



UT10P02

Power MOSFET

-10A, -20V P-CHANNEL POWER MOSFET

DESCRIPTION

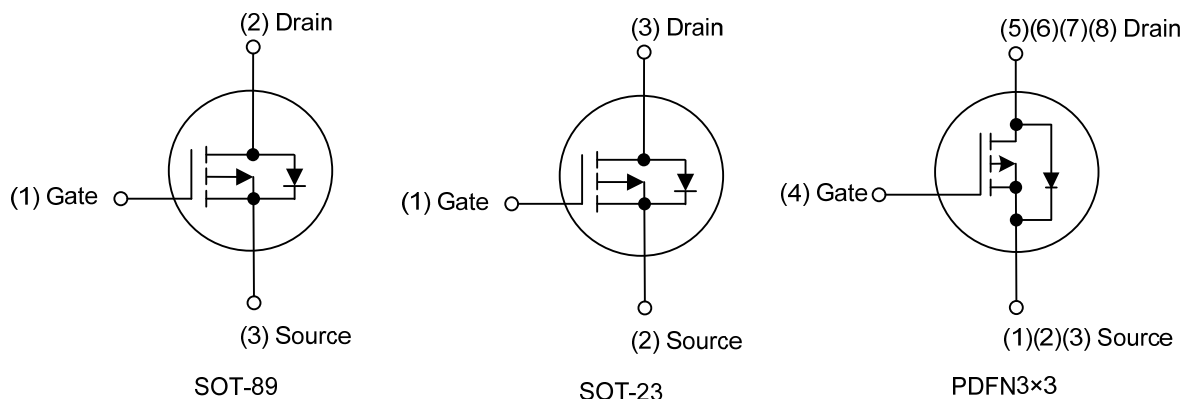
The UTC **UT10P02** is a P-channel MOSFET, it uses UTC's advanced technology to provide the customers with a minimum on state resistance and low gate charge, etc.

The UTC **UT10P02** is suitable for load switch and battery protection applications.

FEATURES

- * $R_{DS(ON)} \leq 32 \text{ m}\Omega$ @ $V_{GS} = -10\text{V}$, $I_D = -8.0\text{A}$
- $R_{DS(ON)} \leq 40 \text{ m}\Omega$ @ $V_{GS} = -4.5\text{V}$, $I_D = -8.0\text{A}$
- $R_{DS(ON)} \leq 56 \text{ m}\Omega$ @ $V_{GS} = -2.5\text{V}$, $I_D = -5.0\text{A}$
- $R_{DS(ON)} \leq 75 \text{ m}\Omega$ @ $V_{GS} = -1.8\text{V}$, $I_D = -2.0\text{A}$
- * Improved dv/dt capability
- * Fast switching
- * Suit for -1.8V gate drive applications

SYMBOL



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT10P02L-AB3-R	UT10P02G-AB3-R	SOT-89	G	D	S	-	-	-	-	-	Tape Reel
UT10P02L-AE3-R	UT10P02G-AE3-R	SOT-23	G	S	D	-	-	-	-	-	Tape Reel
UT10P02L-P3030-R	UT10P02G-P3030-R	PDFN3x3	S	S	S	G	D	D	D	D	Tape Reel

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

UT10P02G-AB3-R (1) Packing Type (2) Package Type (3) Green Package	(1) R: Tape Reel (2) AB3: SOT-89, AE3: SOT-23, P3030: PDFN3x3 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

SOT-89	SOT-23	PDFN3×3
□□□□ UT10P02 1 → Date Code → L: Lead Free → G: Halogen Free	AP02 □ → L: Lead Free → G: Halogen Free	UT 10P02 • □□□□ → Date Code

■ **ABSOLUTE MAXIMUM RATINGS** ($T_C = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	± 10	V
Drain Current	Continuous	I_D	-10	A
	Pulsed (Note 2)	I_{DM}	-20	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	65.1	mJ
Power Dissipation	SOT-89	P_D	1.78	W
	SOT-23		1.25	W
	PDFN3×3		23	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^\circ\text{C}$

