



USG10R072H

Preliminary

Power MOSFET

N-CHANNEL SGT ENHANCEMENT POWER MOSFET

DESCRIPTION

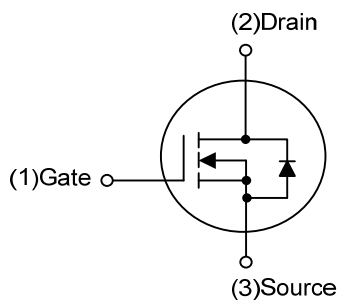
The UTC **USG10R072H** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed and low gate charge, etc.

The UTC **USG10R072H** applies to primary side switch, synchronous rectifier, Motor Drives, etc.

FEATURES

- * $R_{DS(ON)} \leq 7.2 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=40\text{A}$
- * High Cell Density Trench Technology
- * High Power and Current Handling Capability

SYMBOL

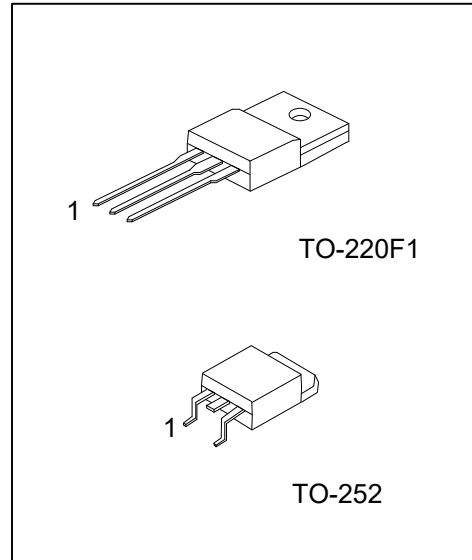


ORDERING INFORMATION

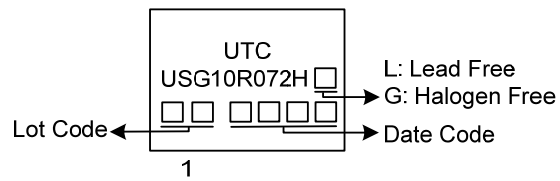
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
USG10R072HL-TF1-T	USG10R072HG-TF1-T	TO-220F1	G	D	S	Tube
USG10R072HL-TN3-R	USG10R072HG-TN3-R	TO-252	G	D	S	Tape Reel

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

USG10R072HG-TF1-T		(1)Packing Type	(1) T: Tube, R: Tape Reel
		(2)Package Type	(2) TF1: TO-220F1, TN3: TO-252
		(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free



■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	Continuous	I_D	90	A
	Pulsed (Note 2)	I_{DM}	180	A
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	10	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4	V/ns
Power Dissipation	TO-220F1	P_D	36	W
	TO-252		60	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. $L = 0.1\text{mH}$, $I_{AS} = 14.2\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

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

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F1	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
	TO-252		110	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220F1	θ_{JC}	3.47	$^{\circ}\text{C}/\text{W}$
	TO-252		2.08 (Note)	$^{\circ}\text{C}/\text{W}$

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

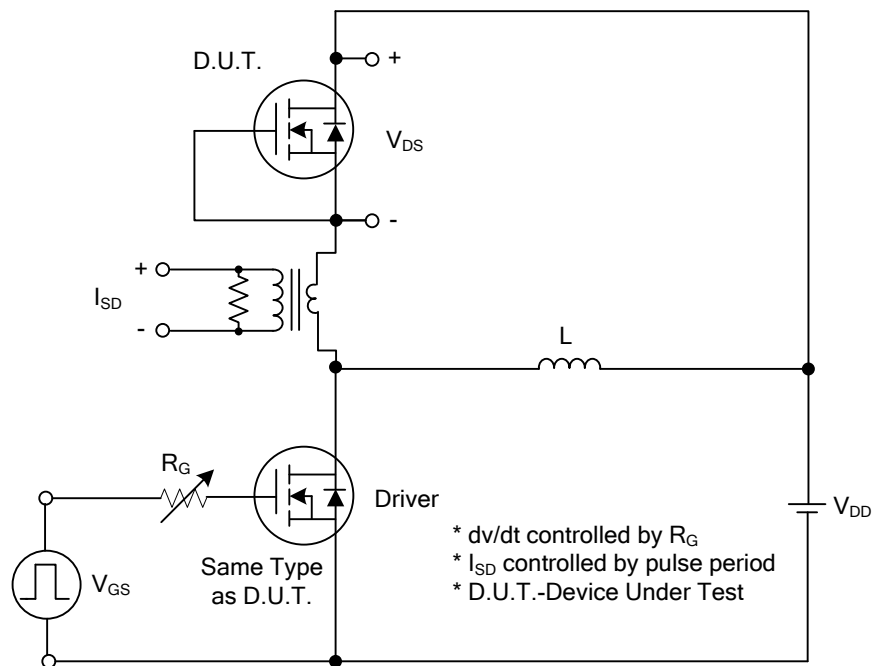
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	100			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =100V, 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	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =40A			7.2	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		2942		pF
Output Capacitance		C _{OSS}			1126		pF
Reverse Transfer Capacitance		C _{RSS}			70		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =80V, V _{GS} =10V, I _D =90A		62		nC
Gate to Source Charge		Q _{GS}			15		nC
Gate to Drain Charge		Q _{GD}			22		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =50V, V _{GS} =10V, I _D =90A, R _G =3.0Ω		15		ns
Rise Time		t _R			22		ns
Turn-OFF Delay Time		t _{D(OFF)}			34		ns
Fall-Time		t _F			21		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				90	A
Maximum Body-Diode Pulsed Current		I _{SM}				180	A
Drain-Source Diode Forward Voltage		V _{SD}	I _{SD} =90A			1.4	V
Body Diode Reverse Recovery Time		t _{rr}	I _S =30A, dI/dt=100A/μs		63		ns
Body Diode Reverse Recovery Charge		Q _{rr}			148		nC

