

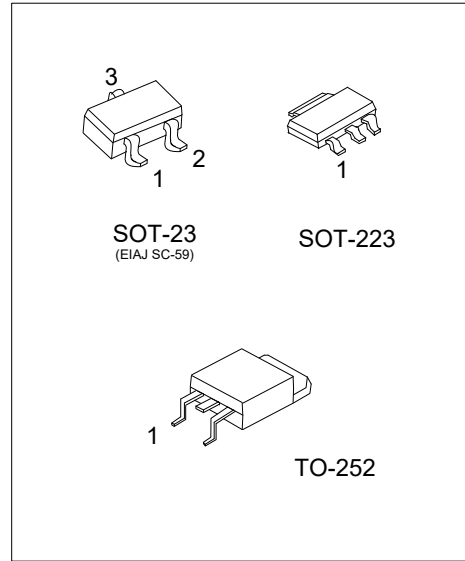


**UT4N10**

Preliminary

**Power MOSFET**

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



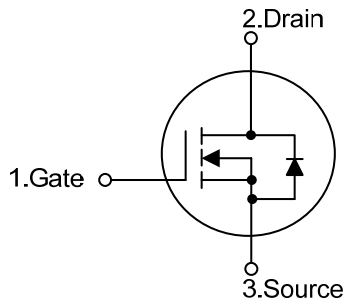
■ **DESCRIPTION**

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

<p>UT4N10G-AA3-R</p> <ul style="list-style-type: none"> <li>(1)Packing Type</li> <li>(2)Package Type</li> <li>(3)Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) R: Tape Reel</li> <li>(2) AA3: SOT-223, AE3: SOT-23, TN3: TO-252</li> <li>(3) G: Halogen Free and Lead Free, L: Lead Free</li> </ul>
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■ ABSOLUTE MAXIMUM RATING ( $T_A=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	100	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	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.  $I_{SD} \leq 4.0\text{A}$ ,  $di/dt \leq 100\text{A}/\mu\text{s}$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J = 25^\circ\text{C}$ .

■ THERMAL DATA (NOTE)

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	SOT-223	$\theta_{JA}$	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 in<sup>2</sup> copper pad of FR4 board; 270 $^\circ\text{C}/\text{W}$  when mounted on min. copper pad.

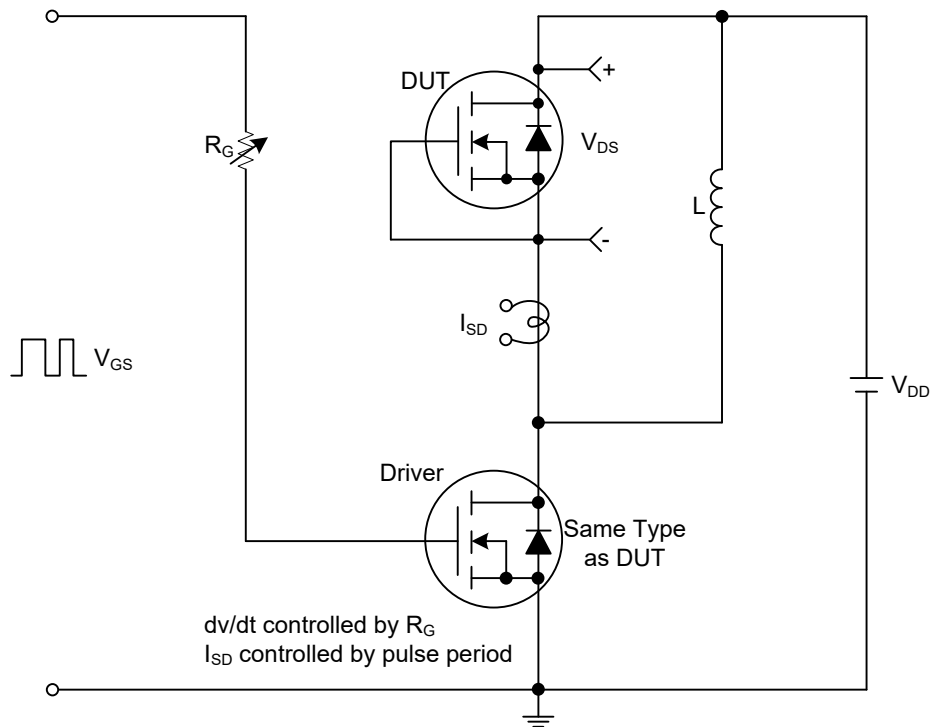
■ ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	100			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS} = 100V, V_{GS} = 0V$			1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20V$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0		3.0	V
Drain to Source On-state Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 2.0A$			180	m $\Omega$
		$V_{GS} = 4.5V, I_D = 2.0A$			200	m $\Omega$
<b>DYNAMIC PARAMETERS</b>						
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
<b>SWITCHING PARAMETERS</b>						
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)	$t_{D(ON)}$	$V_{DD} = 15V, V_{GS} = 10V, I_D = 4.0A,$ $R_G = 25\Omega$ (Note 1, 2)		5		ns
Turn-ON Rise Time	$t_R$			17		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			34		ns
Turn-OFF Fall-Time	$t_F$			22		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
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	$Q_{rr}$	$di/dt = 100A/\mu s$		35		nC

