



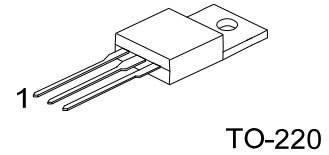
N-CHANNEL SGT ENHANCEMENT POWER MOSFET

DESCRIPTION

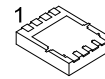
The UTC **USG10R060H** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with low $R_{DS(ON)}$ characteristic by high cell density trench technology.

FEATURES

- * $R_{DS(ON)} \leq 6.0 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=50\text{A}$
- * Extremely low on-resistance $R_{DS(ON)}$
- * Excellent Low Ciss

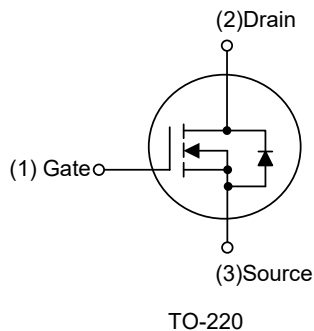


TO-220

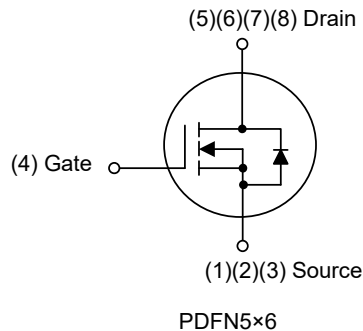


PDFN5x6

SYMBOL



TO-220



PDFN5x6

ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
USG10R060HL-TA3-T	USG10R060HG-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
USG10R060HL-P5060-R	USG10R060HG-P5060-R	PDFN5x6	S	S	S	G	D	D	D	D	Tape Reel

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

USG10R060HG-TA3-T		(1) Packing Type	(1) T: Tube, R: Tape Reel
		(2) Package Type	(2) TA3: TO-220, P5060: PDFN5x6
		(3) Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

TO-220	PDFN5×6
UTC USG10R060H □ Lot Code ← □ □ □ □ □ → Date Code 1 L: Lead Free G: Halogen Free	UTC USG 10R060H Lot Code ← • □ □ □ □ □ → Date Code

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	DC	I_D	100	A
	Pulsed (Note 2)	I_{DM}	200	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	90	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.1	V/ns
Power Dissipation	TO-220/TO-263	P_D	130	W
	PDFN5×6		67	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. $L = 0.1\text{mH}$, $I_{AS} = 42.4\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$, 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-220/TO-263	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
	PDFN5×6		65 (Note)	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220/TO-263	θ_{JC}	0.96	$^{\circ}\text{C}/\text{W}$
	PDFN5×6		1.87 (Note)	$^{\circ}\text{C}/\text{W}$

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

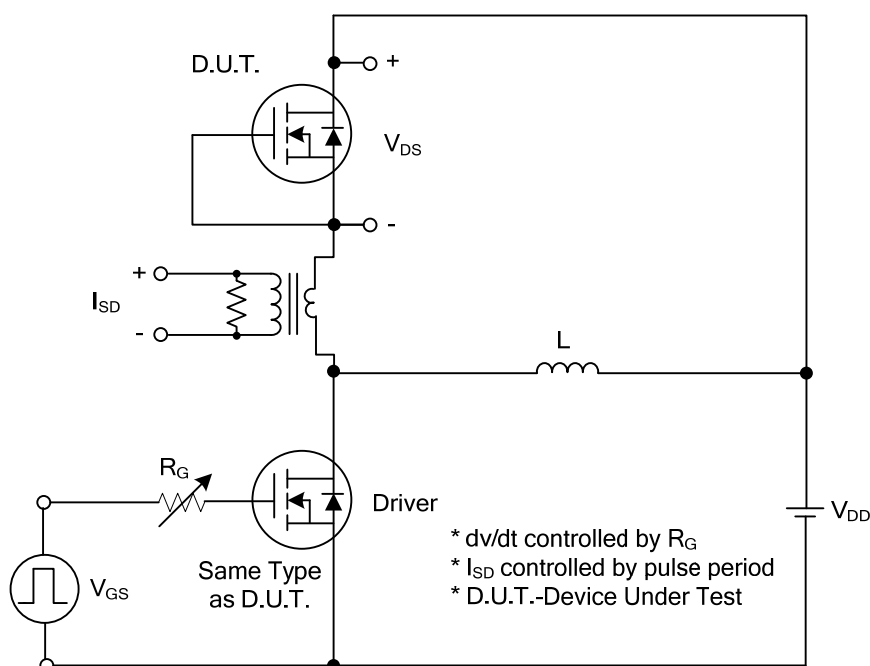
ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

