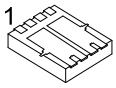
DUAL ENHANCEMENT MODE (N-CHANNEL / P-CHANNEL)



PDFN5×6

■ DESCRIPTION

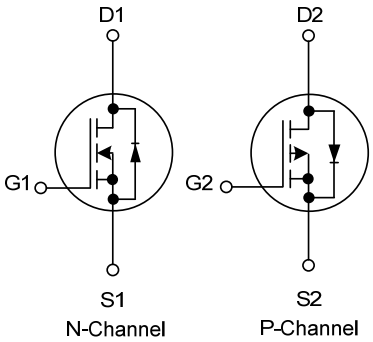
The UTC **UT17NP06M** incorporates a N-channel MOSFET and a P-channel MOSFET，it uses UTC's advanced technology to provide customers a minimum on-state resistance, high switching speed, low gate charge and cost effectiveness.

The UTC **UT17NP06M** is universally applied in low voltage applications.

■ FEATURES

*N-CHANNEL
$R_{DS(on)}$ ≤ 50 mΩ @ V_{GS}=10V, I_D=10A
$R_{DS(on)}$ ≤ 64 mΩ @ V_{GS}=4.5V, I_D=10A
*P-CHANNEL
$R_{DS(on)}$ ≤ 70 mΩ @ V_{GS}=-10V, I_D=-10A
$R_{DS(on)}$ ≤ 84 mΩ @ V_{GS}=-4.5V, I_D=-10A
* High switching speed

■ SYMBOL



■ ORDERING INFORMATION

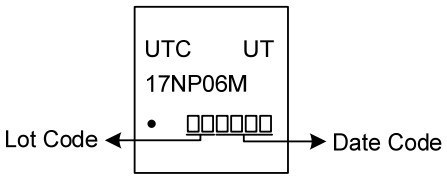
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT17NP06ML-P5060-R	UT17NP06MG-P5060-R	PDFN5×6	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

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

UT17NP06MG-P5060-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) P5060: PDFN5×6
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

PARAMETER			SYMBOL	RATINGS		UNIT
				N-CH	P-CH	
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	17	-17	A
	Pulsed		I_{DM}	34	-34	A
Avalanche Energy, Single Pulse (Note 3)			E_{AS}	7	34	mJ
Peak Diode Recovery dv/dt (Note 4)			dv/dt	1.45	1.47	V/ns
Power Dissipation			P_D	20		W
Junction Temperature			T_J	+150		°C
Range of Storage Temperature			T_{STG}	-55 ~ +150		°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 = 0.1mH, I_{AS} = 11A, V_{DD} = 25V, R_G = 25Ω, Starting T_J = 25°C
P-Channel: L = 0.1mH, I_{AS} = -26A, V_{DD} = -25V, R_G = 25Ω, Starting T_J = 25°C
4. N-Channel: I_{SD} ≤ 17A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
P-Channel: I_{SD} ≤ -17A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	65	°C/W
Junction to Case	θ_{JC}	6.25 (Note)	°C/W

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

■ 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}	I_D=250μA, V_{GS}=0V	60			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=60V, 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	1.0		3.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=10A			50	mΩ
			V_{GS}=4.5V, I_D=10A			64	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz		565		pF
Output Capacitance		C_{OSS}			78		pF
Reverse Transfer Capacitance		C_{RSS}			64		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=48V, V_{GS}=10V, I_D=17A , (Note 1, 2)		16		nC
Gate to Source Charge		Q_{GS}			1.65		nC
Gate to Drain Charge		Q_{GD}			3.1		nC
Turn-ON Delay Time (Note 1)		$t_{D(ON)}$	V_{DD}=30V, V_{GS}=10V, I_D=17A, R_G=3Ω (Note 1, 2)		3.7		ns
Rise Time		t_R			16		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			17		ns
Fall-Time		t_F			19		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				17	A
Maximum Body-Diode Pulsed Current		I_{SM}				34	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=17A, V_{GS}=0V			1.4	V
Reverse Recovery Time		t_{rr}	I_S=17A, V_{GS}=0V, dI_F/dt =100A/μs		30		ns
Reverse Recovery Charge		Q_{rr}			11		nC

■ ELECTRICAL CHARACTERISTICS (Cont.)