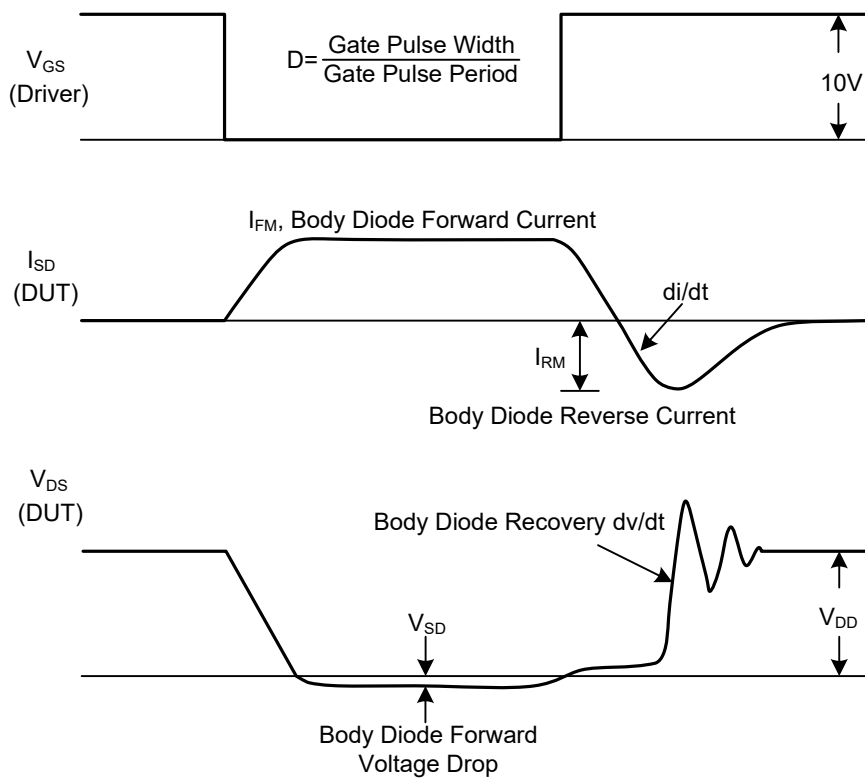
Notes: 1. Pulse Test : Pulse width  $\leq 1000\mu s$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS



