



UNA04R060M

Power MOSFET

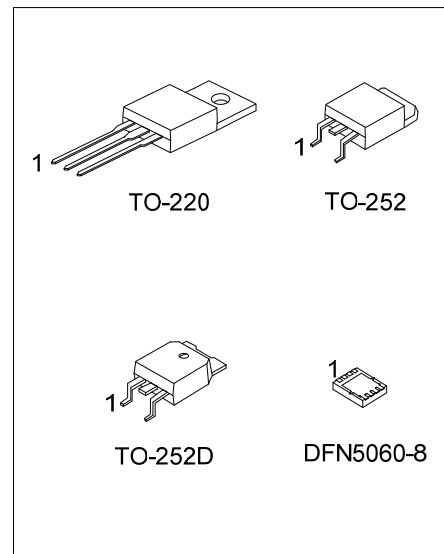
70A, 40V N-CHANNEL POWER MOSFET

■ DESCRIPTION

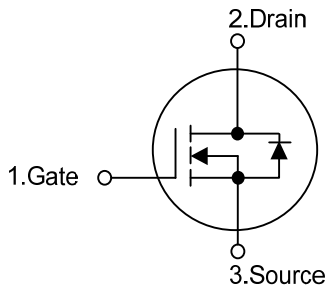
The UTC **UNA04R060M** is a N-channel enhancement mode power field effect transistors with stable off-state characteristics, fast switching speed, low thermal resistance, usually used at telecom and computer application.

■ FEATURES

- * $R_{DS(ON)} < 6.0\ m\Omega @ V_{GS} = 10\ V, I_D = 20\ A$
- * $R_{DS(ON)} < 8.0\ m\Omega @ V_{GS} = 4.5\ V, I_D = 20\ A$
- * Fast switching capability
- * Avalanche energy specified



■ SYMBOL



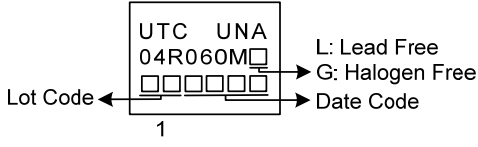
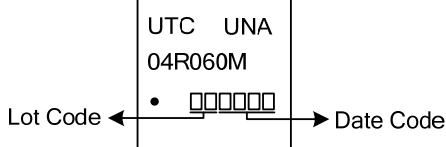
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UNA04R060ML-TA3-R	UNA04R060MG-TA3-R	TO-220	G	D	S	-	-	-	-	-	Tube
UNA04R060ML-TN3-R	UNA04R060MG-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UNA04R060ML-TND-R	UNA04R060MG-TND-R	TO-252D	G	D	S	-	-	-	-	-	Tape Reel
UNA04R060MG-K08-5060-R	UNA04R060MG-K08-5060-R	DFN5060-8	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UNA04R060MG-TA3-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) TA3: TO-220, TN3: TO-252, TND: TO-252D, K08-5060: DFN5060-8</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
--	--

■ MARKING

TO-220 / TO-252 / TO-252D	DFN5060-8
 <p>UTC UNA 04R060M □□□□□ 1</p> <p>Lot Code ←</p> <p>→ L: Lead Free → G: Halogen Free → Date Code</p>	 <p>UTC UNA 04R060M • □□□□□</p> <p>Lot Code ←</p> <p>→ Date Code</p>

FLYING 汎翔國際有限公司
www.flying1688.com

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	40	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current	$T_C = 25^\circ\text{C}$	TO-220	70	A
		TO-252		
	TO-252D	50	A	
	DFN5060-8			
$T_C = 100^\circ\text{C}$	TO-220	42	A	
	TO-252			
	TO-252D	30	A	
	DFN5060-8			
Drain Current Pulsed (Note 2)	TO-220	210	A	
	TO-252			
	TO-252D	150	A	
	DFN5060-8			
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	80	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	10	V/ns
Power Dissipation	TO-220	110	W	
	TO-252			
	TO-252D	50	W	
	DFN5060-8			
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. Repeatability rating: pulse width limited by junction temperature.

