



USG10R088H

Preliminary

POWER MOSFET

N-CHANNEL SGT ENHANCEMENT POWER MOSFET

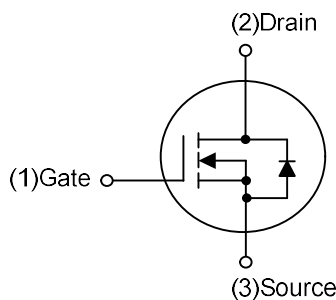
DESCRIPTION

The UTC **USG10R088H** 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.

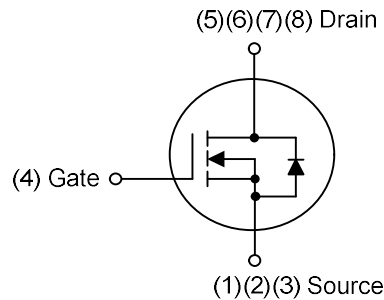
FEATURES

- * $R_{DS(ON)} \leq 8.8 \text{ m}\Omega @ V_{GS} = 10\text{V}, I_D = 40\text{A}$
- * Extremely low on-resistance $R_{DS(ON)}$
- * Excellent Low Ciss

SYMBOL



TO-220F / TO-220F1 / TO-252



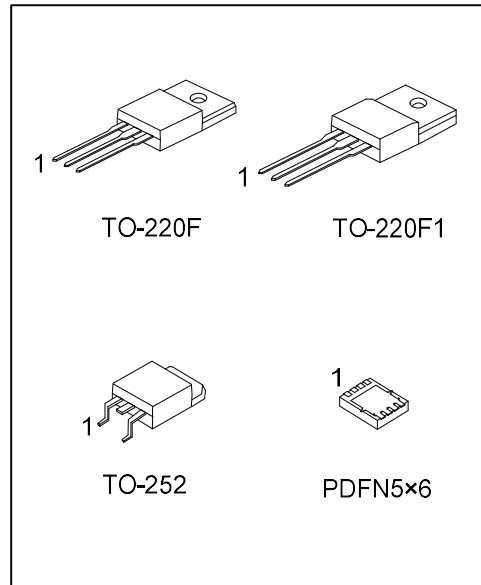
PDFN5x6

ORDERING INFORMATION

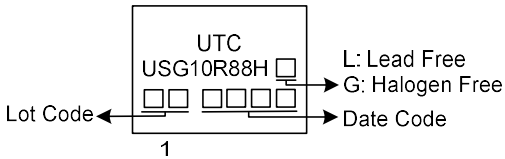
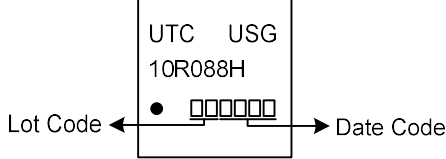
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
USG10R088HL-TF1-T	USG10R088HG-TF1-T	TO-220F1	G	D	S	-	-	-	-	-	Tube
USG10R088HL-TF3-T	USG10R088HG-TF3-T	TO-220F	G	D	S	-	-	-	-	-	Tube
USG10R088HL-TN3-T	USG10R088HG-TN3-T	TO-252	G	D	S	-	-	-	-	-	Tape Reel
USG10R088HL-P5060-R	USG10R088HG-P5060-R	PDFN5x6	S	S	S	G	D	D	D	D	Tape Reel

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

USG10R088HG-TF1-T		(1)Packing Type	(1) T: Tube, R: Tape Reel (2) TF1: TO-220F1, TF3: TO-220F, TN3: TO-252, P5060: PDFN5x6 (3) G: Halogen Free and Lead Free, L: Lead Free
		(2)Package Type	
		(3)Green Package	



■ MARKING

TO-220F / TO-220F1 / TO-252	PDFN5×6
 UTC USG10R88H Lot Code 1 Date Code L: Lead Free G: Halogen Free	 UTC USG 10R088H Lot Code Date Code

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	DC	I_D	65	A
	Pulsed (Note 2)	I_{DM}	130	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	7	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.4	V/ns
Power Dissipation	TO-220F	P_D	31	W
	TO-220F1			
	TO-252		53	W
	PDFN5×6		43	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature Range		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. $L = 0.1\text{mH}$, $I_{AS} = 11.8\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$.

