



UT8NP06M

Preliminary

Power MOSFET

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

■ DESCRIPTION

The UTC **UT8NP06M** 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 **UT8NP06M** is universally applied in low voltage applications.

■ FEATURES

*N-CHANNEL

$R_{DS(ON)} \leq 56 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=4.0\text{A}$

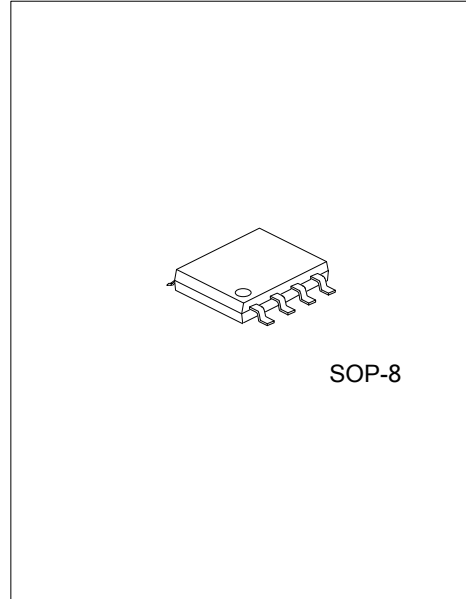
$R_{DS(ON)} \leq 60 \text{ m}\Omega @ V_{GS}=4.5\text{V}, I_D=4.0\text{A}$

*P-CHANNEL

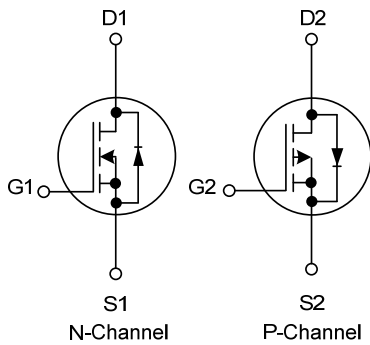
$R_{DS(ON)} \leq 75 \text{ m}\Omega @ V_{GS}=-10\text{V}, I_D=-4.0\text{A}$

$R_{DS(ON)} \leq 102 \text{ m}\Omega @ V_{GS}=-4.5\text{V}, I_D=-4.0\text{A}$

* High switching speed



■ SYMBOL



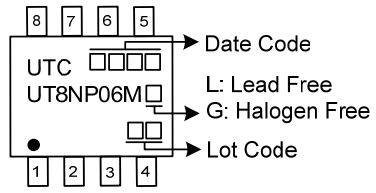
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT8NP06ML-S08-R	UT8NP06MG-S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

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

<p>UT8NP06MG-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
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■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_C=25°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°C	I _D	8	-8	A
	Pulsed (Note 1)	I _{DM}	20	-20	A
Avalanche Energy, Single Pulse (Note 2)	E _{AS}	3	15.5	mJ	
Power Dissipation	P _D	2		W	
Junction Temperature	T _J	-55 ~ +150		°C	
Storage Temperature Range	T _{STG}	-55 ~ +150		°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 = 0.1mH, I_{AS} = 7.75A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C

P-Channel: L = 0.1mH, I_{AS} = -17.6A, V_{DD} = -50V, R_G = 25Ω, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ _{JA}	125	°C/W
Junction to Case	θ _{JC}	62.5	°C/W

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

■ ELECTRICAL CHARACTERISTICS (T_J=25°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 =4.0A			56	mΩ
		V _{GS} =4.5V, I _D =4.0A			60	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		877		pF
Output Capacitance	C _{OSS}			72		pF
Reverse Transfer Capacitance	C _{RSS}			55		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =48V, V _{GS} =10V, I _D =8.0A		32		nC
Gate Source Charge	Q _{GS}			4		nC
Gate Drain Charge	Q _{GD}			6.8		nC
Turn-ON Delay Time (Note 1)	t _{D(ON)}	V _{DD} =30V, V _{GS} =10V, I _D =8.0A, R _G =3Ω		5		ns
Turn-ON Rise Time	t _R			17.5		ns
Turn-OFF Delay Time	t _{D(OFF)}			20		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 =8.0A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)	t _{rr}	I _S =-8.0A, V _{GS} =0V, dI _F /dt=100A/μs		17		ns
Body Diode Reverse Recovery Charge	Q _{rr}			12		nC

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ ELECTRICAL CHARACTERISTICS (Cont.)