3. $L=0.1\text{mH}$, $I_{AS}=40\text{A}$, $V_{DD}=25\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

4. $I_{SD}\leq 48\text{A}$, $di/dt\leq 300\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$

■ THERMAL DATA (Note)

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-252		110	$^\circ\text{C}/\text{W}$
	TO-252D			
	DFN5060-8		35	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	1.14	$^\circ\text{C}/\text{W}$
	TO-252		2.5	$^\circ\text{C}/\text{W}$
	TO-252D			
	DFN5060-8		4.1	$^\circ\text{C}/\text{W}$

Note: The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

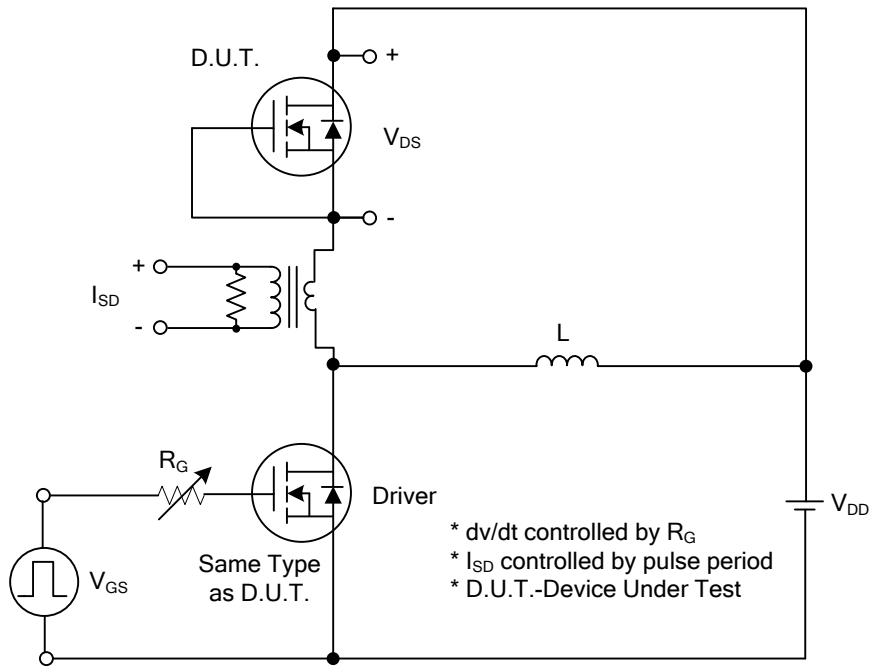
■ ELECTRICAL CHARACTERISTICS (T_c = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	40			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	Forward	I _{GSS}			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	1.6	3.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A			6.0	mΩ
		V _{GS} =4.5V, I _D =20A			8.0	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1MHz		5509		pF
Output Capacitance	C _{OSS}			440		pF
Reverse Transfer Capacitance	C _{RSS}			280		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q _G	V _{DS} =30V, V _{GS} =10V, I _D =1.3A, I _D =100μA (Note 1, 2)		189		nC
Gate-Source Charge	Q _{GS}			10		nC
Gate-Drain Charge (Miller Charge)	Q _{GD}			12.8		nC
Turn-On Delay Time	t _{D(ON)}	V _{DD} =20V, V _{GS} =10V, I _D =0.5A (Note 1, 2)		100		ns
Turn-On Rise Time	t _R			133		ns
Turn-Off Delay Time	t _{D(OFF)}			780		ns
Turn-Off Fall Time	t _F			300		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				70	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				210	A
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =20A			1.0	V
Reverse Recovery Time	t _{rr}	V _{GS} =0V, I _S =20A di/dt=100A/μs		2.67		ns
Reverse Recovery Charge	Q _{rr}			0.16		μC