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. $L=10\text{mH}$, $I_{AS}=-3.6\text{A}$, $V_{DD}=-20\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-89	θ_{JA}	104	$^\circ\text{C/W}$
	SOT-23		125	$^\circ\text{C/W}$
	PDFN3×3		60	$^\circ\text{C/W}$
Junction to Case	SOT-89	θ_{JC}	70	$^\circ\text{C/W}$
	SOT-23		100 (Note)	$^\circ\text{C/W}$
	PDFN3×3		5.4 (Note)	$^\circ\text{C/W}$

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

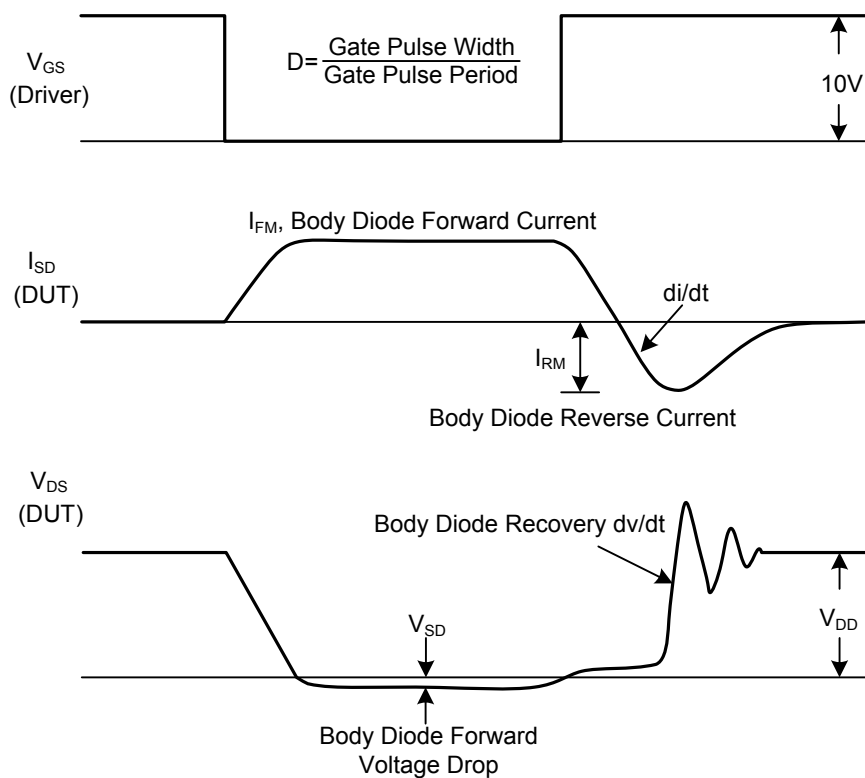
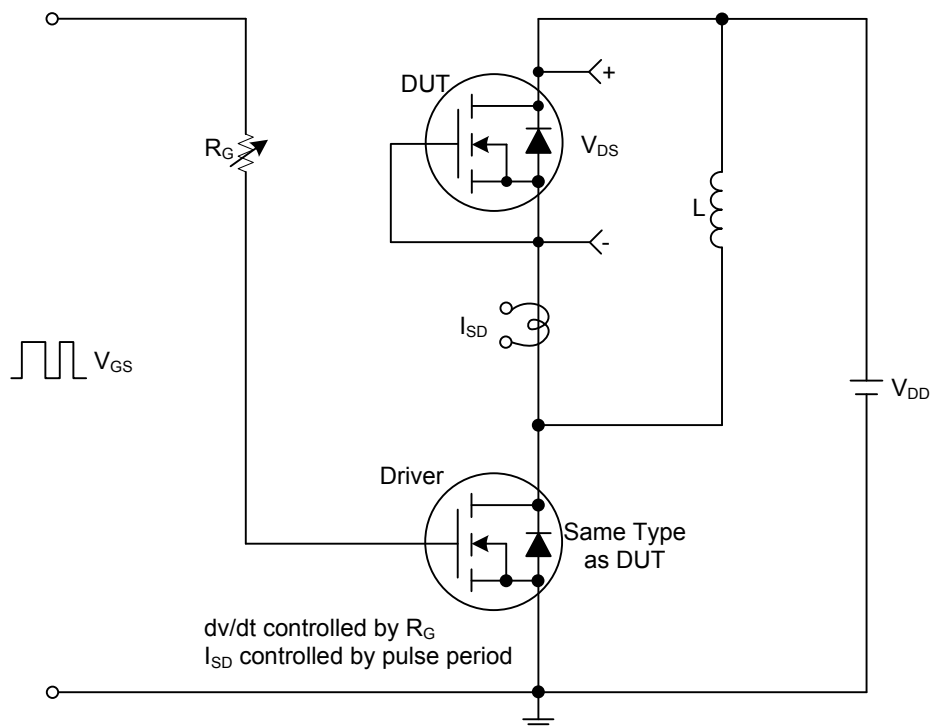
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =-250μA, V _{GS} =0V	-20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-20V, V _{GS} =0V			-1	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±10V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =-250μA	-0.3		-1.2	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-8.0A			32	mΩ
		V _{GS} =-4.5V, I _D =-8.0A			40	mΩ
		V _{GS} =-2.5V, I _D =-5.0A			56	mΩ
		V _{GS} =-1.8V, I _D =-2.0A			75	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =-10V, f=1.0MHz		915.3		pF
Output Capacitance	C _{OSS}			162.9		pF
Reverse Transfer Capacitance	C _{RSS}			142.3		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{DS} =-16V, V _{GS} =-10V, I _D =-10A (Note 1, 2)		30		nC
Gate to Source Charge	Q _{GS}			2.4		nC
Gate to Drain Charge	Q _{GD}			5		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DD} =-10V, V _{GS} =-10V, I _D =-10A, R _G =3.3Ω (Note 1, 2)		8.1		ns
Turn-ON Rise Time	t _R			16.4		ns
Turn-OFF Delay Time	t _{D(OFF)}			47.2		ns
Turn-OFF Fall-Time	t _F			29.9		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				-10	A
Maximum Body-Diode Pulsed Current	I _{SM}				-20	A
Diode Forward Voltage	V _{SD}	I _S =-10A, V _{GS} =0V			-1.2	V