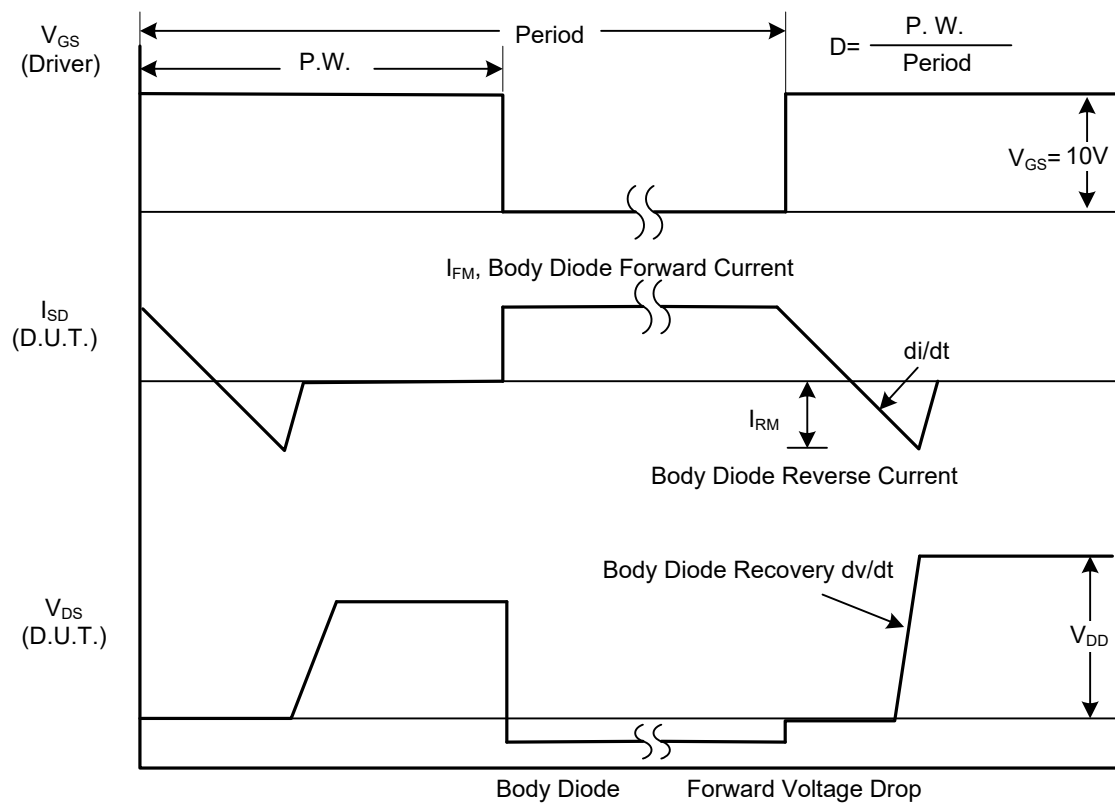
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

