



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

DESCRIPTION

The UTC **UT15NP06** 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 **UT15NP06** is universally applied in low voltage applications.

FEATURES

*N-CHANNEL

$R_{DS(on)} \leq 58 \text{ m}\Omega @ V_{GS}=10V, I_D=12A$

$R_{DS(on)} \leq 83 \text{ m}\Omega @ V_{GS}=4.5V, I_D=8.0A$

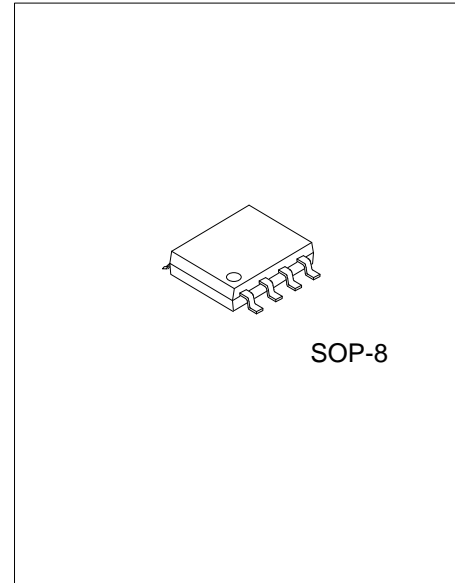
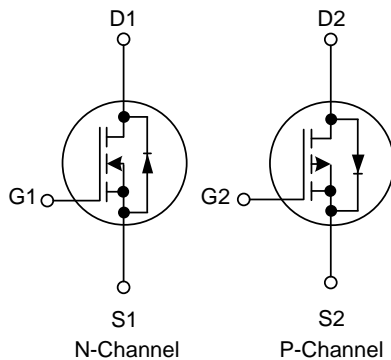
*P-CHANNEL

$R_{DS(on)} \leq 115 \text{ m}\Omega @ V_{GS}=-10V, I_D=-12A$

$R_{DS(on)} \leq 170 \text{ m}\Omega @ V_{GS}=-4.5V, I_D=-8.0A$

* High switching speed

SYMBOL



SOP-8

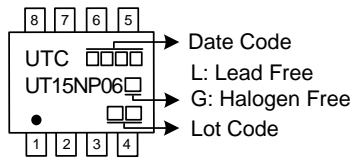
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT15NP06L-S08-R	UT15NP06G-S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

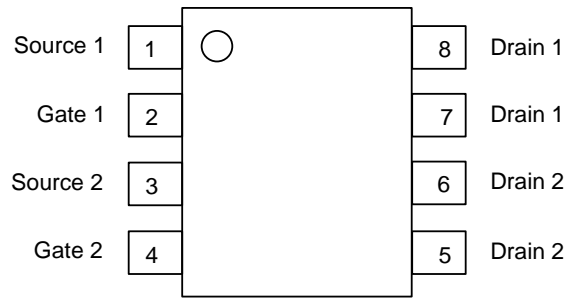
Note: Pin Assignment: G: Gate D: Drain S: Source

UT15NP06G-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



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	15	-15	A
	Pulsed (Note 1)	I_{DM}	30	-30	A
Power Dissipation	$T_A=25^\circ\text{C}$	P_D	1.25		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}	100 (Note)	$^\circ\text{C/W}$

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

■ 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	I_{GSS}	Forward $V_{GS}=+20\text{V}$			+100	nA
		Reverse $V_{GS}=-20\text{V}$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.0		3.0	V
Static Drain-Source On-State Resistance (Note 2)	$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=12\text{A}$			58	m Ω
		$V_{GS}=4.5\text{V}, I_D=8.0\text{A}$			83	m Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}, V_{DS}=25\text{V}, f=1.0\text{MHz}$		647		pF
Output Capacitance	C_{OSS}			48		pF
Reverse Transfer Capacitance	C_{RSS}			39		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 2)	Q_G	$V_{GS}=10\text{V}, V_{DS}=30\text{V}, I_D=10\text{A}$		16.7		nC
Gate to Source Charge	Q_{GS}			3.2		nC
Gate to Drain Charge	Q_{GD}			3.7		nC
Turn-ON Delay Time (Note 2)	$t_{D(ON)}$	$V_{DS}=30\text{V}, V_{GS}=10\text{V}, I_D=10\text{A}, R_G=3.3\Omega$		5		ns
Rise Time	t_R			17		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			18		ns
Fall-Time	t_F			19		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage(Note 2)	V_{SD}	$I_S=15\text{A}, V_{GS}=0\text{V}$			1.4	V
Body Diode Reverse Recovery Time	t_{rr}	$I_S=15\text{A}, V_{GS}=0\text{V}, dI_F/dt=100\text{A}/\mu\text{s}$		23.2		nS
Body Diode Reverse Recovery Charge	Q_{rr}			44		nC

