

**UT40N08M**

Preliminary

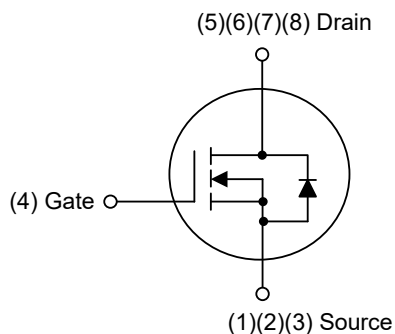
Power MOSFET

**40A, 80V N-CHANNEL
POWER MOSFET****DESCRIPTION**

The **UTC UT40N08M** is a high voltage and high current power MOSFET, designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient AC to DC converters and bridge circuits.

FEATURES

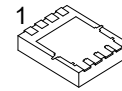
- * $R_{DS(ON)} \leq 35 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=20\text{A}$
- $R_{DS(ON)} \leq 39 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=20\text{A}$
- * High Switching Speed

SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT40N08ML-P3030-R	UT40N08MG-P3030-R	PDFN3×3	S	S	S	G	D	D	D	D	Tape Reel
UT40N08ML-P5060-R	UT40N08MG-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

UT40N08MG-P3030-R		(1) Packing Type	(1) R: Tape Reel
		(2) Package Type	(2) P3030: PDFN3×3, P5060: PDFN5×6
		(3) Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free



PDFN5×6



PDFN3×3

MARKING

PDFN3×3	PDFN5×6
UT 40N08M • □□□ → Date Code	UTC UT 40N08M • □□□□□ Lot Code ← → Date Code

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	80	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	Continuous	I_D	40	A
	Pulsed (Note 2)	I_{DM}	80	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	27	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1	V/ns
Power Dissipation	PDFN3×3	P_D	20	W
	PDFN5×6		25	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. $L = 0.1\text{mH}$, $I_{AS} = 23.4\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq 30\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	PDFN3×3	θ_{JA}	130	$^{\circ}\text{C}/\text{W}$
	PDFN5×6		65	$^{\circ}\text{C}/\text{W}$
Junction to Case	PDFN3×3	θ_{JC}	6.25 (Note)	$^{\circ}\text{C}/\text{W}$
	PDFN5×6		5 (Note)	$^{\circ}\text{C}/\text{W}$

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

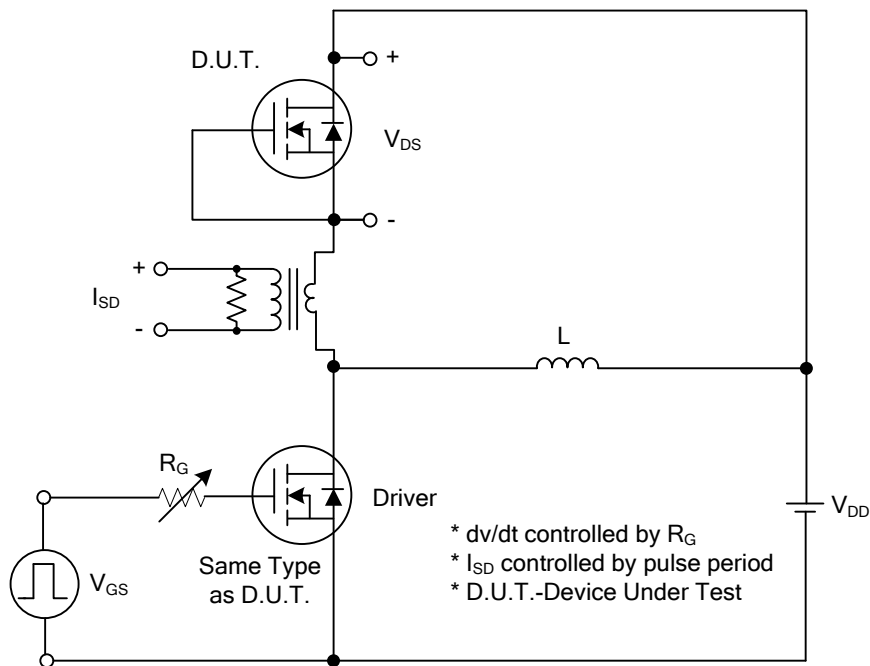
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D = 250μA	80			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =80V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =20V, V _{DS} =0V			100	nA
	Reverse		V _{GS} =-20V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	1.0		3.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =20A			35	mΩ
			V _{GS} =4.5V, I _D =20A			39	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0 MHz		1819		pF
Output Capacitance		C _{OSS}			147		pF
Reverse Transfer Capacitance		C _{RSS}			120		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =64V, V _{GS} =10V, I _D =40A (Note 1, 2)		61.6		nC
Gate-Source Charge		Q _{GS}			10		nC
Gate-Drain Charge		Q _{GD}			17.1		nC
Turn-on Delay Time (Note 1)		t _{D(ON)}	V _{DD} =40V, V _{GS} =10V, I _D =40A, R _G =3Ω (Note 1, 2)		10		ns
Rise Time		t _R			59		ns
Turn-off Delay Time		t _{D(OFF)}			40		ns
Fall-Time		t _F			73		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				40	A
Maximum Body-Diode Pulsed Current		I _{SM}				80	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	V _{GS} =0V, I _S =40A			1.4	V
Reverse Recovery Time (Note 1)		t _{rr}	V _{GS} =0V, I _S =30A,		42		ns
Reverse Recovery Charge		Q _{rr}	dl _F /dt=100A/μs (Note1)		33		nC

