



**UNA10R180H**

**Power MOSFET**

**42A, 100V N-CHANNEL  
POWER MOSFET**

■ **DESCRIPTION**

The UTC **UNA10R180H** is a N-Channel enhancement MOSFET, it uses UTC's advanced technology to provide customers with a minimum on-state resistance and high switching speed.

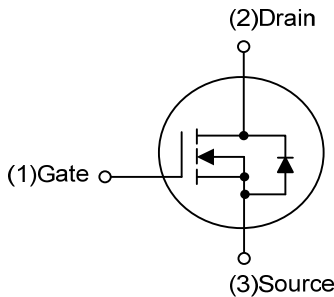
The UTC **UNA10R180H** is suitable for use in a wide variety of applications.

■ **FEATURES**

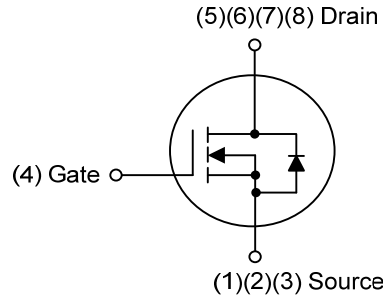
\*  $R_{DS(ON)} \leq 18 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=33\text{A}$

\* High switching speed

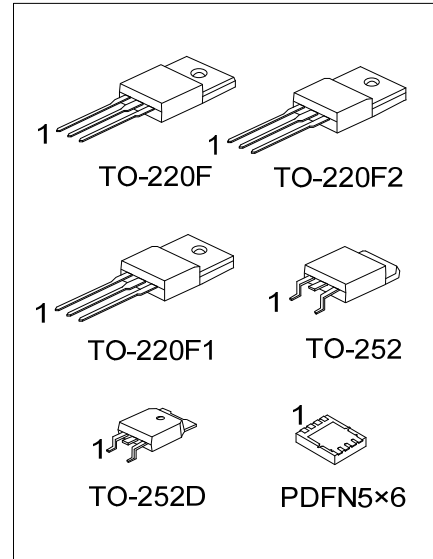
■ **SYMBOL**



TO-220/TO-220F/TO-220F1  
TO-220F2/TO-251/TO-252/TO-252D



PDFN5x6



■ **ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UNA10R180HL-TF1-T	UNA10R180HG-TF1-T	TO-220F1	G	D	S	-	-	-	-	-	Tube
UNA10R180HL-TF2-T	UNA10R180HG-TF2-T	TO-220F2	G	D	S	-	-	-	-	-	Tube
UNA10R180HL-TF3-T	UNA10R180HG-TF3-T	TO-220F	G	D	S	-	-	-	-	-	Tube
UNA10R180HL-TN3-R	UNA10R180HG-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UNA10R180HL-TND-R	UNA10R180HG-TND-R	TO-252D	G	D	S	-	-	-	-	-	Tape Reel
UNA10R180HL-P5060-R	UNA10R180HG-P5060-R	PDFN5x6	S	S	S	G	D	D	D	D	Tape Reel

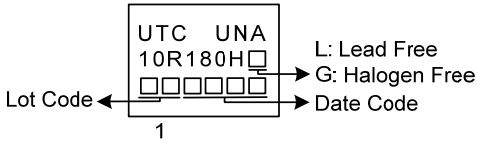
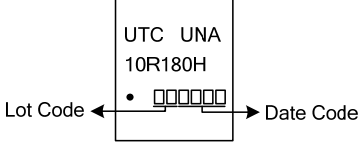
Note: Pin Assignment: G: Gate D: Drain S: Source

<p>UNA10R180HG-TF3-T</p>	<p>(1) T: Tube, R: Tape Reel (2) TF1: TO-220F1, TF2: TO-220F2, TF3: TO-220F, TN3: TO-252, TND: TO-252D, P5060: PDFN5x6 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
--------------------------	--

# UNA10R180H

Power MOSFET

## MARKING

TO-220F / TO-220F1 / TO-220F2 / TO-252 / TO-252D	PDFN5x6
 <p>UTC UNA 10R180H □ □ □ □ □ □ Lot Code ← → Date Code</p> <p>L: Lead Free G: Halogen Free</p> <p>1</p>	 <p>UTC UNA 10R180H □ • □ □ □ □ Lot Code ← → Date Code</p>

### ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT	
Drain-Source Voltage		$V_{DSS}$	100	V	
Gate-Source Voltage		$V_{GSS}$	±20	V	
Drain Current	Continuous	$I_D$	$V_{GS} @ 10V, T_C=25^\circ C$ (Silicon Limited)	56	A
			$V_{GS} @ 10V, T_C=100^\circ C$	39	A
			$V_{GS} @ 10V$ (Package Limited), $T_C=25^\circ C$	42	A
	Pulsed (Note 2)	$I_{DM}$	220	A	
Single Pulse Avalanche Energy Tested Value (Note 6)		$E_{AS}$ (Tested )	200	mJ	
Power Dissipation ( $T_C=25^\circ C$ )	TO-220F/TO-220F1		30	W	
	TO-220F2				
	TO-252/TO-252D		140	W	
	PDFN5×6		39	W	
Junction Temperature		$T_J$	-55 ~ +175	°C	
Storage Temperature Range		$T_{STG}$	-55 ~ +175	°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.  $L=0.28mH, I_{AS}=33A, V_{DD}=10V, R_G=25\Omega$ , Starting  $T_J=25^\circ C$

4.  $I_{SD}\leq 33A, di/dt\leq 200A/\mu s, V_{DD}\leq BV_{DSS}$ , starting  $T_J=25^\circ C$

5. Limited by  $T_{Jmax}$ , see Test Circuits and Waveforms for typical repetitive avalanche performance.

6. This value determined from sample failure population. 100% tested to this value in production.

### ■ THERMAL CHARACTERISTICS

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F/TO-220F1		62.5	°C/W
	TO-220F2			
	TO-252/TO-252D		110	°C/W
	PDFN5×6		35	°C/W
Junction to Case	TO-220F/TO-220F1		4.17	°C/W
	TO-220F2			
	TO-252/TO-252D		0.89	°C/W
	PDFN5×6		3.2	°C/W

Note: The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.

■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub>=25°C, unless otherwise specified)