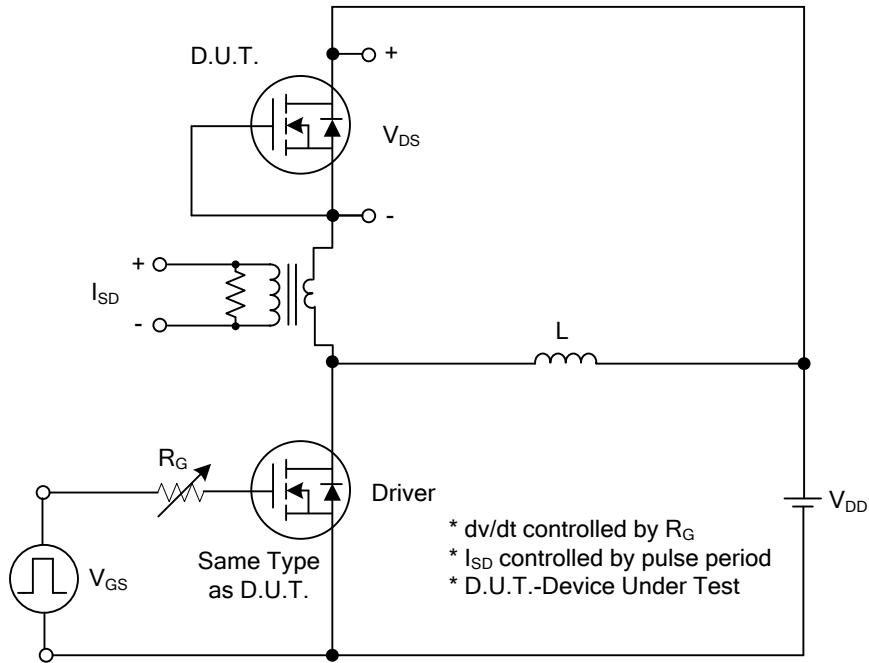
■ ELECTRICAL CHARACTERISTICS (Cont.)

P-Channel

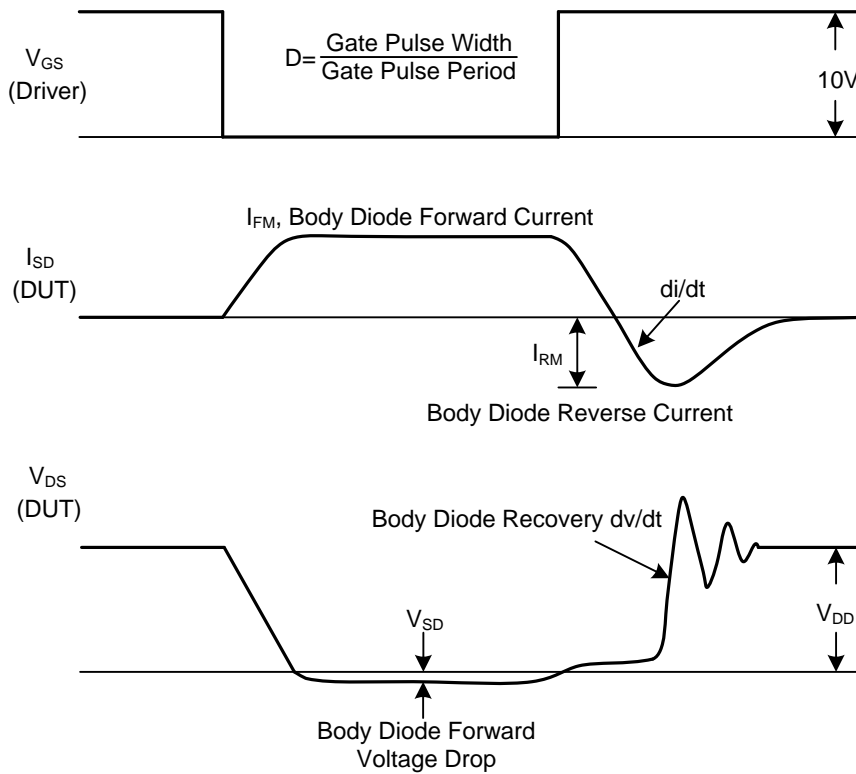
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=-250\mu A, V_{GS}=0V$	-60			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-60V, V_{GS}=0V, T_J=25^\circ C$			-1	μA
		$V_{DS}=-48V, V_{GS}=0V, T_J=125^\circ C$			-10	μA
Gate-Source Leakage Current	Forward	I_{GSS}			+100	nA
	Reverse					
					-100	nA
		$V_{GS}=-20V$				
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0		-3.0	V
Static Drain-Source On-State Resistance (Note 2)	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-12A$			115	m Ω
		$V_{GS}=-4.5V, I_D=-8.0A$			170	m Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=-25V, f=1.0MHz$		830		pF
Output Capacitance	C_{OSS}			65		pF
Reverse Transfer Capacitance	C_{RSS}			51		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 2)	Q_G	$V_{GS}=-10V, V_{DS}=-30V, I_D=-10A$		16.2		nC
Gate to Source Charge	Q_{GS}			4		nC
Gate to Drain Charge	Q_{GD}			3.8		nC
Turn-ON Delay Time (Note 2)	$t_{D(ON)}$	$V_{DS}=-30V, V_{GS}=-10V, I_D=-10A, R_G=3.3\Omega$		6		ns
Rise Time	t_R			17		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			22		ns
Fall-Time	t_F			18		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage(Note 2)	V_{SD}	$I_S=-15A, V_{GS}=0V$			1.4	V
Body Diode Reverse Recovery Time	t_{rr}	$I_S=-15A, V_{GS}=0V, di_F/dt=100A/\mu s$		34.7		nS
Body Diode Reverse Recovery Charge	Q_{rr}			63		nC