P-Channel

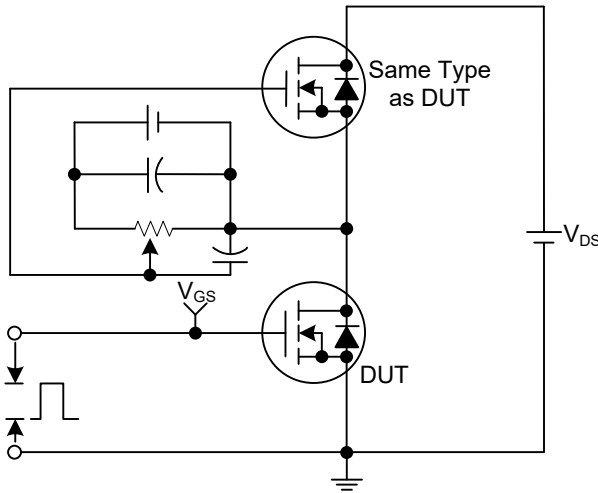
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-60			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-60V, V_{GS}=0V$			-1	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
ON CHARACTERISTICS						
Cutoff Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0		-3.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-4.0A$			75	m Ω
		$V_{GS}=-4.5V, I_D=-4.0A$			102	m Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=-25V, V_{GS}=0V, f=1.0MHz$		1151		pF
Output Capacitance	C_{OSS}			90		pF
Reverse Transfer Capacitance	C_{RSS}			72		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{DS}=-48V, V_{GS}=-10V, I_D=-8.0A$		28		nC
Gate to Source Charge	Q_{GS}			5.3		nC
Gate to Drain Charge	Q_{GD}			6		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DS}=-30V, V_{GS}=-10V, I_D=-8.0A,$ $R_G=3\Omega$		6		ns
Rise Time	t_R			18		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			38		ns
Fall-Time	t_F			22		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Diode Forward Voltage	V_{SD}	$I_S=-8.0A, V_{GS}=0V$			-1.4	V
Body Diode Reverse Recovery Time (Note 1)	t_{rr}	$I_S=-8.0A, V_{GS}=0V,$ $dI_F/dt=100A/\mu s$		64		ns
Body Diode Reverse Recovery Charge	Q_{rr}			60		nC

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

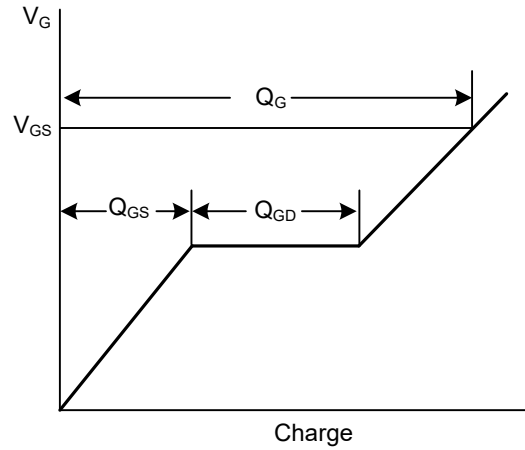
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