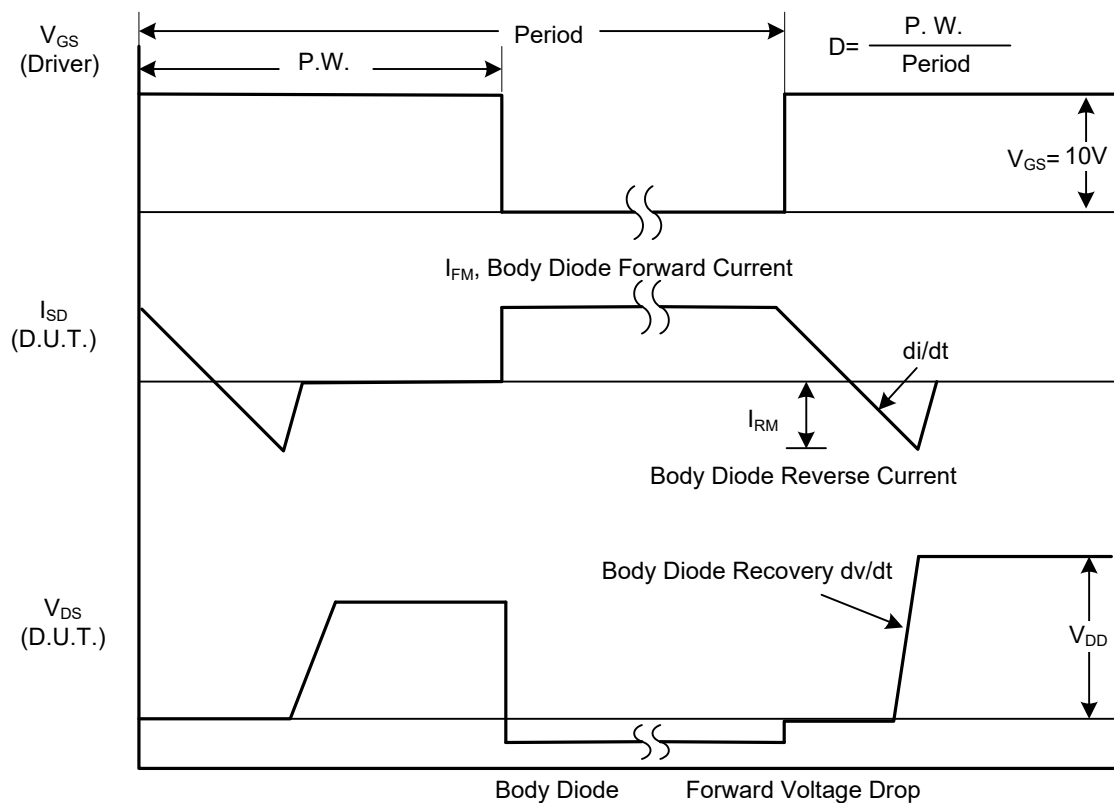
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

