

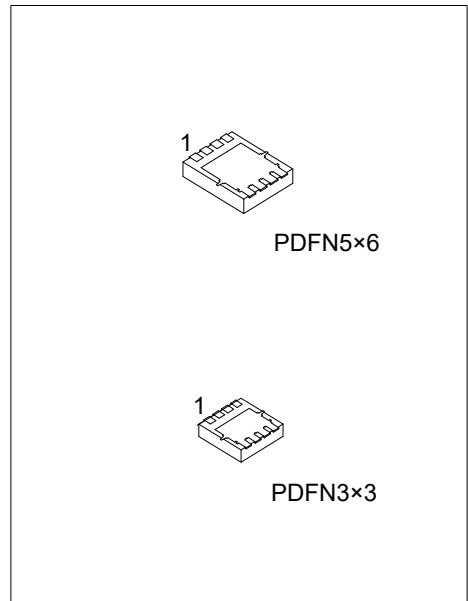


USG10R160H

Preliminary

Power MOSFET

**N-CHANNEL SGT
ENHANCEMENT POWER
MOSFET**



■ DESCRIPTION

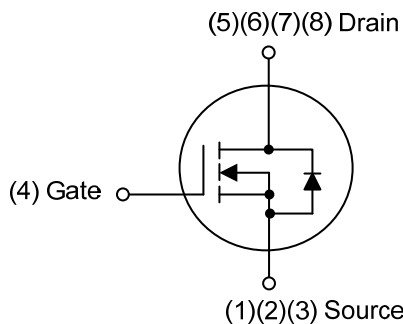
The UTC **USG10R160H** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed and low gate charge, etc.

The UTC **USG10R160H** applies to primary side switch, synchronous rectifier, Motor Drives, etc.

■ FEATURES

- * $R_{DS(ON)} \leq 16 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=20\text{A}$
- * High Cell Density Trench Technology
- * High Power and Current Handling Capability

■ SYMBOL



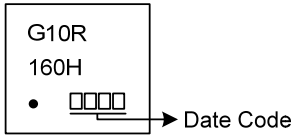
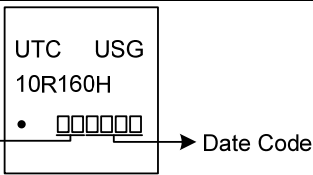
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment						Packing		
Lead Free	Halogen Free		1	2	3	4	5	6		7	8
USG10R160HL-P3030-R	USG10R160HG-P3030-R	PDFN3x3	S	S	S	G	D	D	D	D	Tape Reel
USG10R160HL-P5060-R	USG10R160HG-P5060-R	PDFN5x6	S	S	S	G	D	D	D	D	Tape Reel

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

<p>USG10R160HG-P3030-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) P3030: PDFN3x3, P5060: PDFN5x6</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
---	--

MARKING

PDFN3x3	PDFN5x6
 <p>G10R 160H • □□□□ → Date Code</p>	 <p>UTC USG 10R160H • □□□□□□ → Date Code ← Lot Code</p>

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	Continuous	I_D	40	A
	Pulsed (Note 2)	I_{DM}	80	A
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	1.7	mJ
Power Dissipation	PDFN3×3	P_D	22	W
	PDFN5×6		28	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. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.
 3. $L = 0.1\text{mH}$, $I_{AS} = 5.9\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	PDFN3×3	θ_{JA}	130	$^{\circ}\text{C/W}$
	PDFN5×6		65	$^{\circ}\text{C/W}$
Junction to Case (Note)	PDFN3×3	θ_{JC}	5.68	$^{\circ}\text{C/W}$
	PDFN5×6		4.46	$^{\circ}\text{C/W}$

