

**USG60P08M**

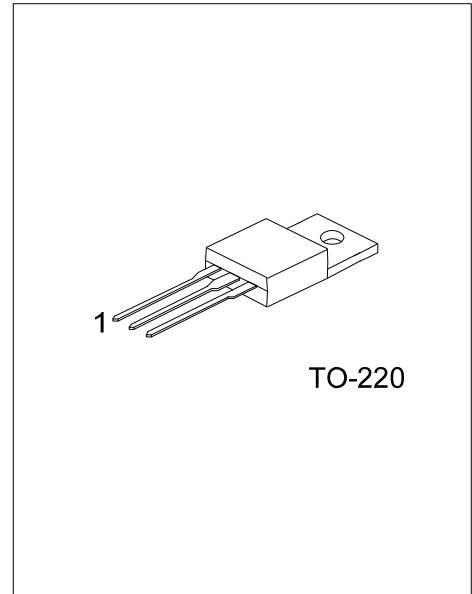
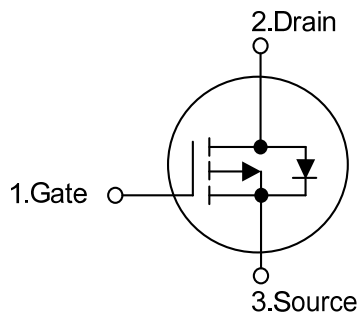
Preliminary

POWER MOSFET**P-CHANNEL SGT
ENHANCEMENT POWER
MOSFET****DESCRIPTION**

The UTC **USG60P08M** is a P-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

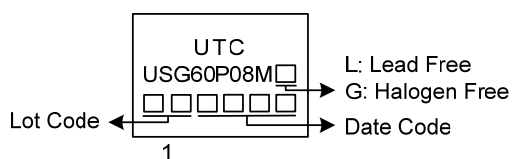
- * $R_{DS(ON)} \leq 19.5 \text{ m}\Omega$ @ $V_{GS} = -10\text{V}$, $I_D = -30\text{A}$
- * $R_{DS(ON)} \leq 29 \text{ m}\Omega$ @ $V_{GS} = -4.5\text{V}$, $I_D = -30\text{A}$
- * Extremely low on-resistance $R_{DS(ON)}$
- * Excellent Low Ciss

SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
USG60P08ML-TA3-T	USG60P08MG-TA3-T	TO-220	G	D	S	Tube

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

USG60P08MG-TA3-T		(1) Packing Type	(1) T: Tube
		(2) Package Type	(2) TA3: TO-220
		(3) Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

MARKING

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	-80	V
Gate-Source Voltage		V _{GSS}	±20	V
Drain Current	DC	I _D	-60	A
	Pulsed (Note 2)	I _{DM}	-120	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	403	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.5	V/ns
Power Dissipation		P _D	1700	W
Junction Temperature		T _J	+150	°C
Storage Temperature Range		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} = -89.8A, V_{DD} = -50V, R_G = 25 Ω, Starting T_J = 25°C

4. I_{SD} ≤ -30A, di/dt ≤ 200A/μs, V_{DD} ≤ V_{(BR)DSS}, T_J ≤ 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ _{JA}	62.5	°C/W
Junction to Case	θ _{JC}	0.74	°C/W

