



USG06R096M

Preliminary

Power MOSFET

N-CHANNEL SGT ENHANCEMENT POWER MOSFET

DESCRIPTION

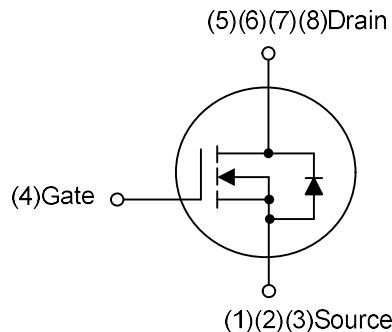
The UTC **USG06R096M** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed and low gate charge, etc.

The UTC **USG06R096M** applies to primary side switch, synchronous rectifier, Motor Drives, etc.

FEATURES

- * $R_{DS(ON)} \leq 9.6 \text{ m}\Omega$ @ $V_{GS} = 10\text{V}$, $I_D = 35\text{A}$
 $R_{DS(ON)} \leq 15 \text{ m}\Omega$ @ $V_{GS} = 4.5\text{V}$, $I_D = 20\text{A}$
- * High Cell Density Trench Technology
- * High Power and Current Handling Capability
- * Green Product

SYMBOL

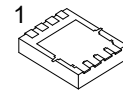


ORDERING INFORMATION

Ordering Number	Package	Pin Assignment								Packing
		1	2	3	4	5	6	7	8	
USG06R096MG-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

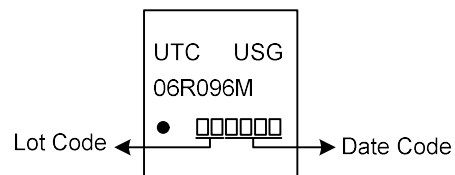
Note: Pin Assignment: S: Source G: Gate D: Drain

USG06R096MG-P5060-R	
(1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) P5060: PDFN5×6
(3)Green Package	(3) G: Halogen Free and Lead Free



PDFN5×6

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	60	V
Gate-Source Voltage		V _{GSS}	±20	V
Drain Current	Continuous	I _D	70	A
	Pulsed (Note 2)	I _{DM}	140	A
Single Pulsed Avalanche Energy (Note 3)		E _{AS}	19	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	0.37	V/ns
Power Dissipation		P _D	30	W
Junction Temperature		T _J	+150	°C
Storage Temperature		T _{STG}	-55 ~ +150	°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 = 0.1mH, I_{AS} = 19.7A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C

4. I_{SD} ≤ 30A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, T_J ≤ T_{JMAX}, T_J = 25°C.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ _{JA}	65	°C/W
Junction to Case	θ _{JC}	4.16	°C/W

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

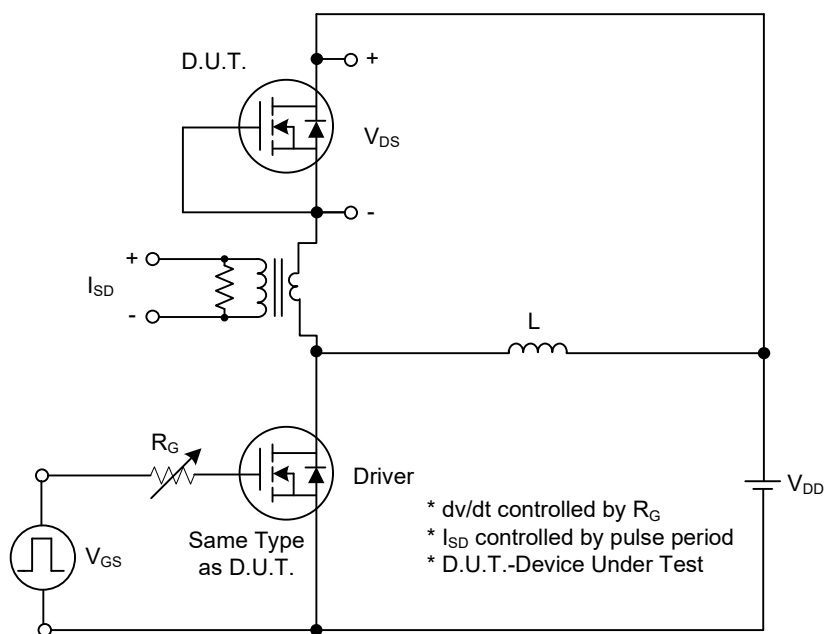
ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	60			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =60V, 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	1.0		2.5	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =35A			9.6	mΩ
			V _{GS} =4.5V, I _D =20A			15	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		1235		pF
Output Capacitance		C _{OSS}			453		pF
Reverse Transfer Capacitance		C _{RSS}			64		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =48V, V _{GS} =4.5V, I _D =35A		19		nC
		Q _G	V _{DS} =48V, V _{GS} =10V, I _D =35A		32		nC
Gate to Source Charge		Q _{GS}		V _{DS} =48V, V _{GS} =10V, I _D =35A		5	
Gate to Drain Charge		Q _{GD}			9		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =30V, V _{GS} =10V, I _D =35A, R _G =3Ω		7		ns
Rise Time		t _R			17		ns
Turn-OFF Delay Time		t _{D(OFF)}			25		ns
Fall-Time		t _F			17		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				70	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =70A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time		t _{rr}	I _S =30A, dI/dt=100A/μs		58		ns
Body Diode Reverse Recovery Charge		Q _{rr}			40		nC