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

■ TEST CIRCUITS AND WAVEFORMS

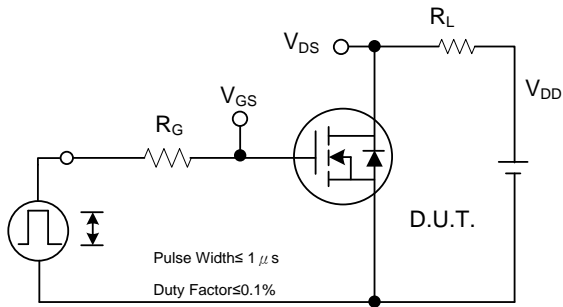


Peak Diode Recovery dv/dt Test Circuit

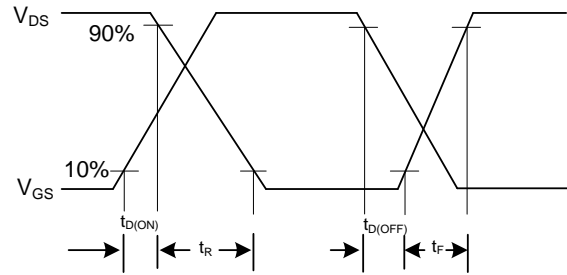


Peak Diode Recovery dv/dt Waveforms

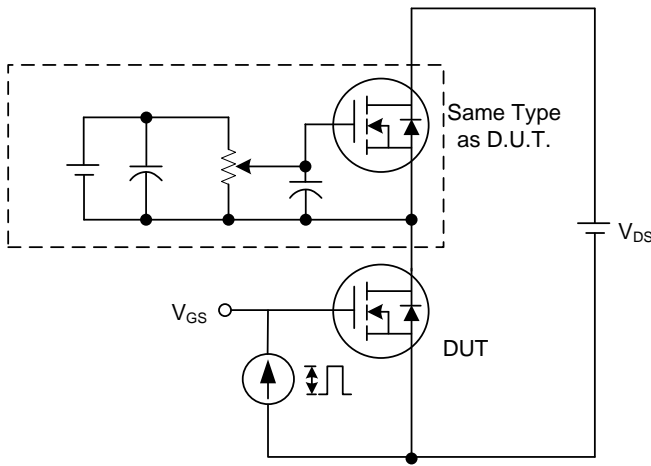
■ TEST CIRCUITS AND WAVEFORMS



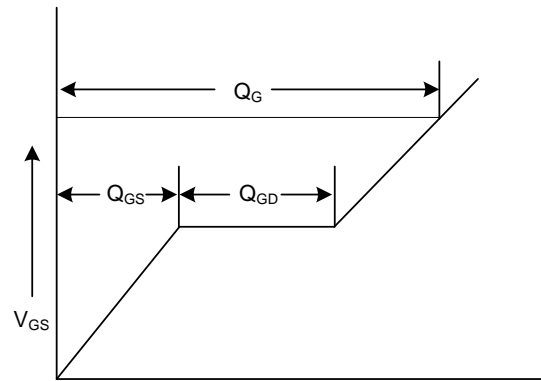
Switching Test Circuit



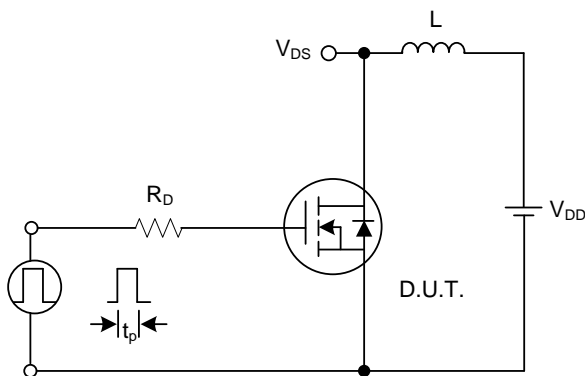
Switching Waveforms



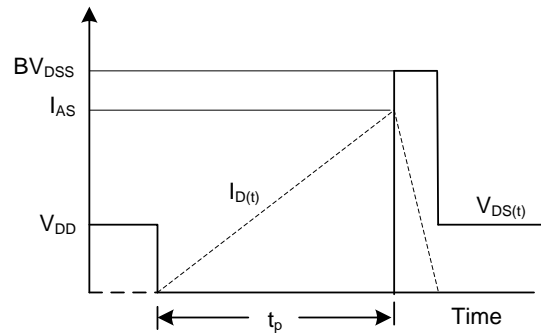
Gate Charge Test Circuit



Charge
Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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