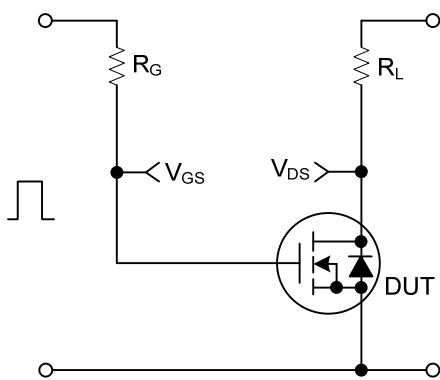
N-CHANNEL



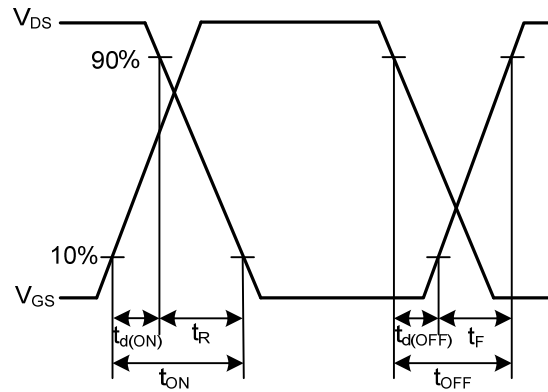
Gate Charge Test Circuit



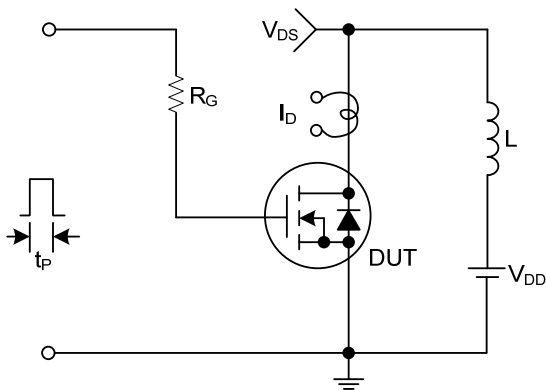
Gate Charge Waveforms



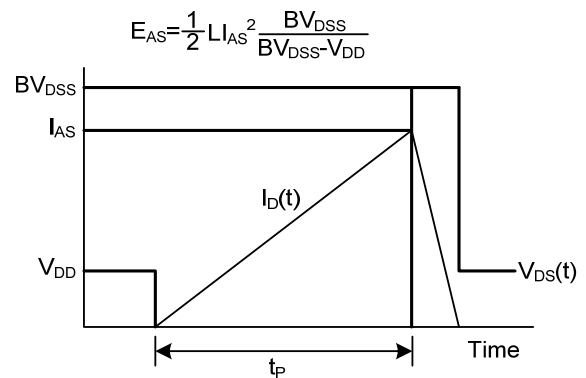
Resistive Switching Test Circuit



Resistive Switching Waveforms



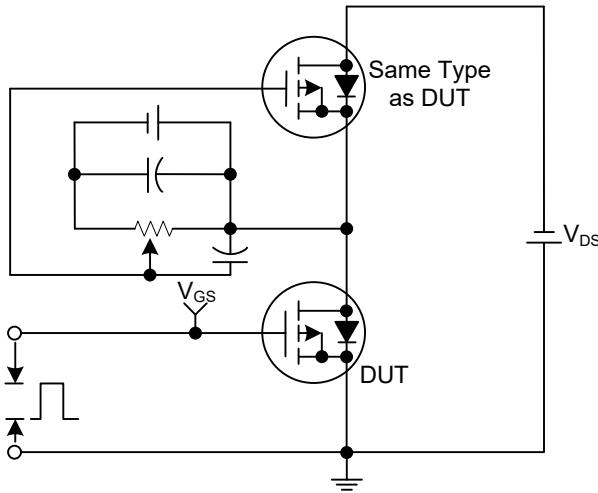
Unclamped Inductive Switching Test Circuit



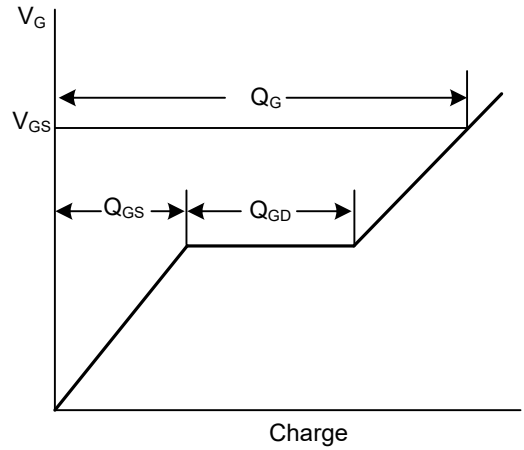
Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS

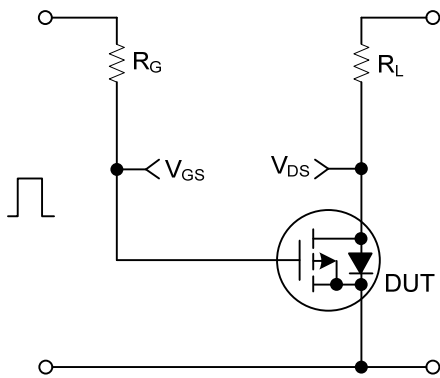
P-CHANNEL



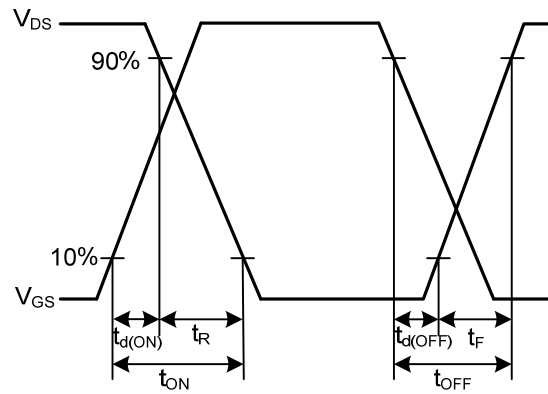
Gate Charge Test Circuit



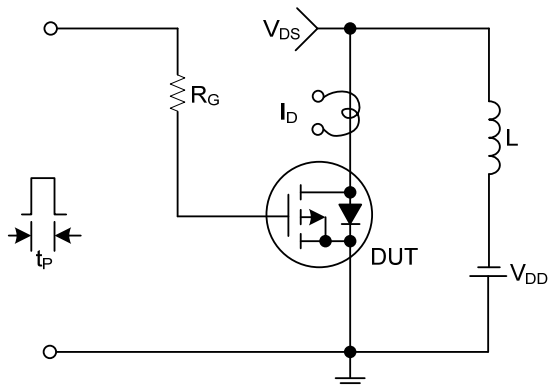
Gate Charge Waveforms



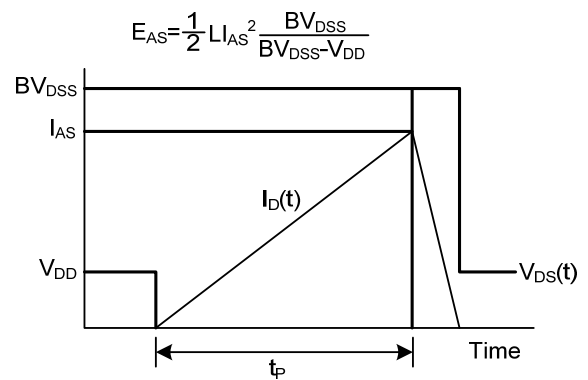
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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