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

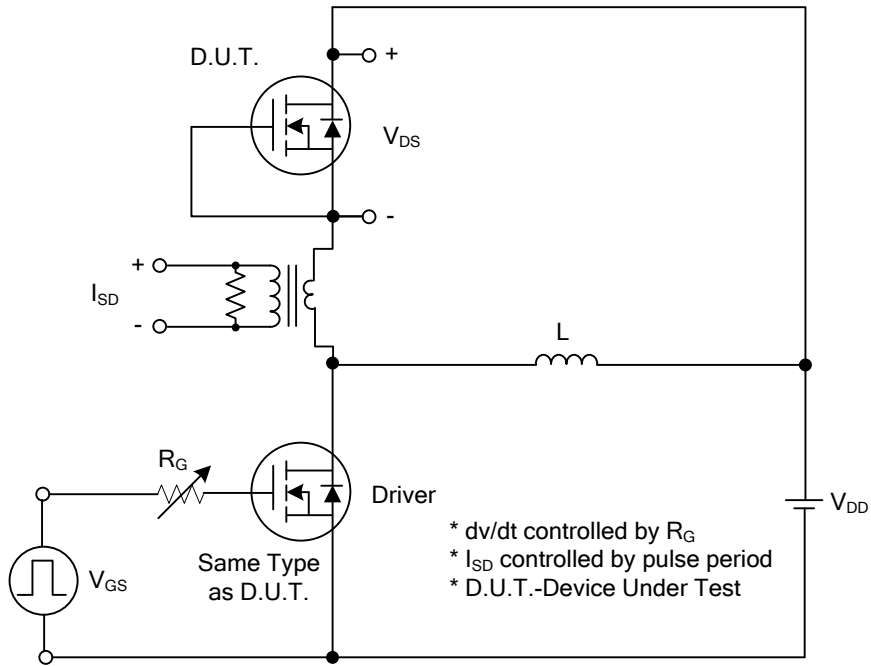
■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	100			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=100\text{V}$, $V_{GS}=0\text{V}$			1	μA
Gate-Source Leakage Current	Forward	$V_{GS}=+20\text{V}$, $V_{DS}=0\text{V}$			+100	nA
	Reverse	$V_{GS}=-20\text{V}$, $V_{DS}=0\text{V}$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=20\text{A}$			16	m Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=25\text{V}$, $V_{GS}=0\text{V}$, $f=1.0\text{MHz}$		1069		pF
Output Capacitance	C_{OSS}			603		pF
Reverse Transfer Capacitance	C_{RSS}			79		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{DS}=80\text{V}$, $V_{GS}=10\text{V}$, $I_D=40\text{A}$		30		nC
Gate to Source Charge	Q_{GS}			6		nC
Gate to Drain Charge	Q_{GD}			13		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=50\text{V}$, $V_{GS}=10\text{V}$, $I_D=20\text{A}$, $R_G=3\Omega$		8		ns
Rise Time	t_R			18		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			20		ns
Fall-Time	t_F			18		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	V_{SD}	$I_{SD}=40\text{A}$			1.4	V

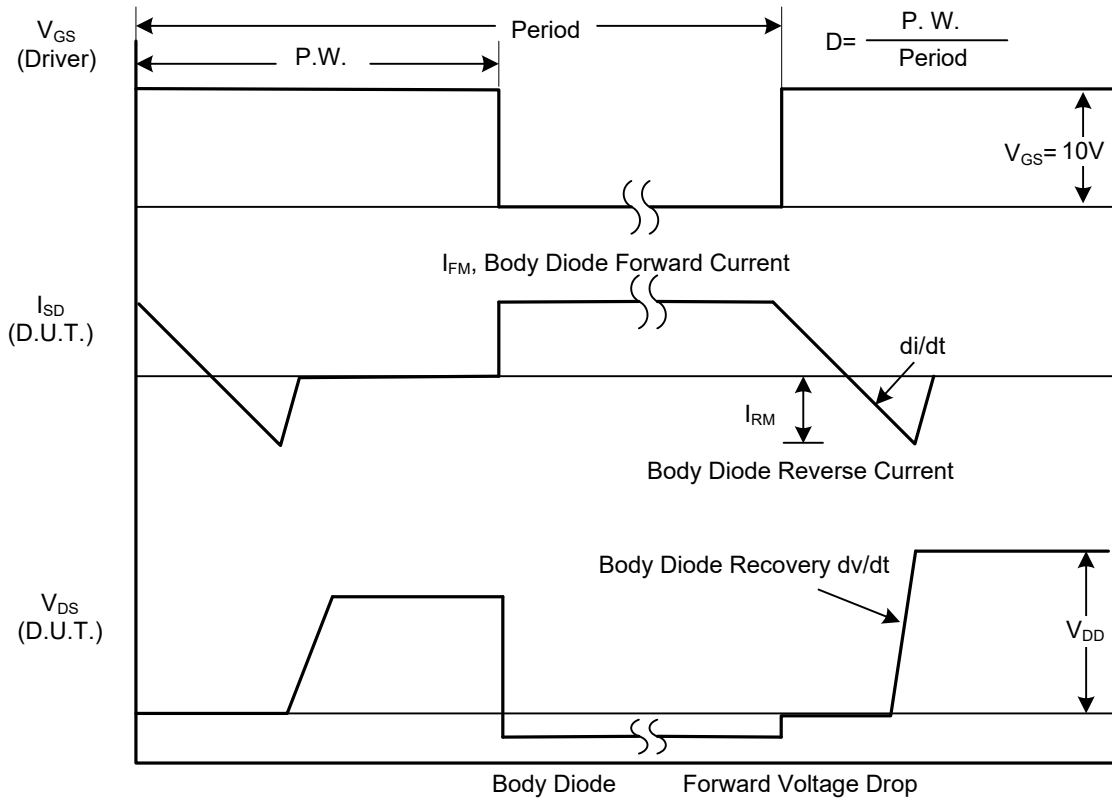
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

