

**UT4N10**

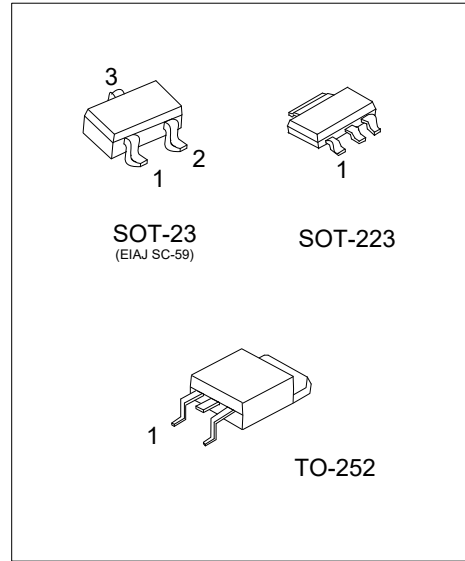
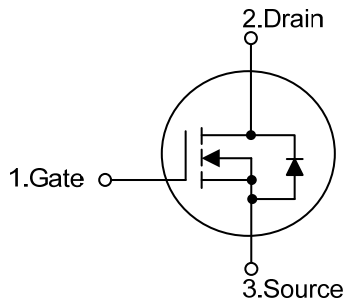
Preliminary

Power MOSFET**4.0A, 100V N-CHANNEL
ENHANCEMENT MODE
POWER MOSFET****DESCRIPTION**

The UTC **UT4N10** is a N-channel power MOSFET providing very low on-resistance. It has high efficiency and perfect cost-effectiveness. It can be generally applied in the commercial and industrial fields.

FEATURES

- * $R_{DS(ON)} \leq 180 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=2.0\text{A}$
- * $R_{DS(ON)} \leq 200 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=2.0\text{A}$
- * Simple drive requirement

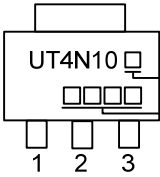
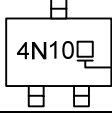
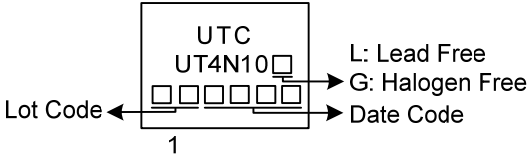
SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen-Free		1	2	3	
UT4N10L-AA3-R	UT4N10G-AA3-R	SOT-223	G	D	S	Tape Reel
UT4N10L-AE3-R	UT4N10G-AE3-R	SOT-23	G	S	D	Tape Reel
UT4N10L-TN3-R	UT4N10G-TN3-R	TO-252	G	D	S	Tape Reel

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

UT4N10G-AA3-R (1) Packing Type (2) Package Type (3) Green Package	(1) R: Tape Reel (2) AA3: SOT-223, AE3: SOT-23, TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free
--	--

MARKING

PACKAGE	MARKING
SOT-223	
SOT-23	
TO-252	

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	Continuous	I_D	4	A
	Pulsed (Note 2)	I_{DM}	8	A
Avalanche Energy (Note 3)	Single Pulsed (Note 3)	E_{AS}	29	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.4	V/ns
Power Dissipation	SOT-223	P_D	0.89	W
	SOT-23		0.3	W
	TO-252		1.14	W
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Storage Temperature Range		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. $L = 30\text{mH}$, $I_{AS} = 1.4\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$.

4. $I_{SD} \leq 4.0\text{A}$, $di/dt \leq 100\text{ A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DS}$, $T_J = 25^{\circ}\text{C}$.

■ **THERMAL DATA (NOTE)**

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	SOT-223	θ_{JA}	140	$^{\circ}\text{C}/\text{W}$
	SOT-23		416	$^{\circ}\text{C}/\text{W}$
	TO-252		110	$^{\circ}\text{C}/\text{W}$

Note: Surface mounted on 1 in² copper pad of FR4 board; 270 $^{\circ}\text{C}/\text{W}$ when mounted on min. copper pad.

