

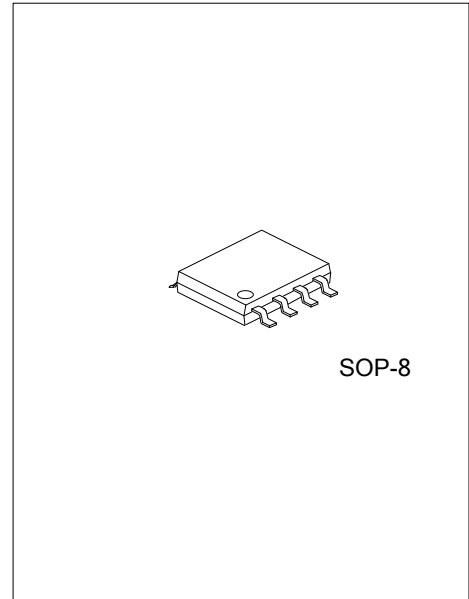


UT24NN04

Preliminary

Power MOSFET

**24A, 40V DUAL N-CHANNEL
ENHANCEMENT MODE
POWER MOSFET**



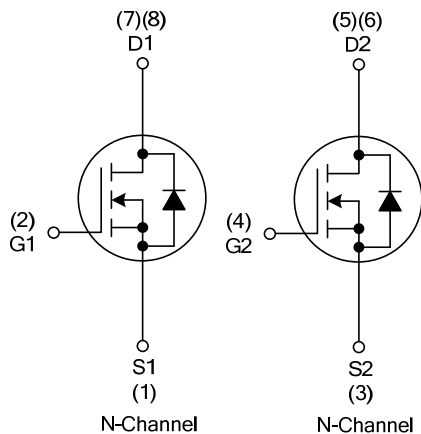
■ DESCRIPTION

The UTC **UT24NN04** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with low R_{DS(ON)} characteristic by high cell density trench technology.

■ FEATURES

- * R_{DS(ON)} ≤ 17 mΩ @ V_{GS}=10V, I_D=12A
- R_{DS(ON)} ≤ 22 mΩ @ V_{GS}=4.5V, I_D=12A
- * Fast Switching Speed
- * Simple Drive Requirement

■ SYMBOL



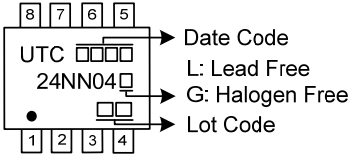
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	15	
UT24NN04L-S08-R	UT24NN04G-S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

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

<p>UT24NN04G-S08-R</p>	<p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) S08: SOP-8</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
------------------------	--	--

MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	40	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	Continuous	I_D	24	A
	Pulsed (Note 2)	I_{DM}	48	A
Power Dissipation		P_D	1	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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	125	$^{\circ}\text{C/W}$