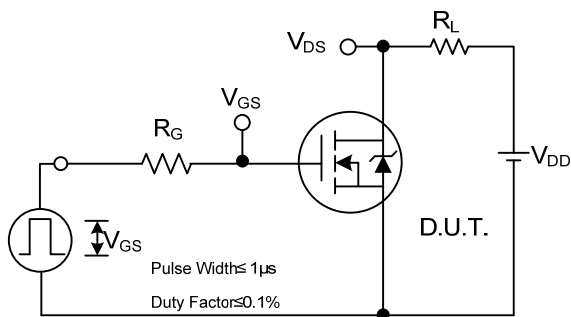


Peak Diode Recovery dv/dt Test Circuit

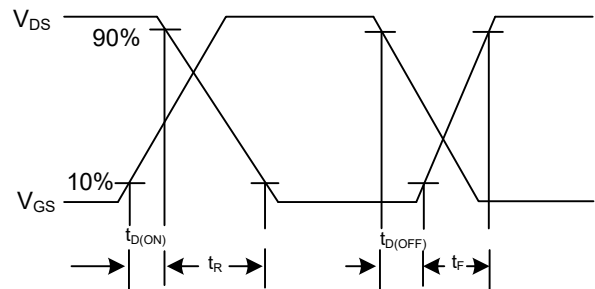


Peak Diode Recovery dv/dt Waveforms

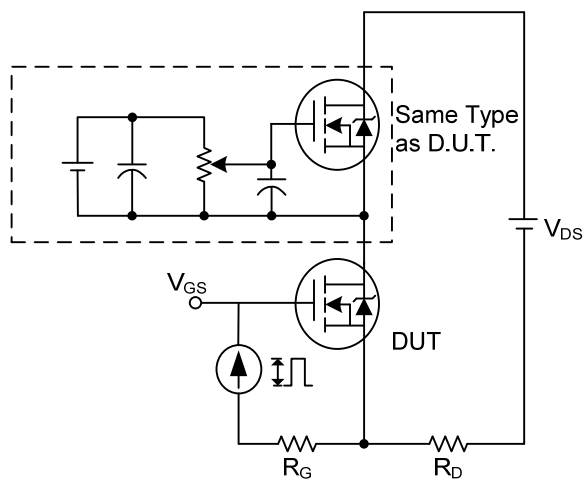
TEST CIRCUITS AND WAVEFORMS



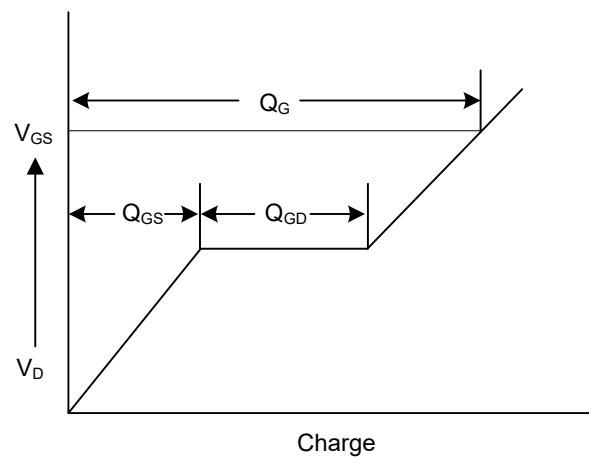
Switching Test Circuit



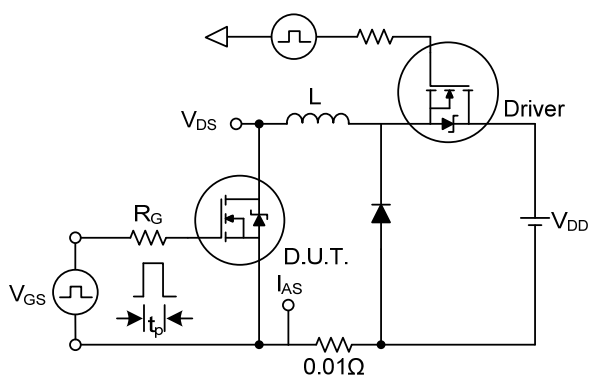
Switching Waveforms



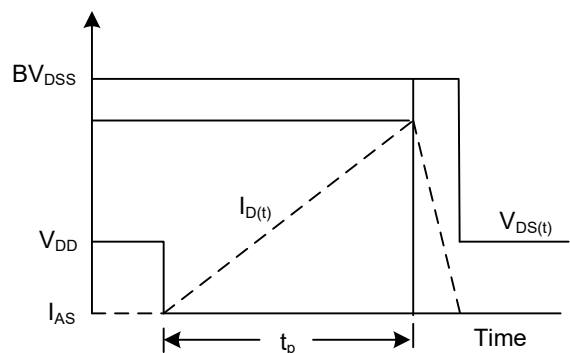
Gate Charge Test Circuit



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.