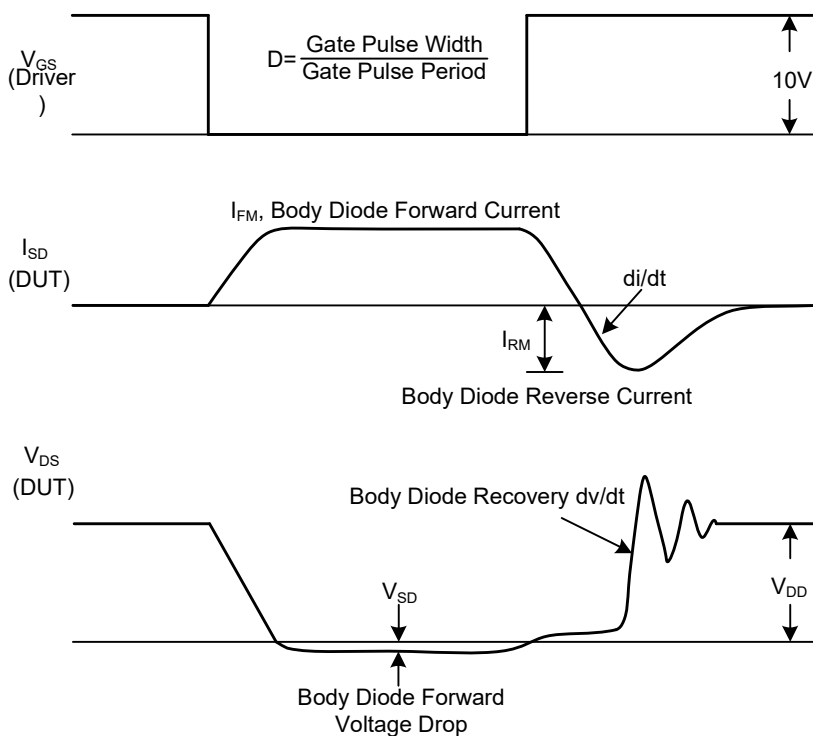
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

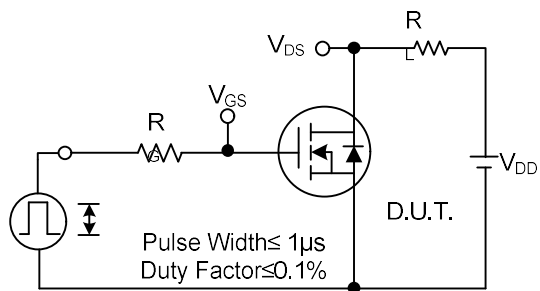


Peak Diode Recovery dv/dt Test Circuit

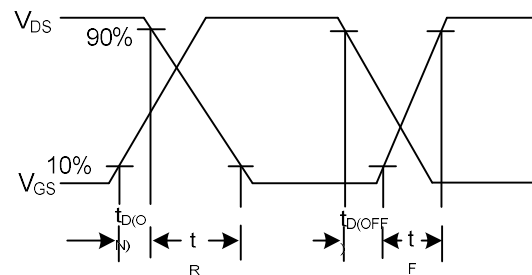


Peak Diode Recovery dv/dt Waveforms

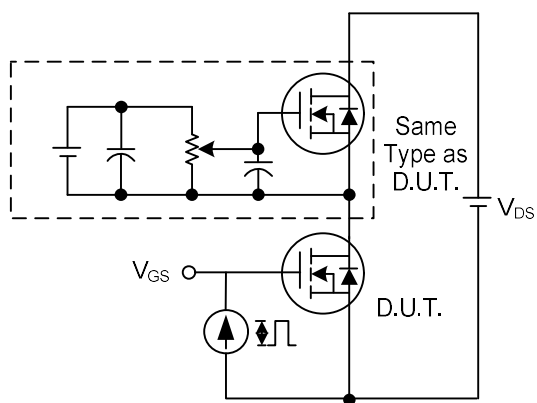
■ TEST CIRCUITS AND WAVEFORMS



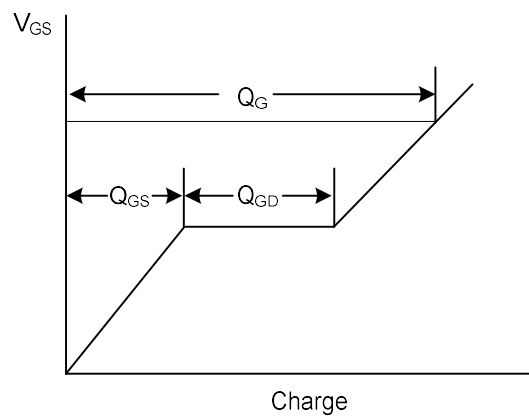
Switching Test Circuit



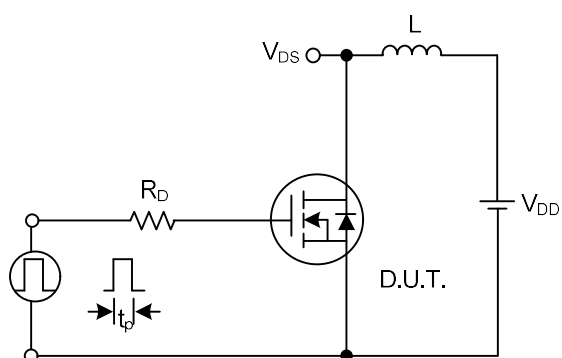
Switching Waveforms



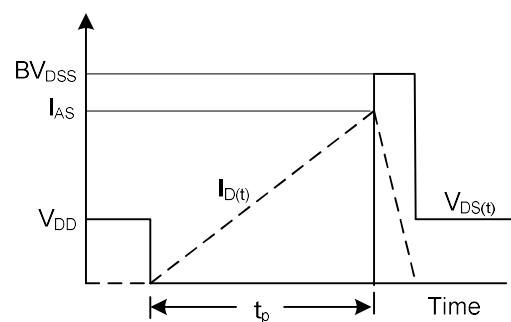
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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