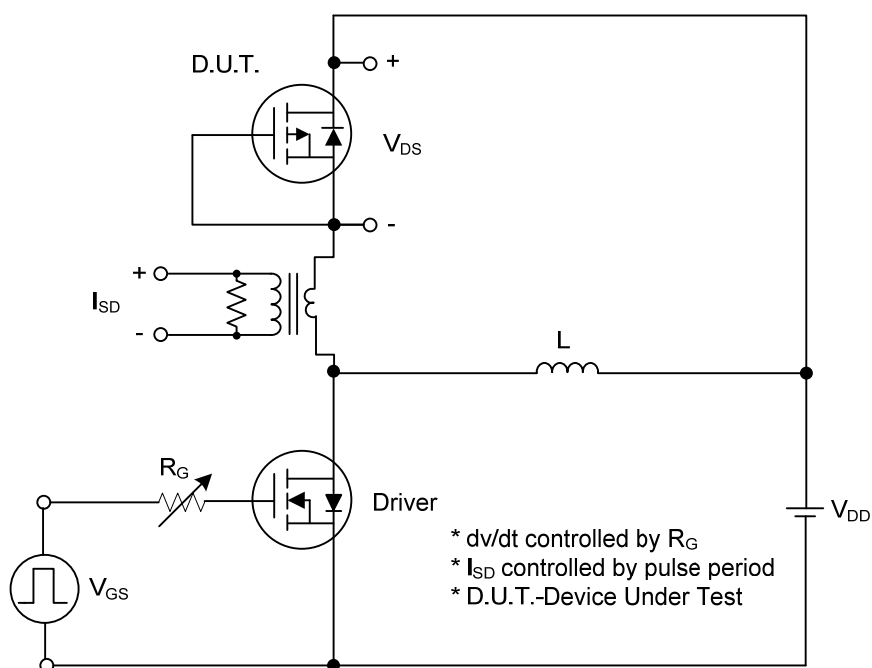
■ ELECTRICAL CHARACTERISTICS (T_J=25°C unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250μA	-80			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-80V, V _{GS} =0V			-1	μA
Gate-Source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =-250μA	-1.0		-2.5	V
Drain-Source On-State Resistance (Note 2)	R _{DS(ON)}	V _{GS} =-10V, I _D =-30A			19.5	mΩ
		V _{GS} =-4.5V, I _D =-30A			29	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =-25V, f=1.0MHz		6450		pF
Output Capacitance	C _{OSS}			1134		pF
Reverse Transfer Capacitance	C _{RSS}			107		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 2)	Q _G	V _{DS} =-64V, V _{GS} =-10V, I _D =-60A (Note 1, 2)		81		nC
Gate-Source Charge	Q _{GS}			15		nC
Gate-Drain Charge	Q _{GD}			10		nC
Turn-ON Delay Time (Note 2)	t _{D(ON)}	V _{DS} =-40V, V _{GS} =-10V, I _D =-60A, R _G =3Ω (Note 1, 2)		42		ns
Turn-ON Rise Time	t _R			31		ns
Turn-OFF Delay Time	t _{D(OFF)}			309		ns
Turn-OFF Fall Time	t _F			44		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				-60	A
Drain-Source Diode Forward Voltage (Note 2)	V _{SD}	V _{GS} =0V, I _S =-60A			-1.4	V
Body Diode Reverse Recovery Time	t _{rr}	I _S =-30A, V _{GS} =0V,		64		ns
Reverse Recovery Charge	Q _{rr}	dI _F /dt=100A/μs (Note 1)		117		nC

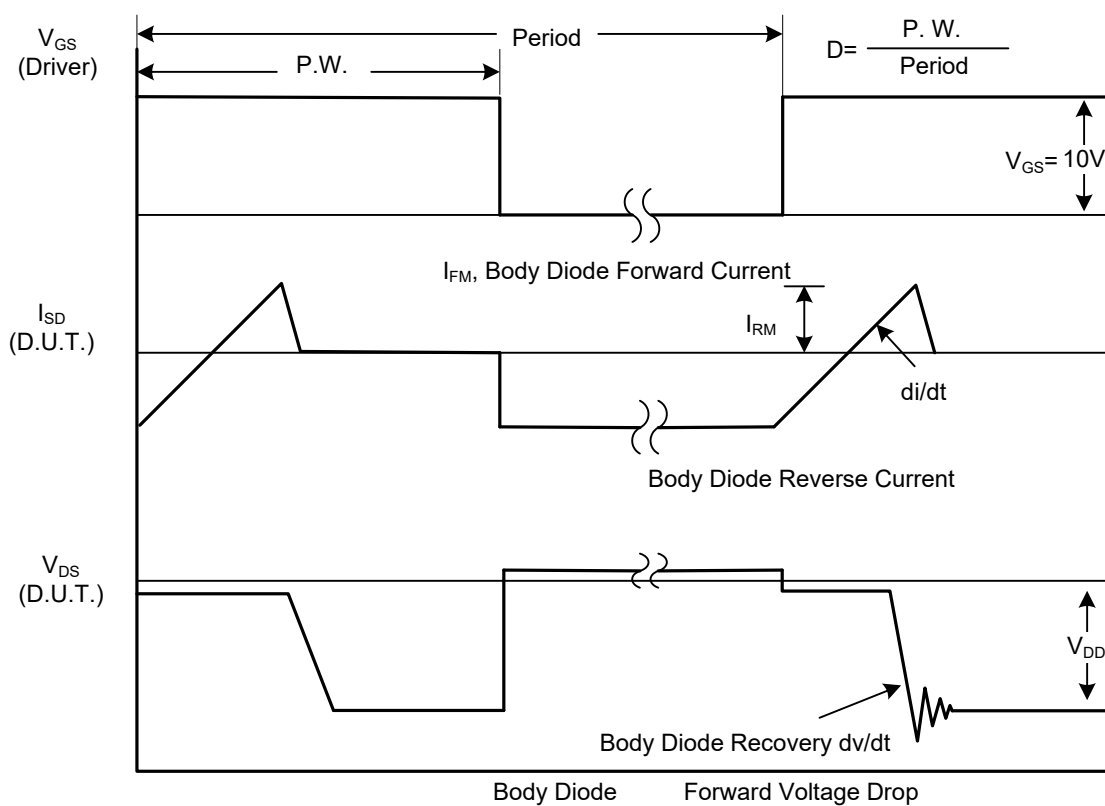
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