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 _{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 =50A			6.0	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		3248		pF
Output Capacitance		C _{OSS}			1800		pF
Reverse Transfer Capacitance		C _{RSS}			211		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =80V, V _{GS} =10V, I _D =100A (Note 1, 2)		77		nC
Gate to Source Charge		Q _{GS}			12		nC
Gate to Drain Charge		Q _{GD}			32		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =50V, V _{GS} =10V, I _D =100A, R _G =3Ω (Note 1, 2)		14		ns
Rise Time		t _R			21		ns
Turn-OFF Delay Time		t _{D(OFF)}			41		ns
Fall-Time		t _F			24		ns
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				100	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				200	A
Diode Forward Voltage		V _{SD}	I _F =100A, 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

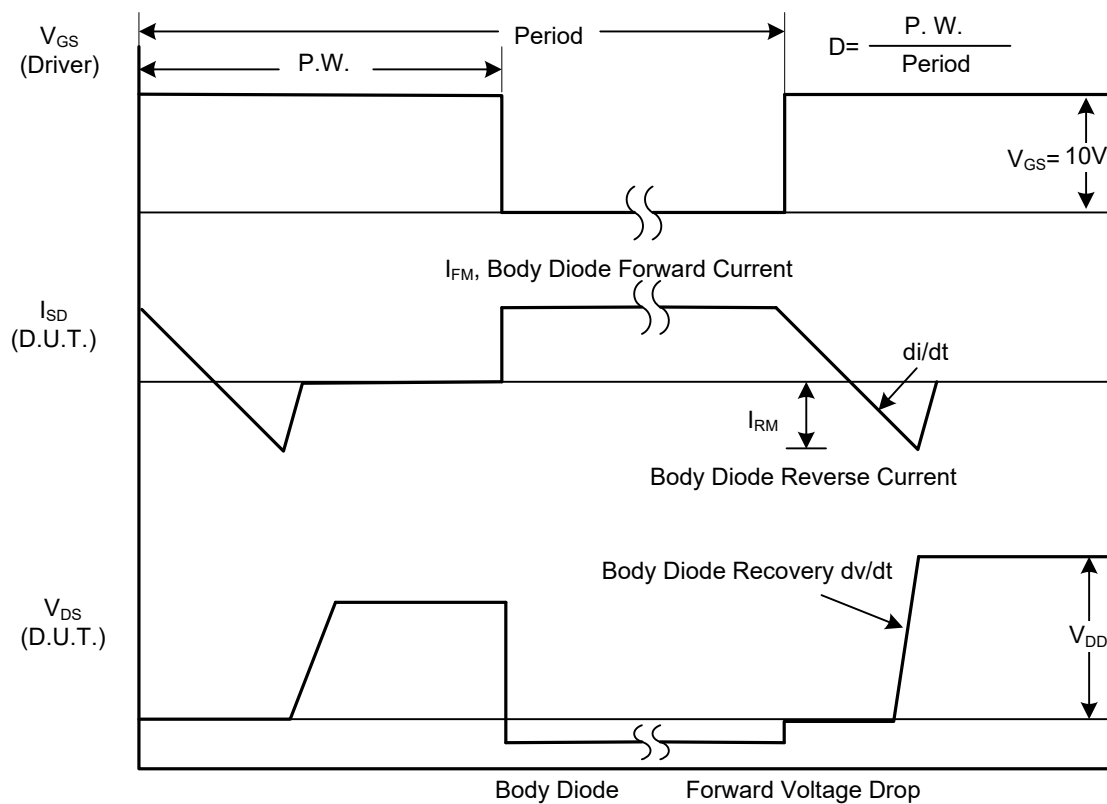
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