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

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-220F1			
	TO-252		110	$^\circ\text{C}/\text{W}$
	PDFN5×6		65 (Note)	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220F	θ_{JC}	4	$^\circ\text{C}/\text{W}$
	TO-220F1			
	TO-252		2.36 (Note)	$^\circ\text{C}/\text{W}$
	PDFN5×6		2.9 (Note)	$^\circ\text{C}/\text{W}$

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

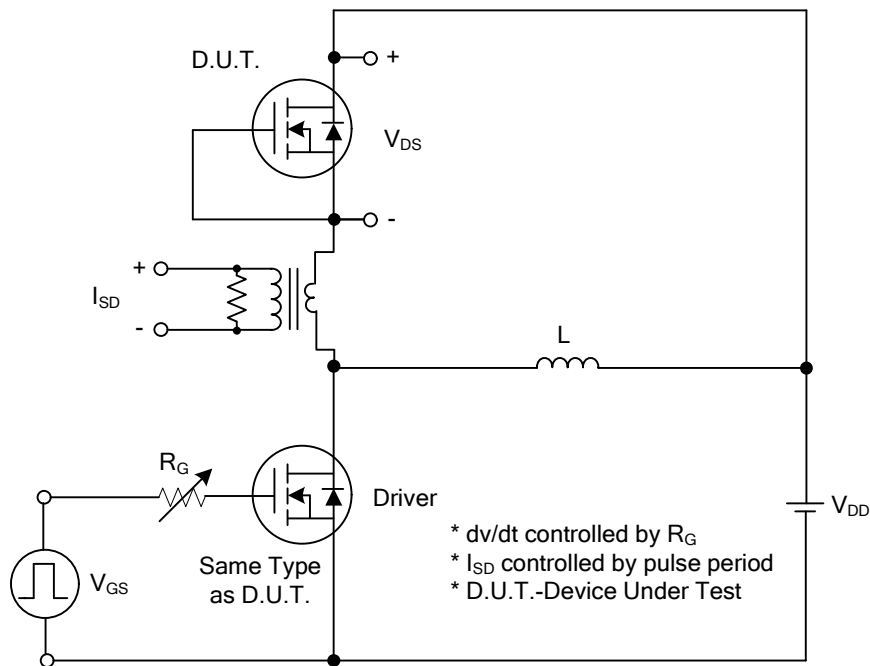
■ **ELECTRICAL CHARACTERISTICS** ($T_J = 25^\circ\text{C}$, unless otherwise specified.)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	100			V
Drain-Source Leakage Current		I _{DSS}	V _D =100V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =+20V, V _D =0V			+100	nA
	Reverse		V _{GS} =-20V, V _D =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _D = V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =40A			8.8	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _D =25V, f=1.0MHz		2179		pF
Output Capacitance		C _{OSS}			1126		pF
Reverse Transfer Capacitance		C _{RSS}			138		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _D =80V, V _{GS} =10V, I _D =65A (Note 1, 2)		56		nC
Gate to Source Charge		Q _{GS}			13		nC
Gate to Drain Charge		Q _{GD}			23		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =50V, V _{GS} =10V, I _D =65A, R _G =3Ω (Note 1, 2)		13		ns
Rise Time		t _R			20		ns
Turn-OFF Delay Time		t _{D(OFF)}			28		ns
Fall-Time		t _F			19		ns
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				65	A
Diode Forward Voltage		V _{SD}	I _F =65A, V _{GS} =0V			1.4	V
Reverse Recovery Time (Note 1)		t _{rr}	I _S =30A, V _{GS} =0V,		63		nS
Reverse Recovery Charge		Q _{rr}	dI _F /dt =100A/μs		135		nC