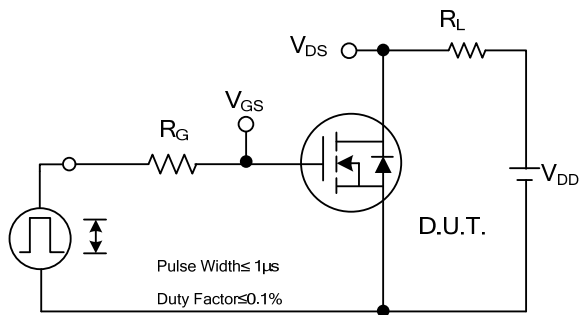
Peak Diode Recovery dv/dt Test Circuit



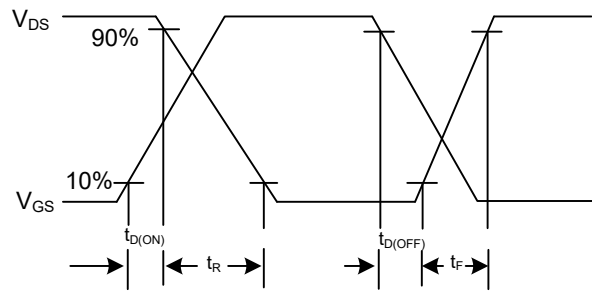
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

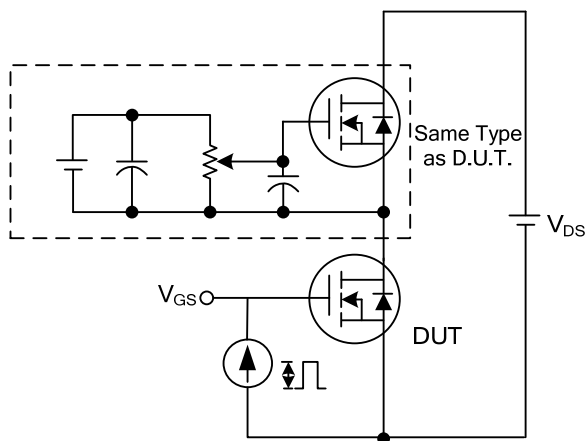
■ TEST CIRCUITS AND WAVEFORMS



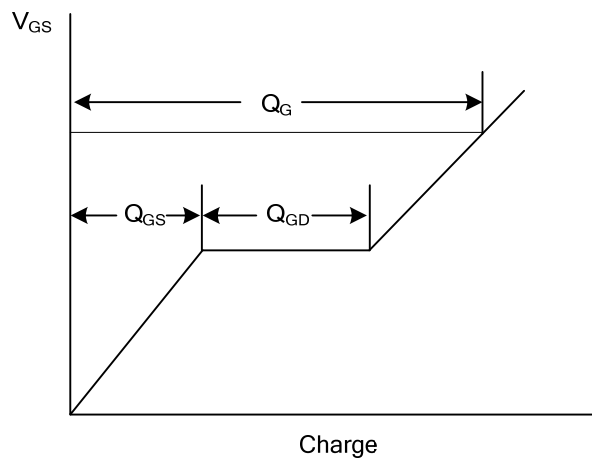
Switching Test Circuit



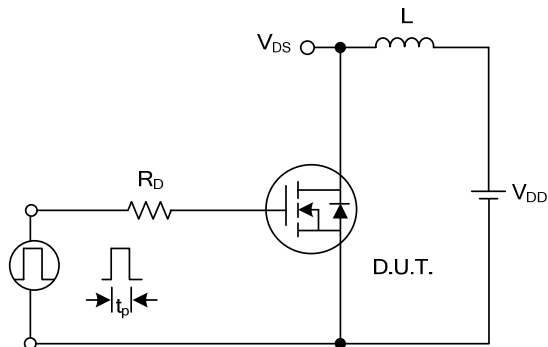
Switching Waveforms



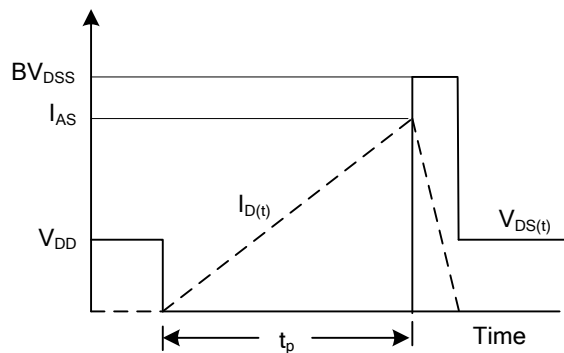
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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