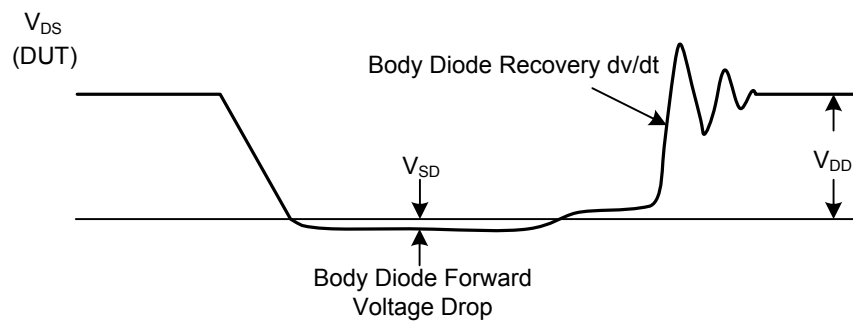
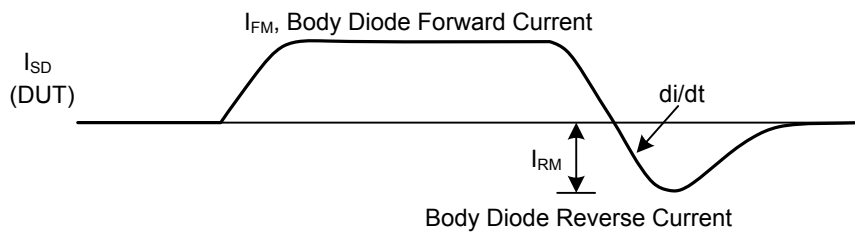
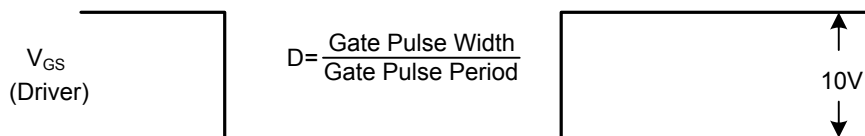
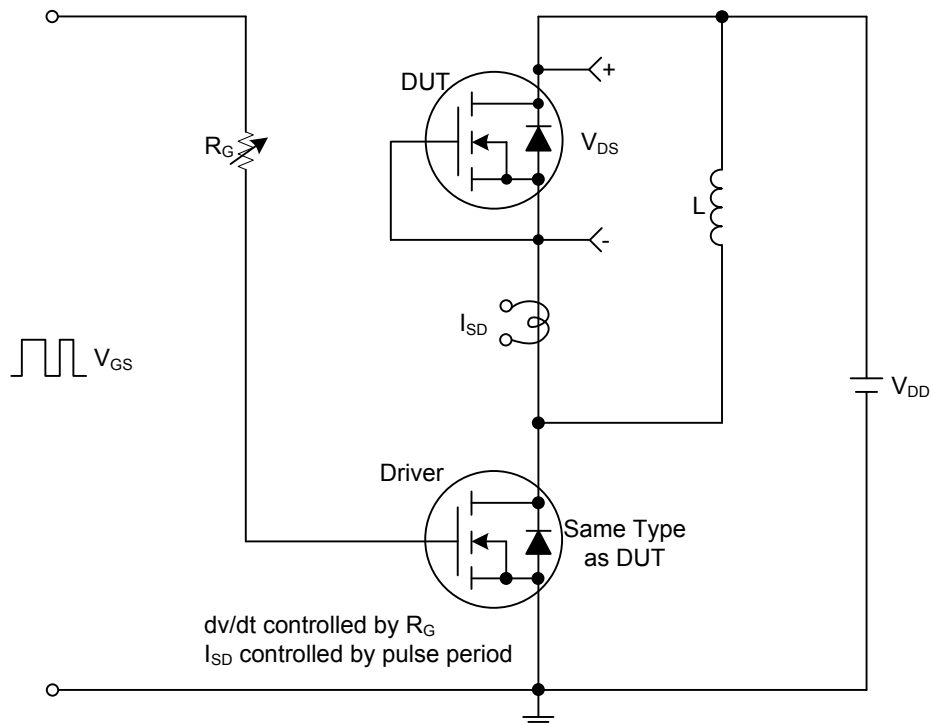
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	100			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V			20	μA
		V <sub>DS</sub> =100V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C			250	μA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =20V			200	nA
		V <sub>GS</sub> =-20V			-200	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =33A (Note 2)		15	18	mΩ
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz		2930		pF
Output Capacitance	C <sub>OSS</sub>			290		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			180		pF
Output Capacitance	C <sub>OSS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =1.0V, f=1.0MHz		1200		pF
		V <sub>GS</sub> =0V, V <sub>DS</sub> =80V, f=1.0MHz		180		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	Q <sub>G</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =30V, I <sub>D</sub> =1A I <sub>G</sub> =100μA (Note 2)		69	100	nC
Gate to Source Charge	Q <sub>GS</sub>			15		nC
Gate-to-Drain ("Miller") Charge	Q <sub>GD</sub>			25		nC
Turn-ON Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =6A, R <sub>G</sub> =6.8Ω (Note 2)		14		ns
Rise Time	t <sub>R</sub>			43		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			53		ns
Fall-Time	t <sub>F</sub>			42		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Continuous Source Current (Body Diode)	I <sub>S</sub>				56	A
Pulsed Source Current (Body Diode) (Note 1)	I <sub>SM</sub>				220	A
Diode Forward Voltage	V <sub>SD</sub>	T <sub>J</sub> =25°C, I <sub>S</sub> =33A, V <sub>GS</sub> =0V (Note 2)			1.3	V
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> =25°C, I <sub>S</sub> =33A,		35	53	ns
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt=100A/μs, V <sub>DD</sub> =50V (Note 2)		41	62	nC

Notes: 1. Repetitive rating; pulse width limited by maximum junction temperature.

2. Pulse width ≤1.0ms, duty cycle ≤ 2%.

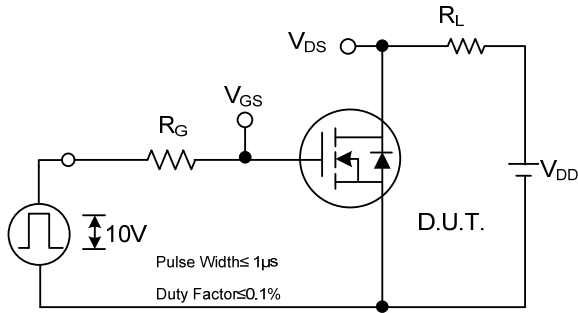
3. C<sub>OSS</sub> eff. is a fixed capacitance that gives the same charging time as C<sub>OSS</sub> while V<sub>DS</sub> is rising from 0 to 80% V<sub>DSS</sub>.