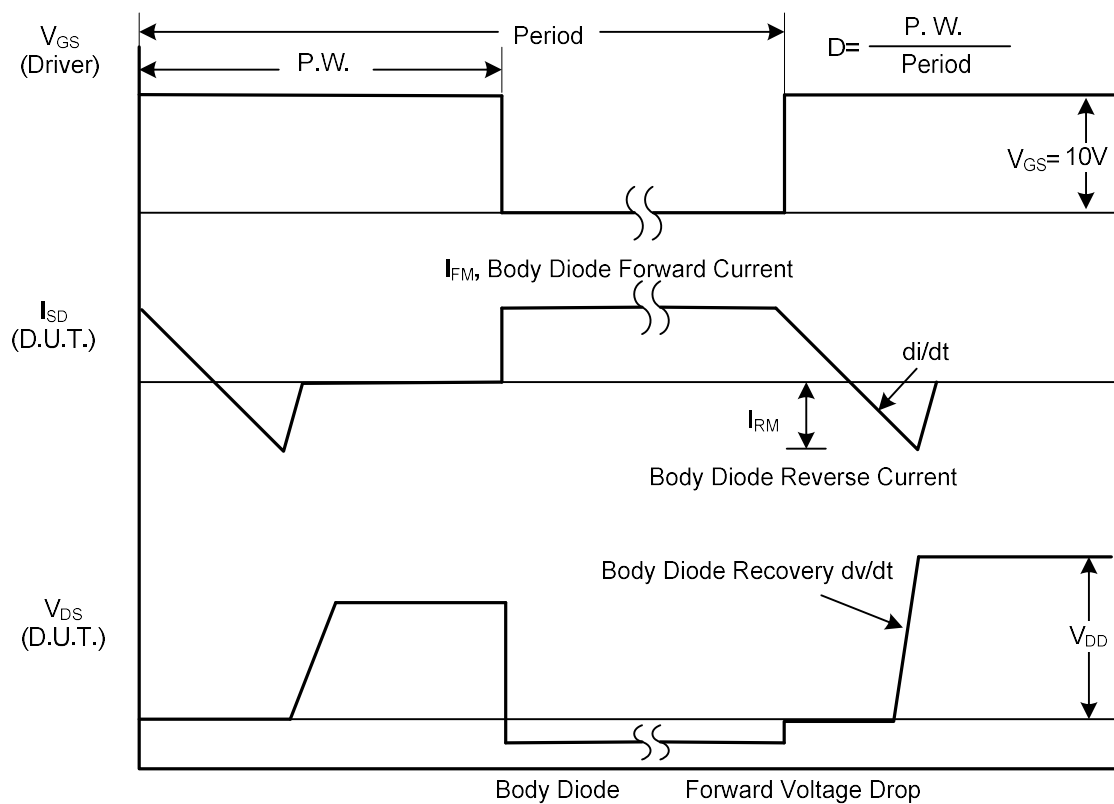
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