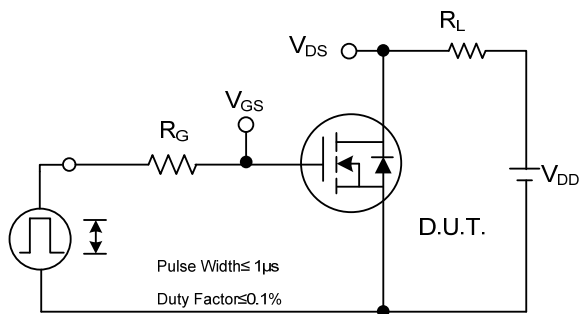


Peak Diode Recovery dv/dt Test Circuit

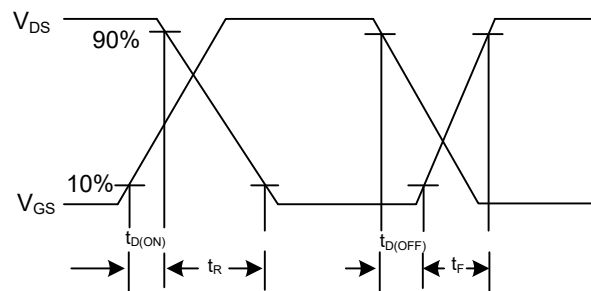


Peak Diode Recovery dv/dt Waveforms

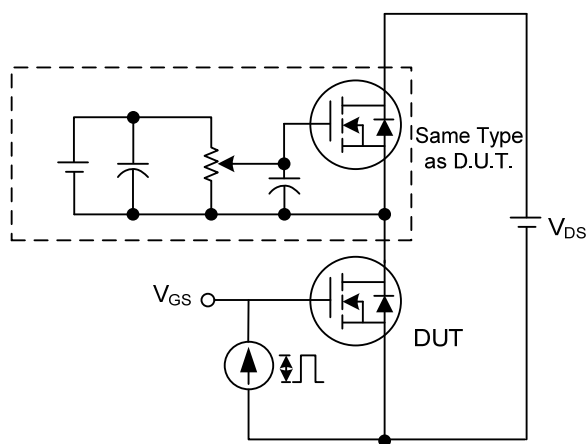
■ TEST CIRCUITS AND WAVEFORMS



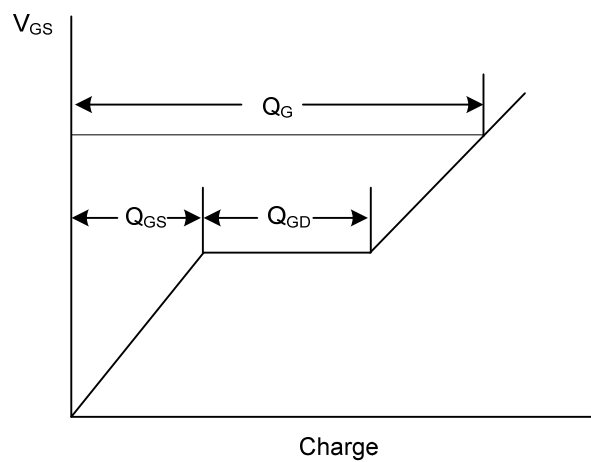
Switching Test Circuit



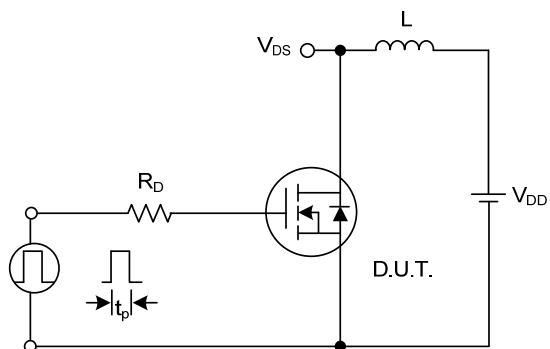
Switching Waveforms



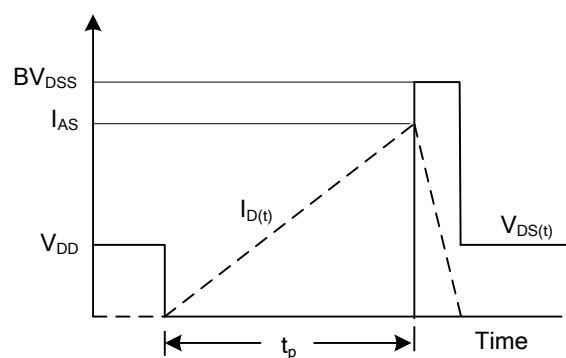
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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