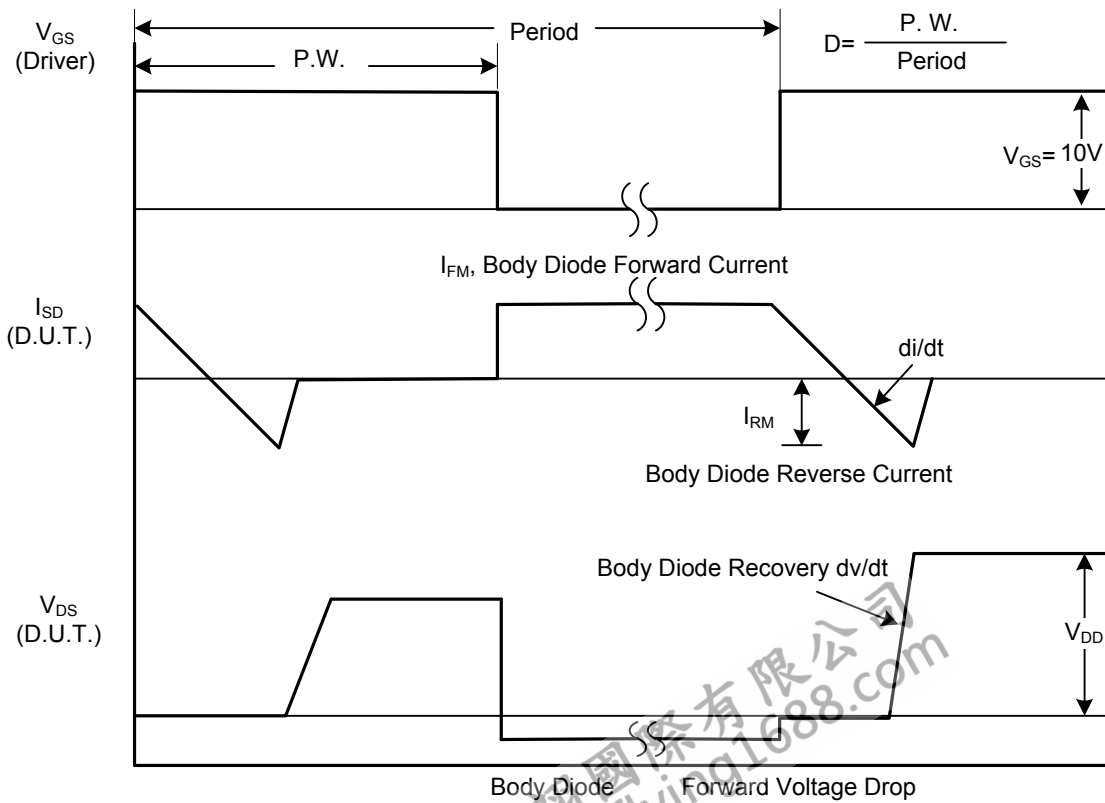
Notes: 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



1A Peak Diode Recovery dv/dt Test Circuit



1B Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS (Cont.)