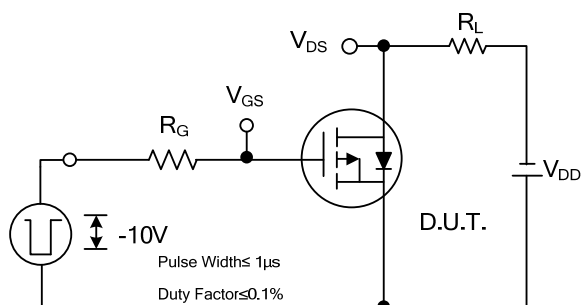


Peak Diode Recovery dv/dt Test Circuit

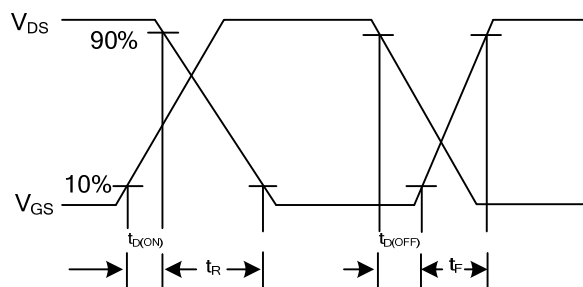


Peak Diode Recovery dv/dt Waveforms

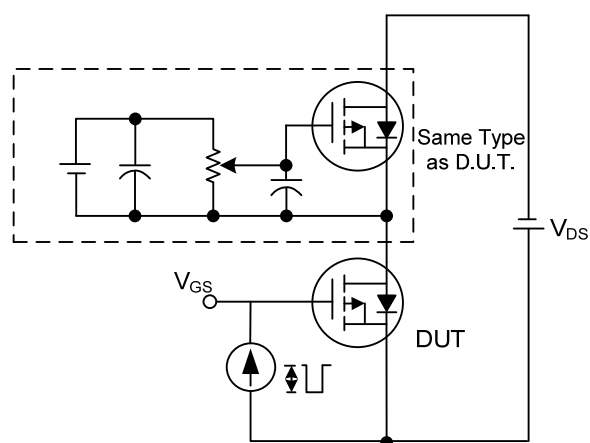
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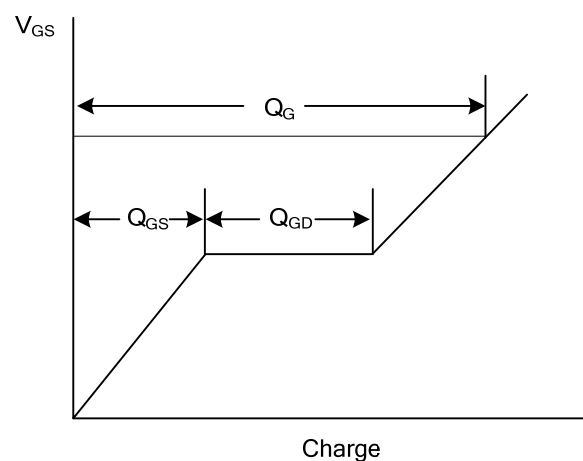
Switching Test Circuit



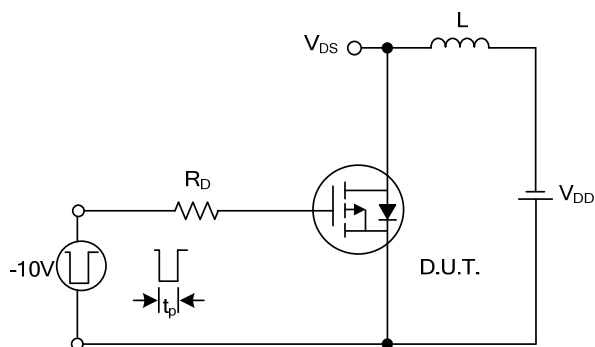
Switching Waveforms



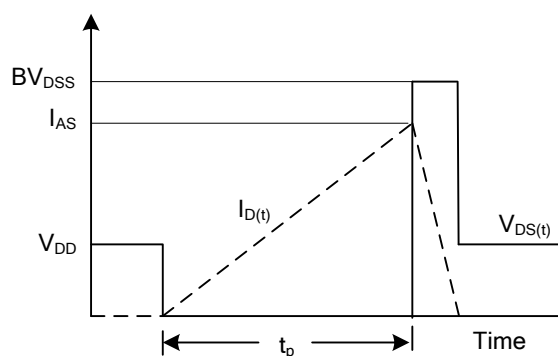
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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