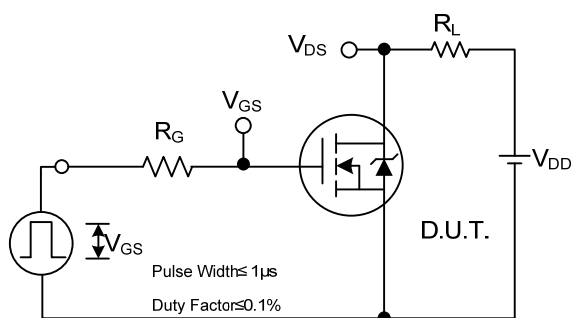


Peak Diode Recovery dv/dt Test Circuit

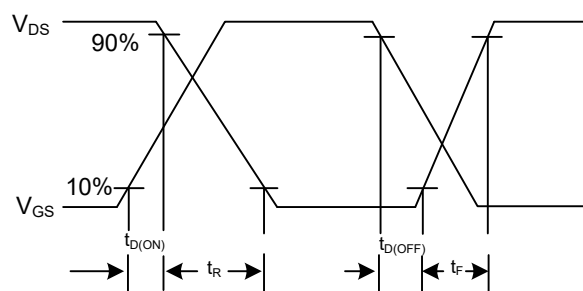


Peak Diode Recovery dv/dt Waveforms

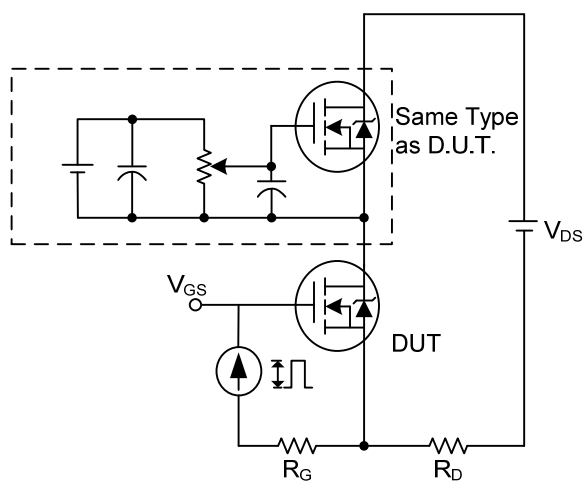
■ TEST CIRCUITS AND WAVEFORMS



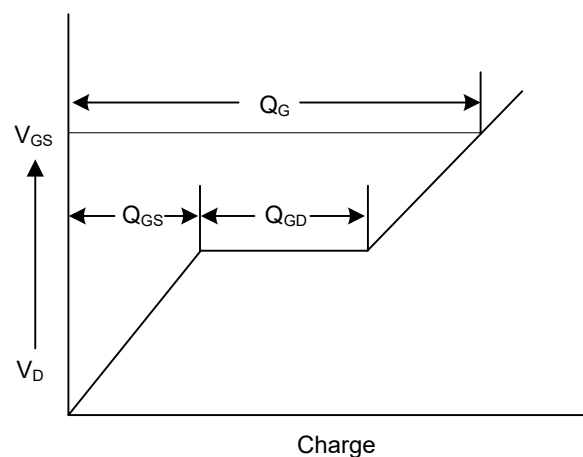
Switching Test Circuit



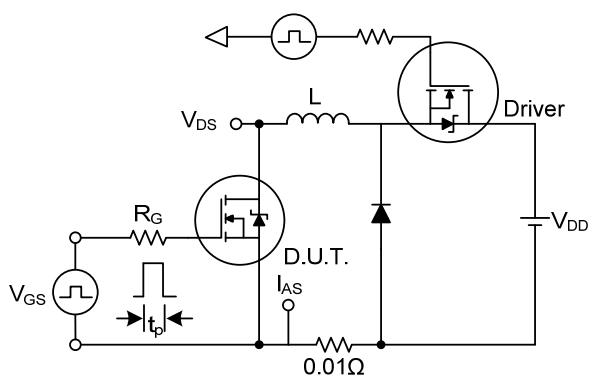
Switching Waveforms



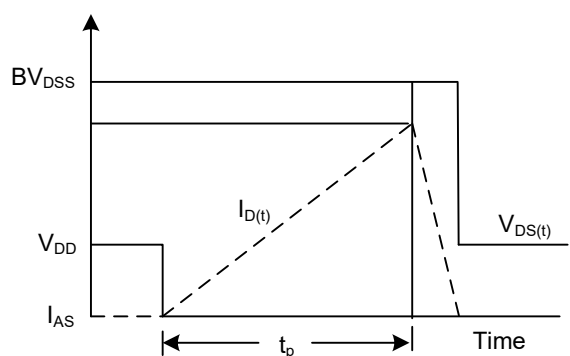
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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