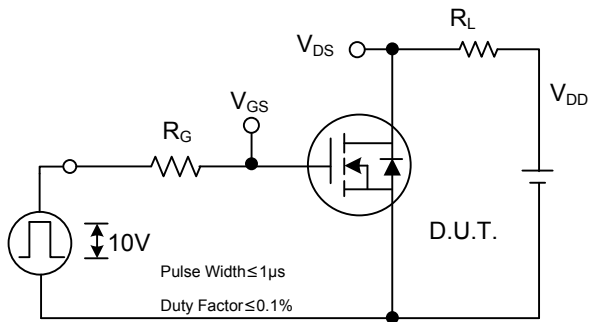


Fig. 2A Switching Test Circuit

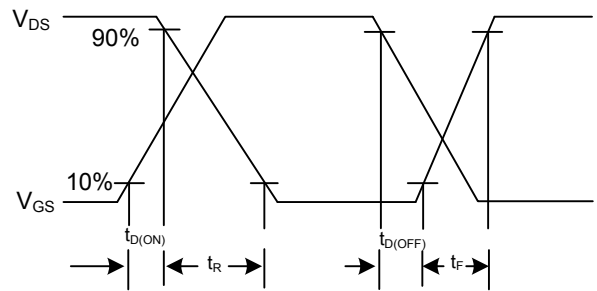


Fig. 2B Switching Waveforms

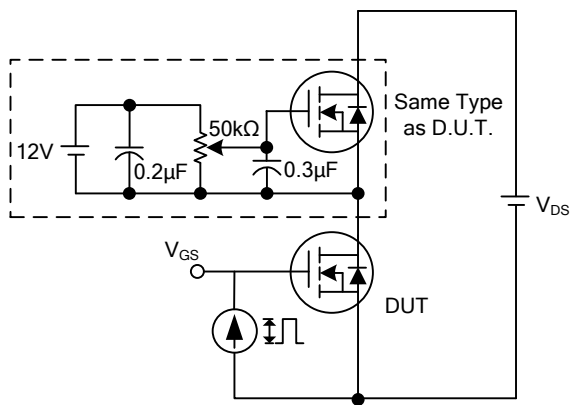


Fig. 3A Gate Charge Test Circuit

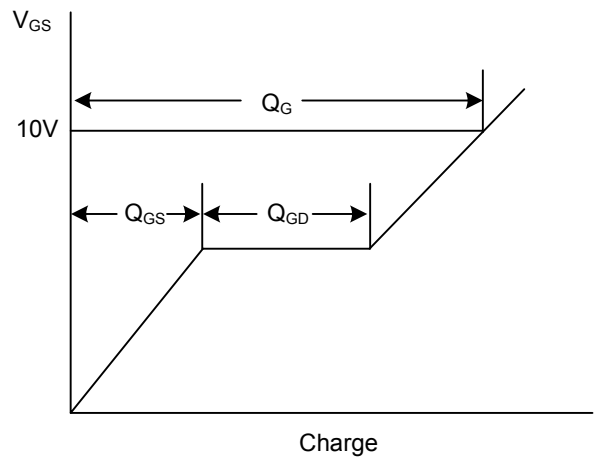


Fig. 3B Gate Charge Waveform

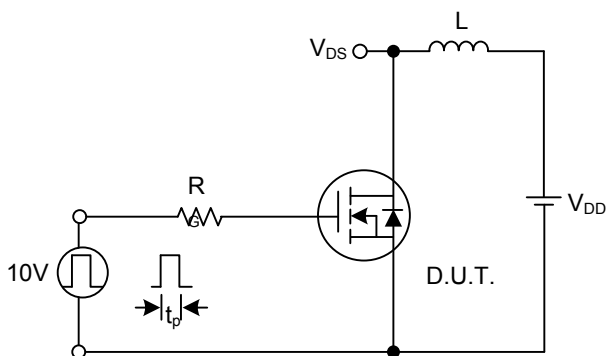


Fig. 4A Unclamped Inductive Switching Test Circuit

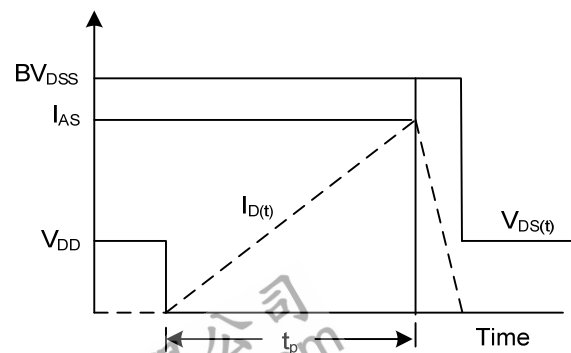


Fig. 4B Unclamped Inductive Switching Waveforms

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.