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

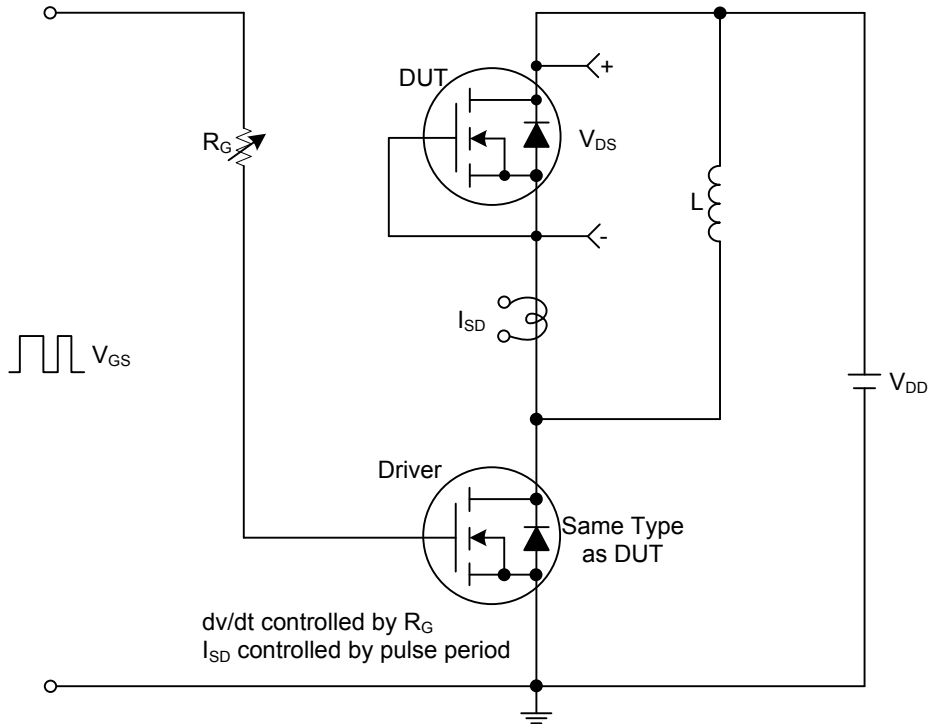
■ ELECTRICAL CHARACTERISTICS ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS								
Drain-Source Breakdown Voltage		BV_{DSS}	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	40			V	
Drain-Source Leakage Current		I_{DSS}	$V_{DS}=40\text{V}, V_{GS}=0\text{V}$			1	μA	
Gate-Source Leakage Current	Forward	I_{GSS}	$V_{DS}=0\text{V}, V_{GS}=20\text{V}$			60	nA	
	Reverse		$V_{DS}=0\text{V}, V_{GS}=-20\text{V}$			-60	nA	
ON CHARACTERISTICS								
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.0		3.0	V	
Drain-Source On-State Resistance		$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=15\text{A}$			17	$\text{m}\Omega$	
			$V_{GS}=4.5\text{V}, I_D=15\text{A}$			22	$\text{m}\Omega$	
DYNAMIC PARAMETERS								
Input Capacitance		C_{ISS}	$V_{DS}=25\text{V}, V_{GS}=0\text{V}, f=1.0\text{MHz}$		1200		pF	
Output Capacitance		C_{OSS}				135		pF
Reverse Transfer Capacitance		C_{RSS}				115		pF
SWITCHING PARAMETERS								
Total Gate Charge (Note 1)		Q_G	$V_{DS}=32\text{V}, V_{GS}=10\text{V}, I_D=24\text{A}, I_G=1\text{mA}$ (Note 1, 2)		36		nC	
Gate-Source Charge		Q_{GS}				6		nC
Gate-Drain Charge		Q_{GD}				10		nC
Turn-ON Delay Time (Note 1)		$t_{D(ON)}$	$V_{DD}=30\text{V}, V_{GS}=10\text{V}, I_D=24\text{A}, R_G=3\Omega$ (Note 1, 2)		10		ns	
Turn-ON Rise Time		t_R				20		ns
Turn-OFF Delay Time		$t_{D(OFF)}$				9		ns
Turn-OFF Fall Time		t_F				20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS								
Maximum Body-Diode Continuous Current		I_S				24	A	
Maximum Body-Diode Pulsed Current		I_{SM}				48	A	
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	$I_S=24\text{A}, V_{GS}=0\text{V}$			1.4	V	

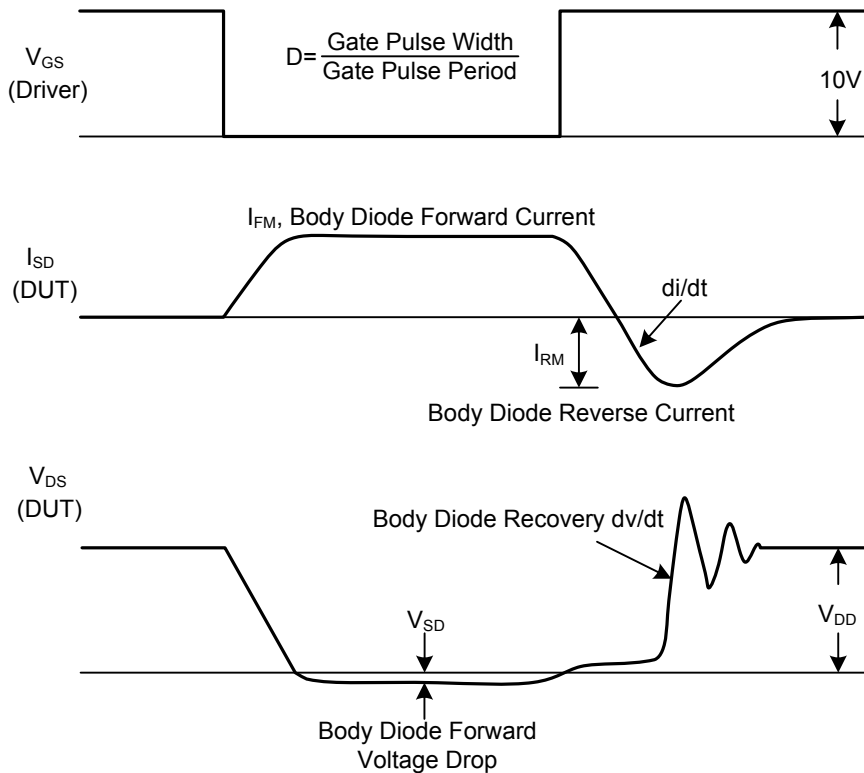
Notes: 1. Pulse Test: Pulse width $\leq 600\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