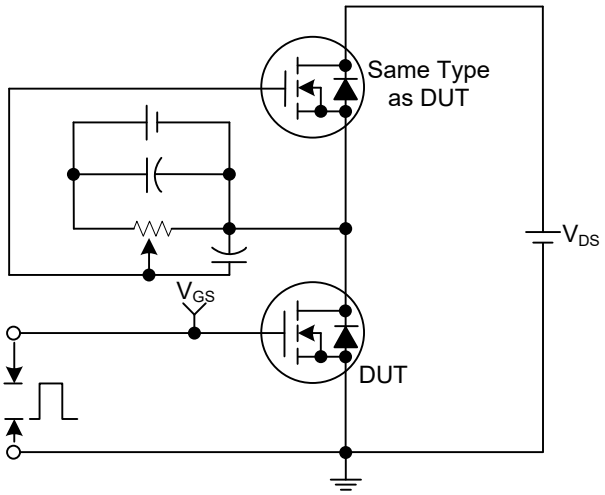
P-Channel

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
STATIC PARAMETERS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=-250μA, V_{GS}=0V	-60			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-60V, 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	-1.0		-3.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-10A			70	mΩ
			V_{GS}=-4.5V, I_D=-10A			84	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{DS}=-25V, V_{GS}=0V, f=1.0MHz		1462		pF
Output Capacitance		C_{OSS}			111		pF
Reverse Transfer Capacitance		C_{RSS}			91		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=-48V, V_{GS}=-10V, I_D=-17A (Note 1, 2)		15.5		nC
Gate to Source Charge		Q_{GS}			1.3		nC
Gate to Drain Charge		Q_{GD}			2.5		nC
Turn-ON Delay Time (Note 1)		$t_{D(ON)}$	V_{DD}=-30V, V_{GS}=-10V, I_D=-17A, R_G=3Ω (Note 1, 2)		5.7		ns
Rise Time		t_R			17		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			48		ns
Fall-Time		t_F			27		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				-17	A
Maximum Body-Diode Pulsed Current		I_{SM}				-34	A
Diode Forward Voltage (Note 1)		V_{SD}	I_S=-17A,V_{GS}=0V			-1.4	V
Body Diode Reverse Recovery Time		t_{rr}	I_S =-17A, V_{GS}=0V		39		nS
Body Diode Reverse Recovery Charge		Q_{rr}	dI_F/dt=100A/μs		29		nC

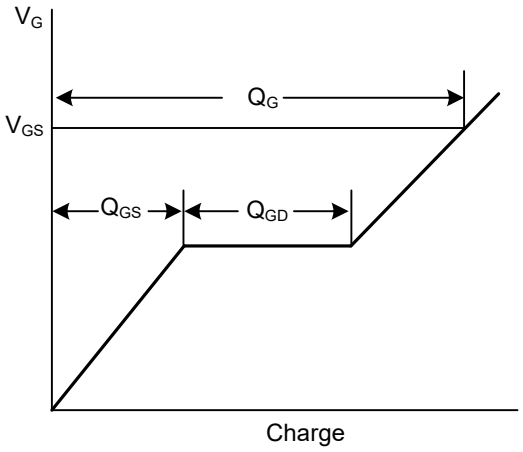
Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS

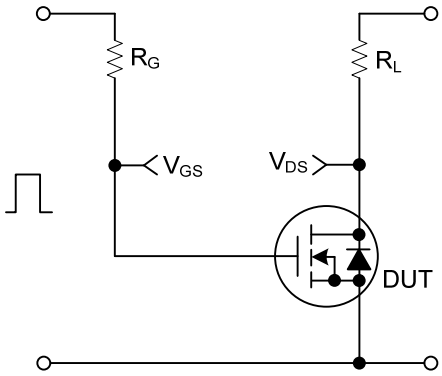
N-CHANNEL



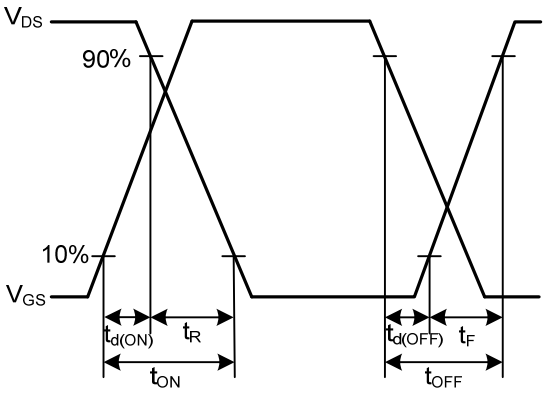
Gate Charge Test Circuit



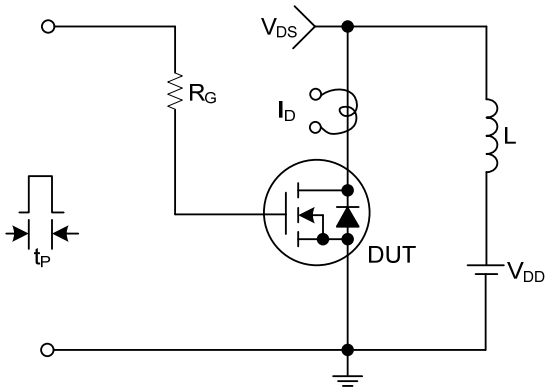
Gate Charge Waveforms



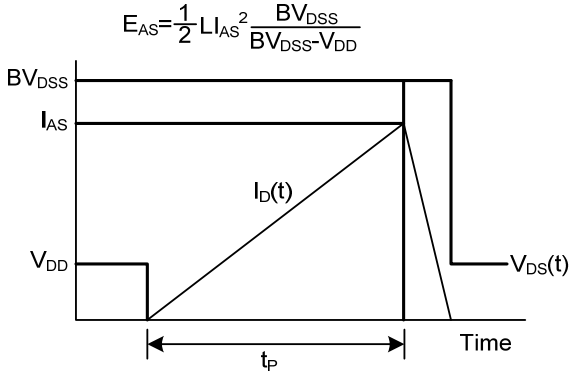
Resistive Switching Test Circuit



Resistive Switching Waveforms



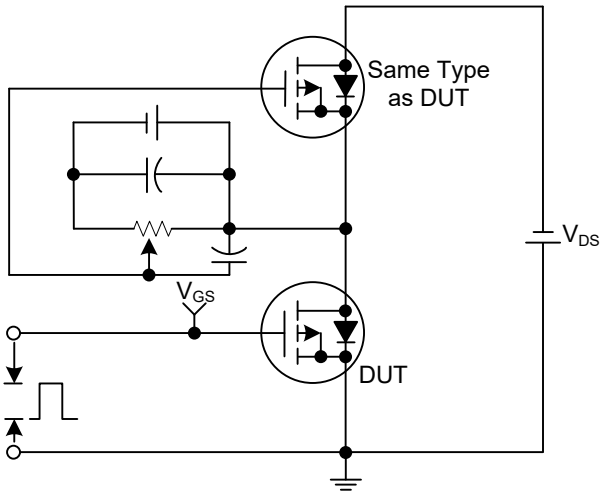
Unclamped Inductive Switching Test Circuit



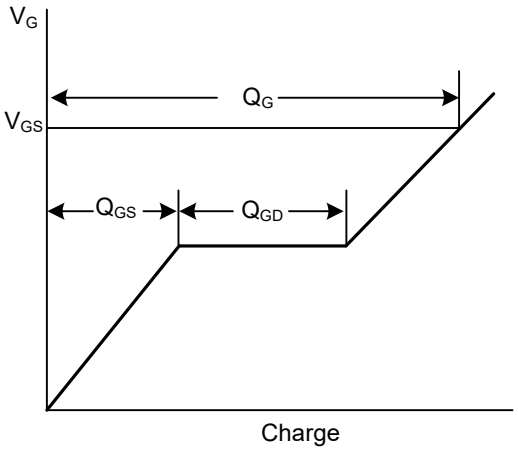
Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS

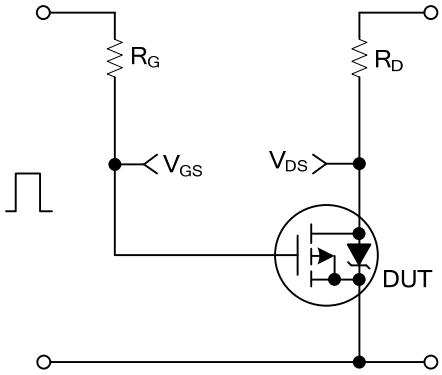
P-CHANNEL



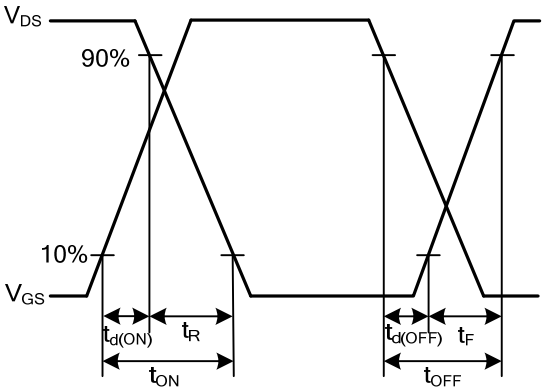
Gate Charge Test Circuit



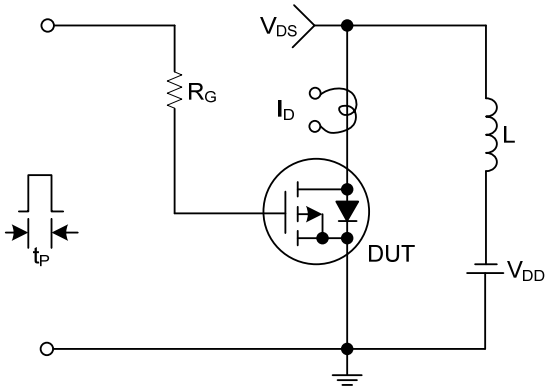
Gate Charge Waveforms



Resistive Switching Test Circuit



Resistive Switching Waveforms



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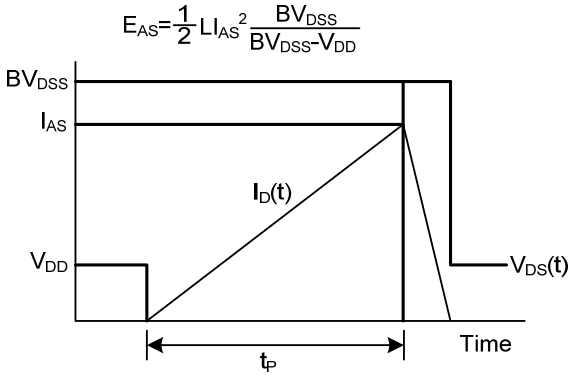

Unclamped Inductive Switching Waveforms