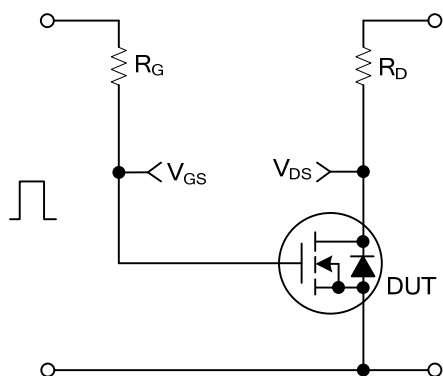


Peak Diode Recovery dv/dt Test Circuit

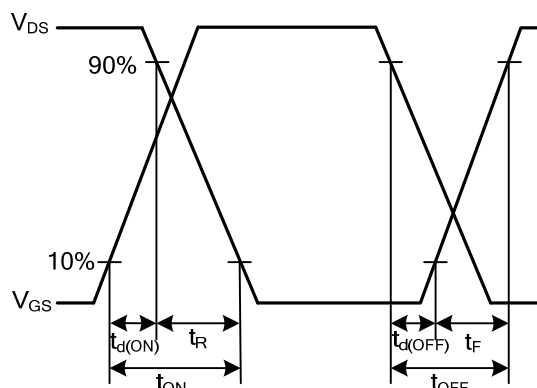


Peak Diode Recovery dv/dt Waveforms

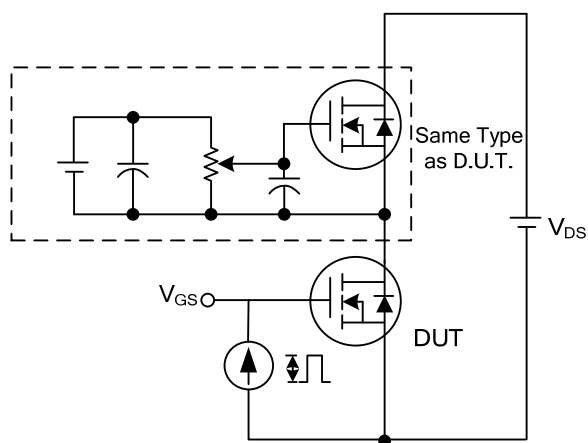
■ TEST CIRCUITS AND WAVEFORMS



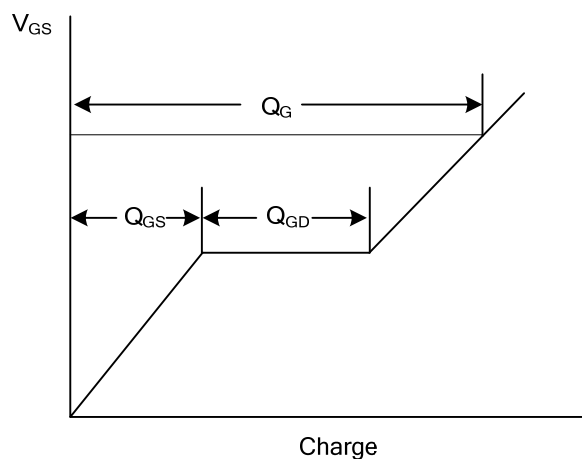
Switching Test Circuit



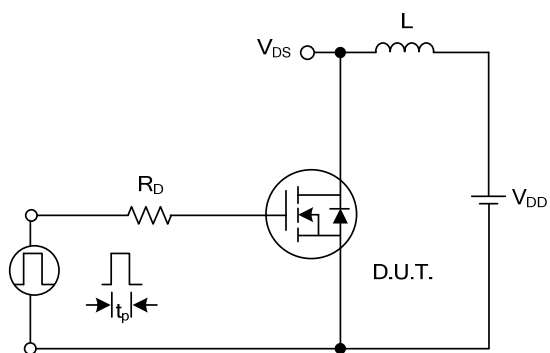
Switching Waveforms



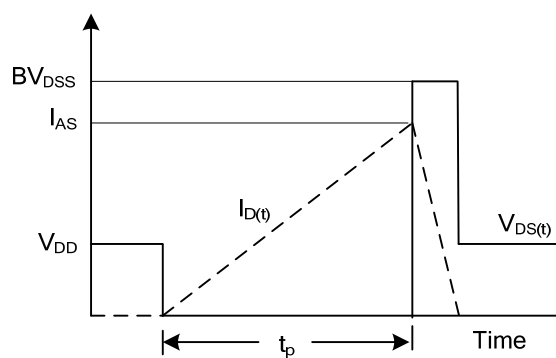
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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