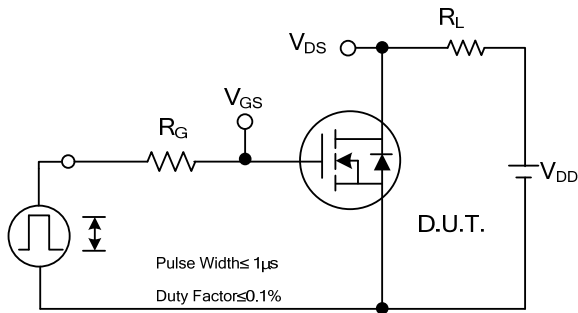
Peak Diode Recovery dv/dt Test Circuit



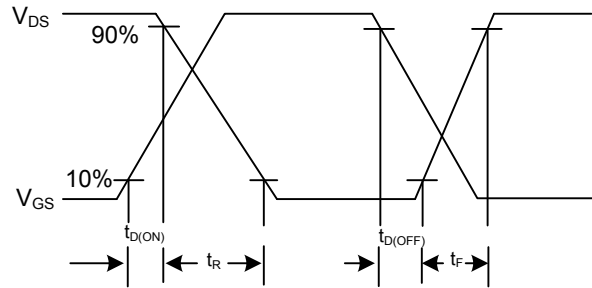
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

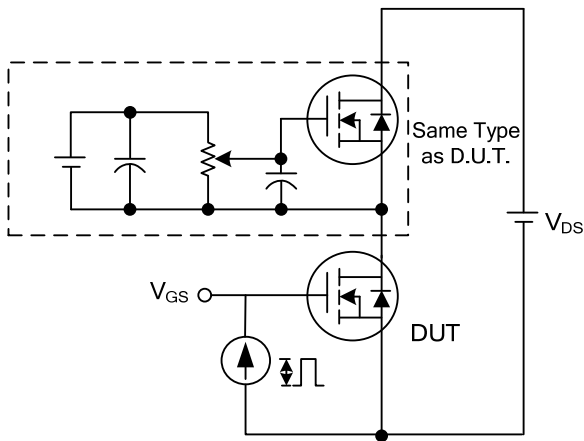
■ TEST CIRCUITS AND WAVEFORMS



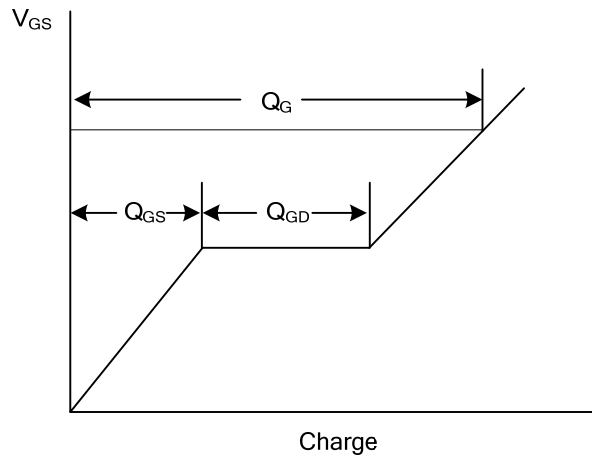
Switching Test Circuit



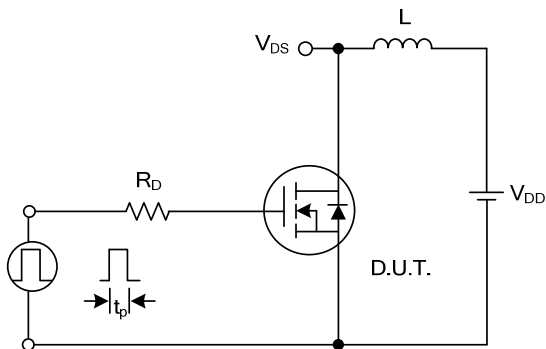
Switching Waveforms



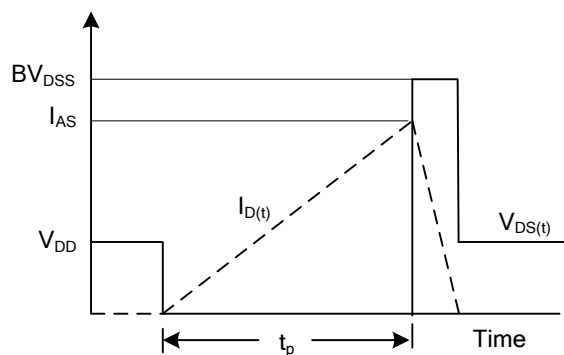
Gate Charge Test Circuit



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.