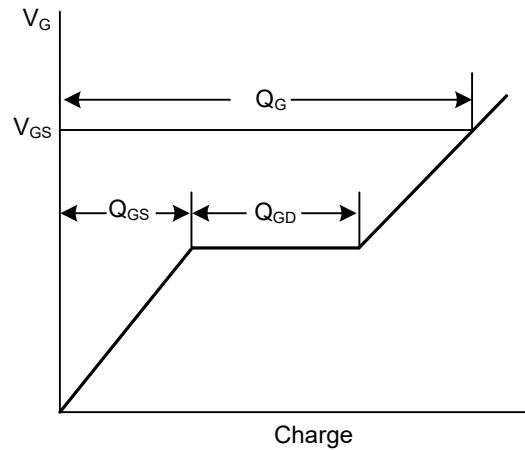
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

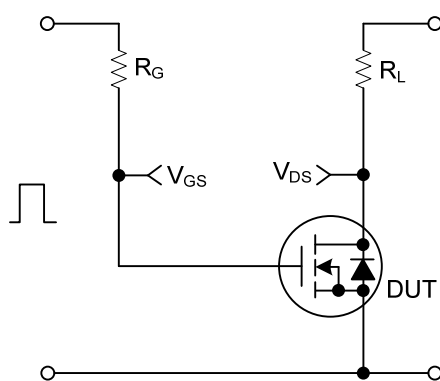
N-CHANNEL



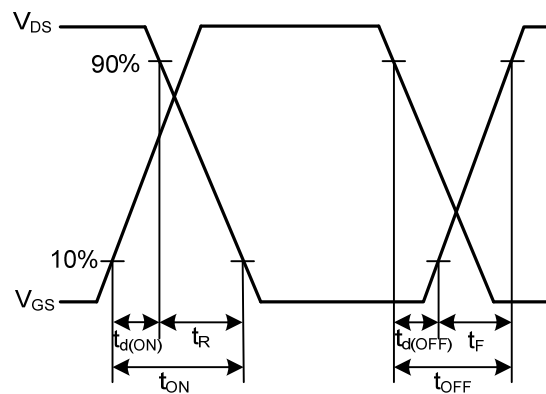
Gate Charge Test Circuit



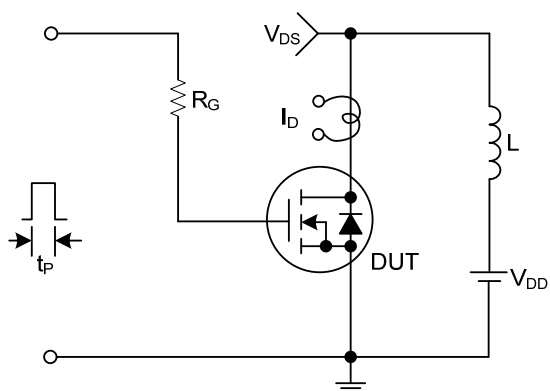
Gate Charge Waveforms



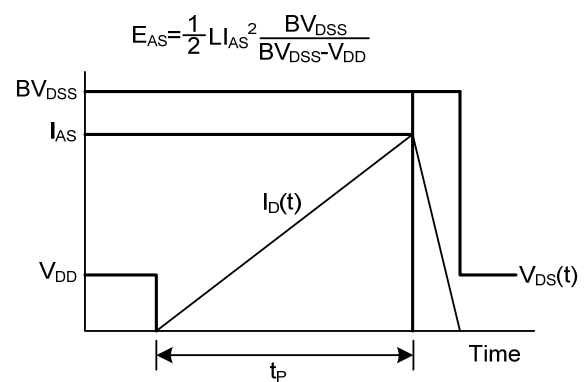
Resistive Switching Test Circuit



Resistive Switching Waveforms



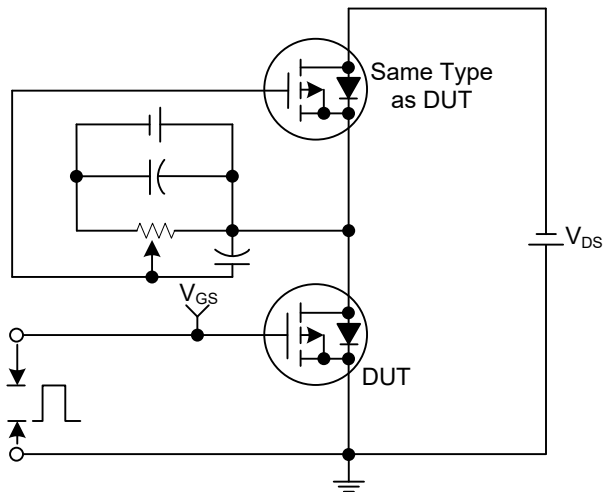
Unclamped Inductive Switching Test Circuit