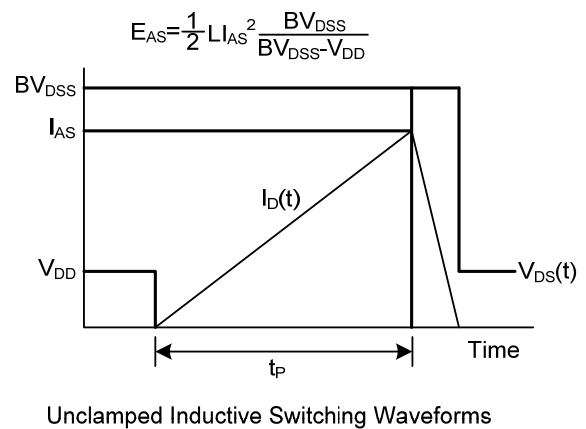
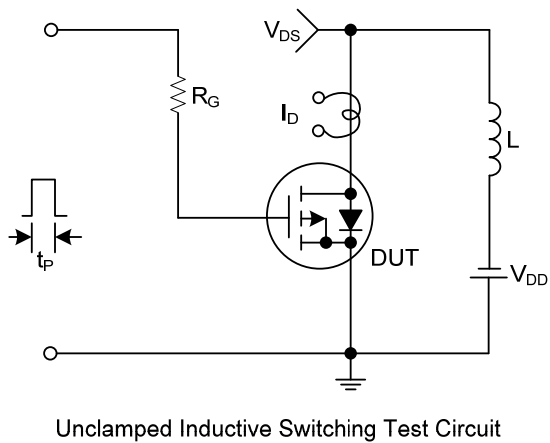
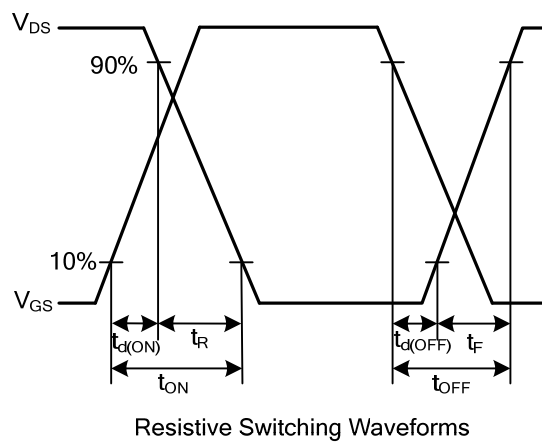
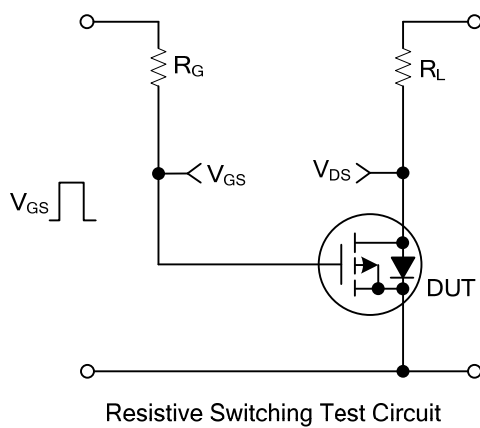
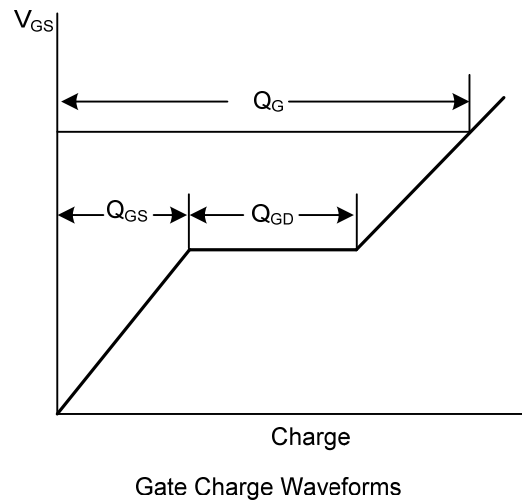
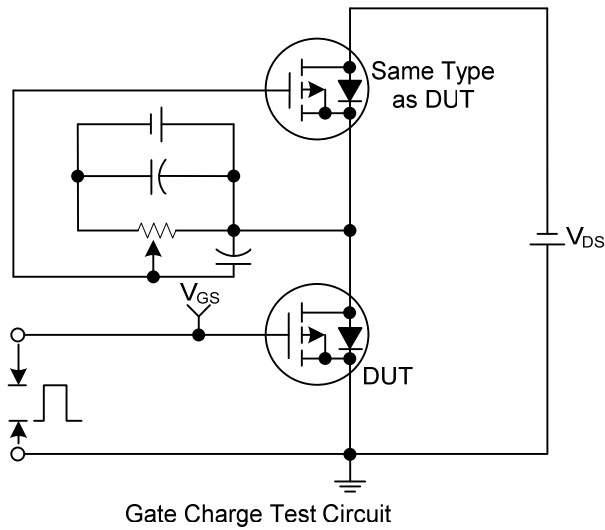
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

Peak Diode Recovery dv/dt Test Circuit and Waveforms

TEST CIRCUITS AND WAVEFORMS



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