## TEST CIRCUITS AND WAVEFORMS

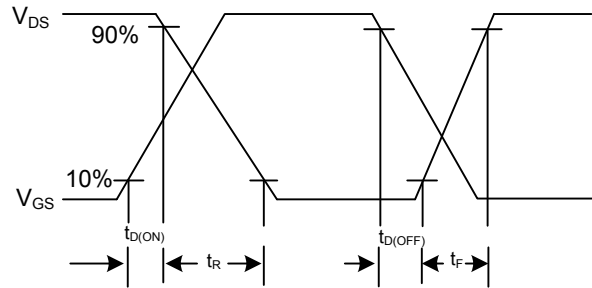


Peak Diode Recovery  $dv/dt$  Test Circuit and Waveforms

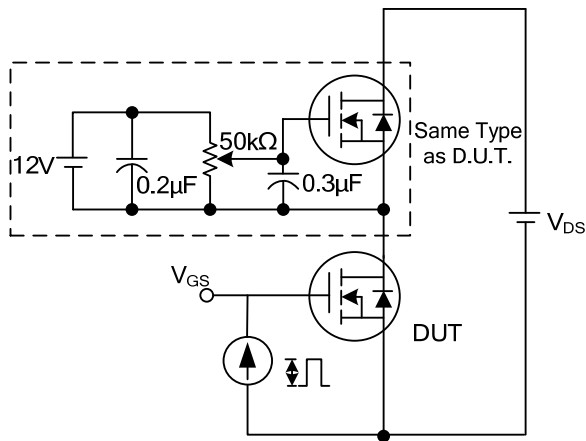
## TEST CIRCUITS AND WAVEFORMS



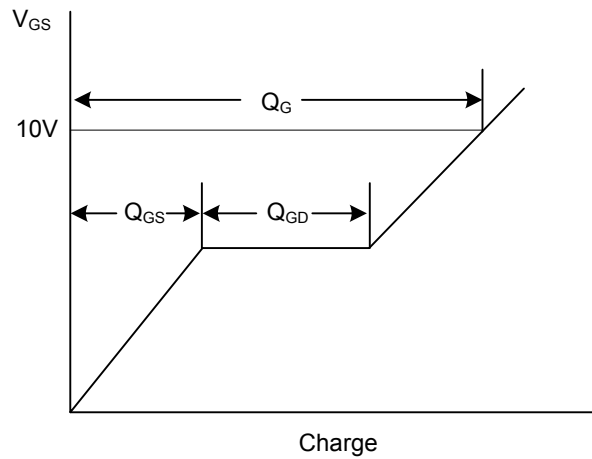
**Switching Test Circuit**



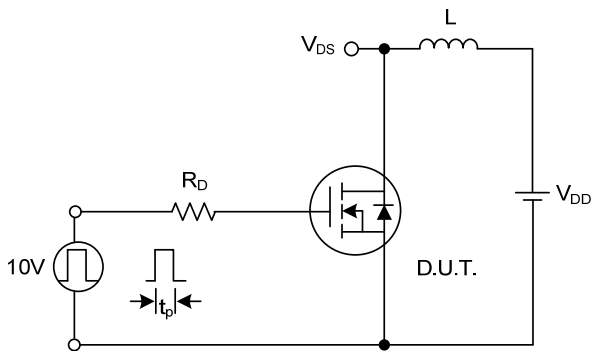
**Switching Waveforms**



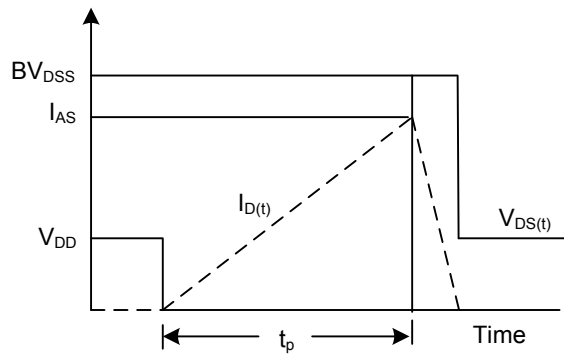
**Gate Charge Test Circuit**



**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.