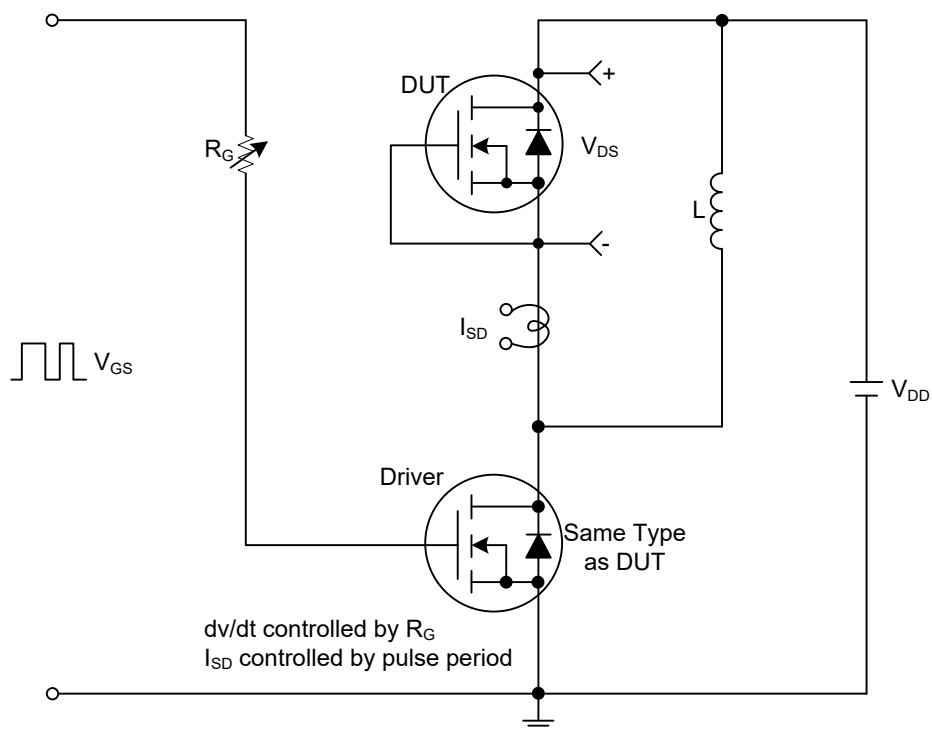
■ **ELECTRICAL CHARACTERISTICS** ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	100			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20V			±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 =2.0A			180	mΩ
		V _{GS} =4.5V, I _D =2.0A			200	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		400		pF
Output Capacitance	C _{OSS}			30		pF
Reverse Transfer Capacitance	C _{RSS}			21		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =80V, V _{GS} =10V, I _D =4.0A, (Note 1, 2)		22		nC
Gate Source Charge	Q _{GS}			3.8		nC
Gate Drain Charge	Q _{GD}			4		nC
Turn-ON Delay Time (Note 1)	t _{D(ON)}	V _{DD} =15V, V _{GS} =10V, I _D =4.0A, R _G =25Ω (Note 1, 2)		5		ns
Turn-ON Rise Time	t _{TR}			17		ns
Turn-OFF Delay Time	t _{D(OFF)}			34		ns
Turn-OFF Fall-Time	t _F			22		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				4	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				8	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	I _S =4.0A, V _{GS} =0V			1.4	V
Reverse Recovery Time (Note 1)	t _{rr}	I _S =4.0A, V _{GS} =0V,		45		ns
Reverse Recovery Charge	Q _{rr}	dI/dt=100A/μs		35		nC

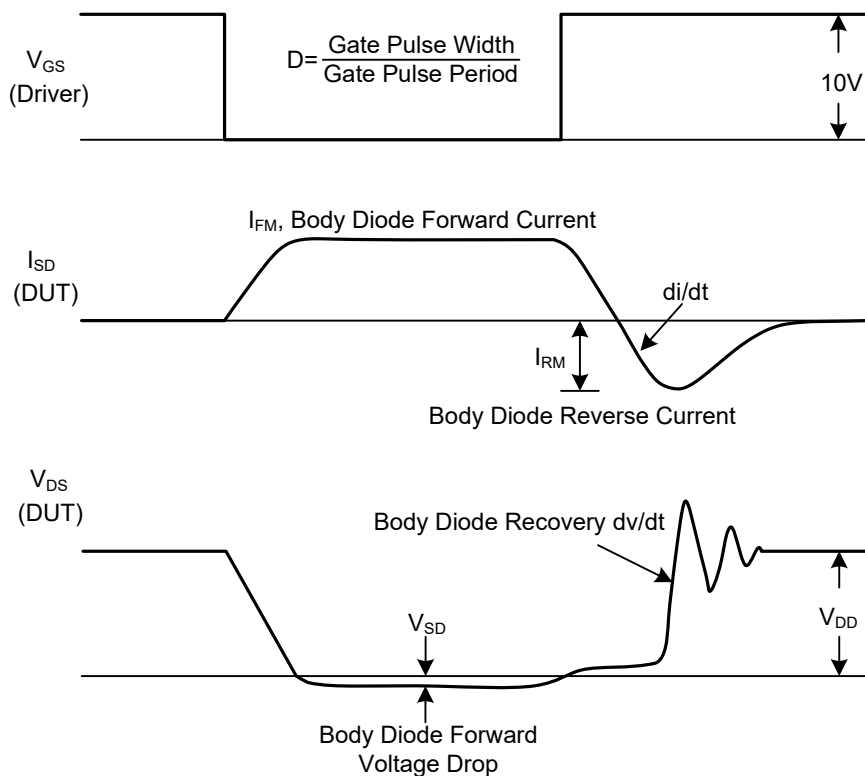
Notes: 1. Pulse Test : Pulse width $\leq 1000\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS



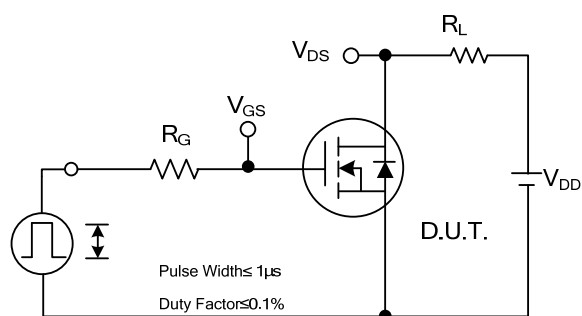
Peak Diode Recovery dv/dt Test Circuit



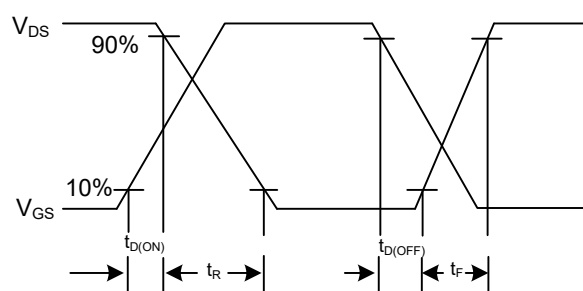
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

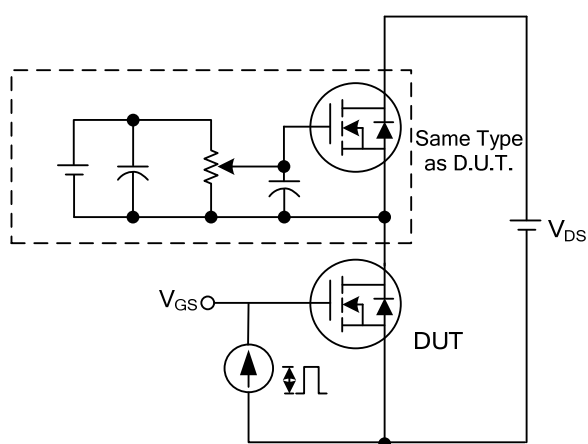
■ TEST CIRCUITS AND WAVEFORMS



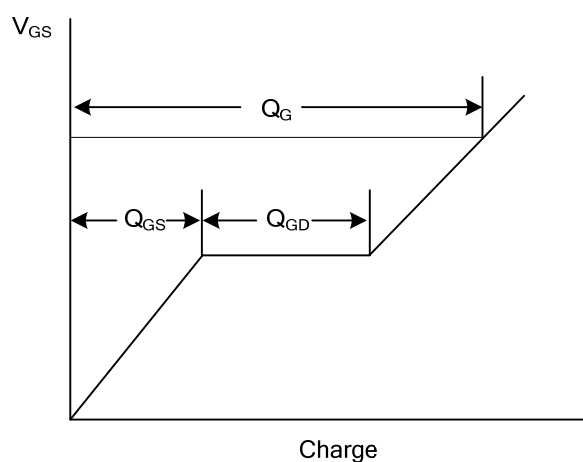
Switching Test Circuit



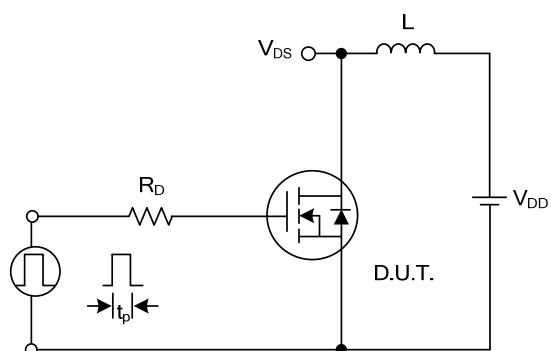
Switching Waveforms



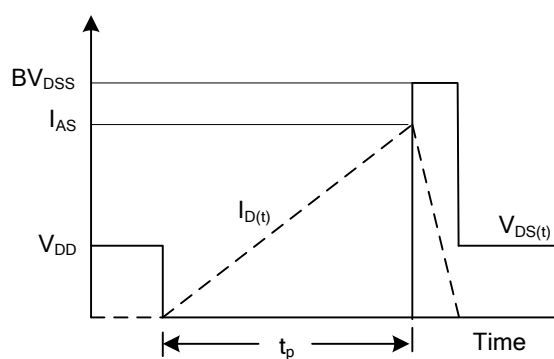
Gate Charge Test Circuit



Gate Charge Waveform



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.