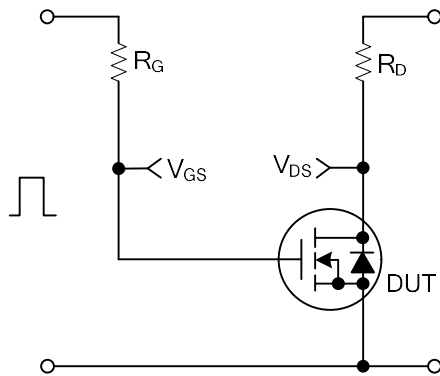


Peak Diode Recovery dv/dt Test Circuit

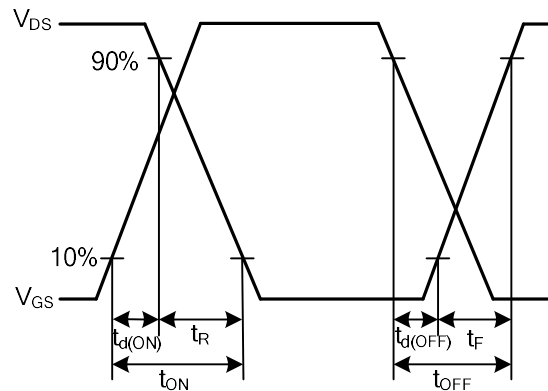


Peak Diode Recovery dv/dt Waveforms

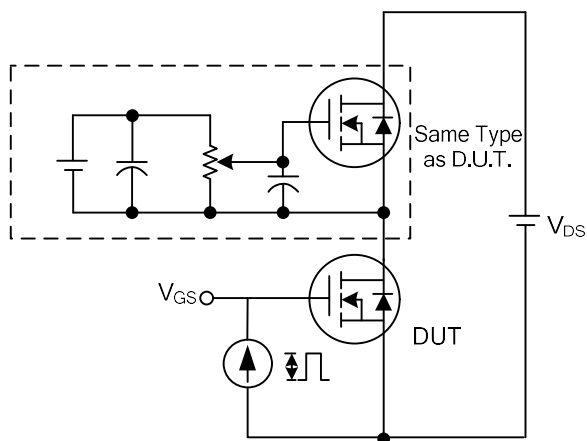
■ TEST CIRCUITS AND WAVEFORMS



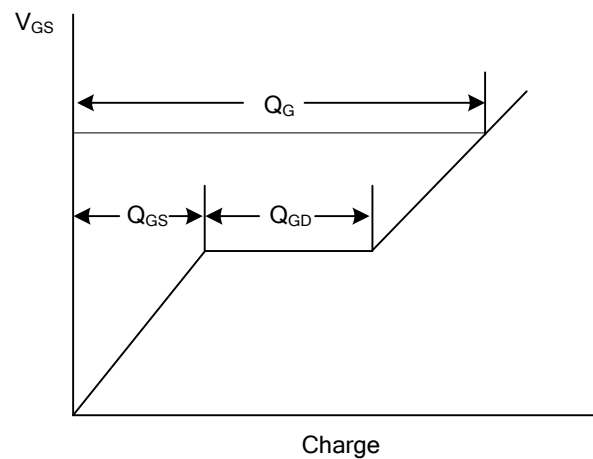
Switching Test Circuit



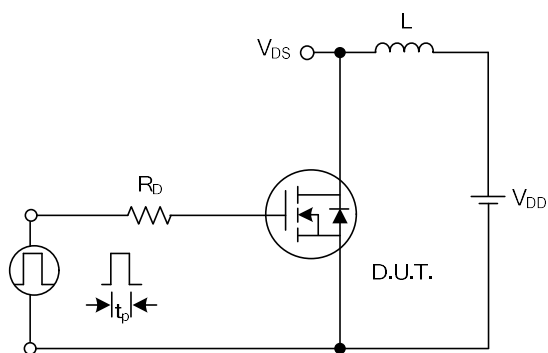
Switching Waveforms



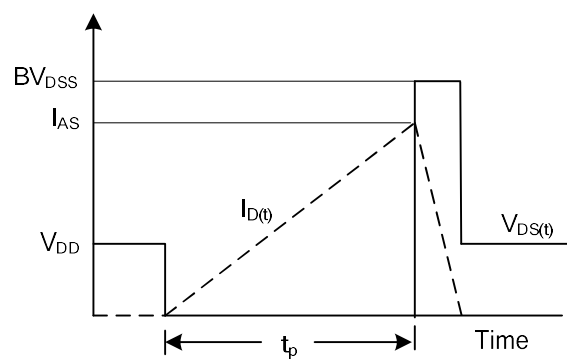
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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