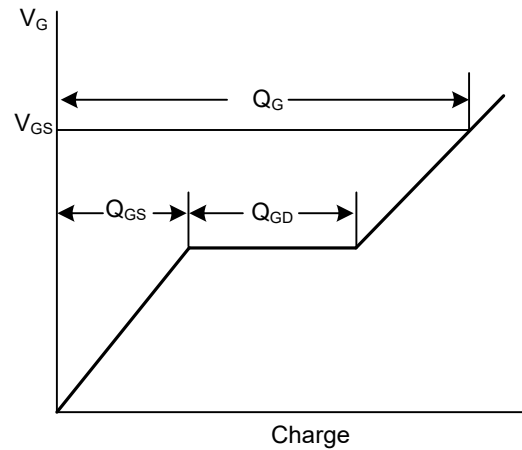
Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS

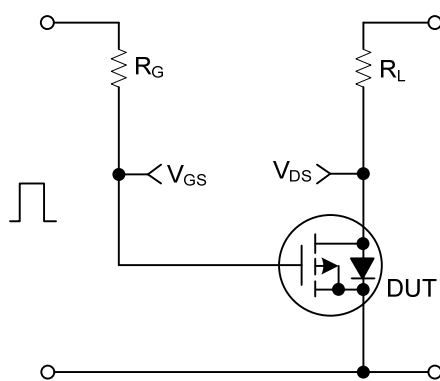
P-CHANNEL



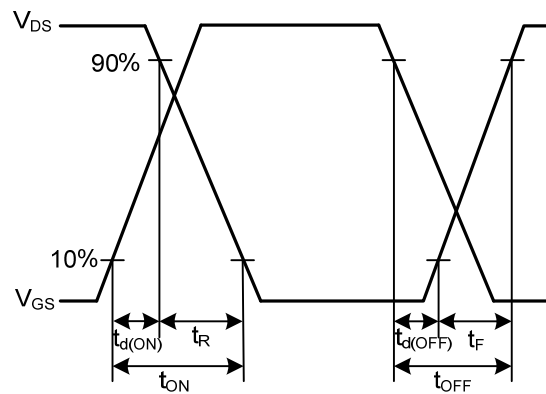
Gate Charge Test Circuit



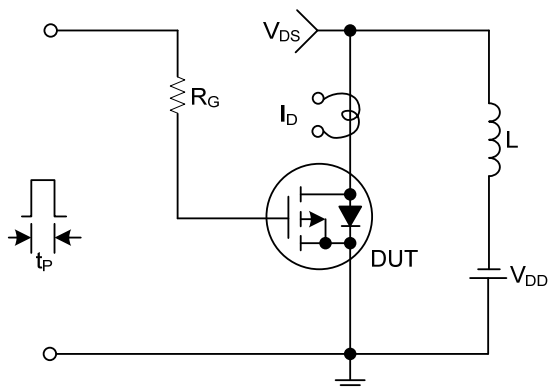
Gate Charge Waveforms



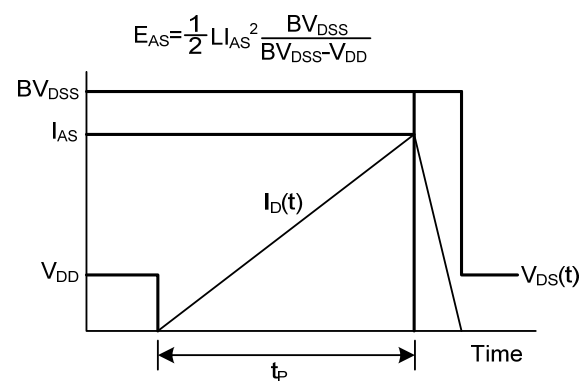
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.