

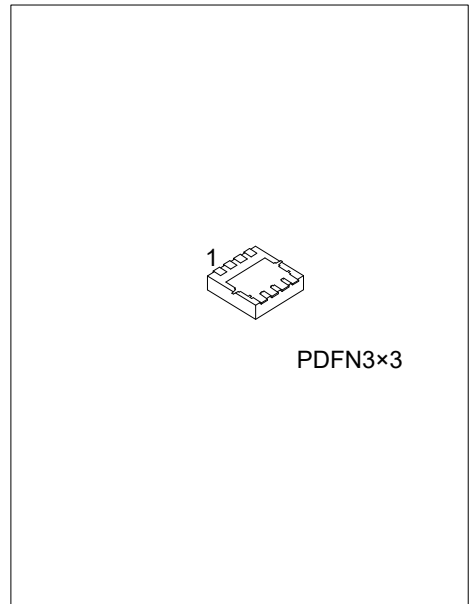


USG10R550M

Preliminary

Power MOSFET

**N-CHANNEL SGT
ENHANCEMENT POWER
MOSFET**



■ DESCRIPTION

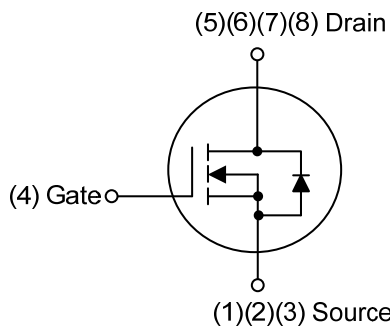
The UTC **USG10R550M** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed and low gate charge, etc.

The UTC **USG10R550M** applies to primary side switch, synchronous rectifier, Motor Drives, etc.

■ FEATURES

- * $R_{DS(ON)} \leq 55 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=5.0\text{A}$
- $R_{DS(ON)} \leq 70 \text{ m}\Omega @ V_{GS}=4.5\text{V}, I_D=3.0\text{A}$
- * High Cell Density Trench Technology
- * High Power and Current Handling Capability

■ SYMBOL



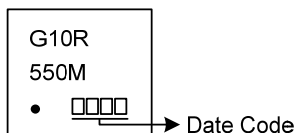
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
USG10R550ML-P3030-R	USG10R550MG-P3030-R	PDFN3x3	S	S	S	G	D	D	D	D	Tape Reel

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

<p>USG10R550MG-P3030-R</p>	<p>(1) R: Tape Reel</p> <p>(2) P3030: PDFN3x3</p> <p>(3) G: Halogen Free and Lead Free, K: Lead Free</p>
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■ MARKING



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

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DSS}	100	V
Gate-Source Voltage	V_{GSS}	± 20	V
Drain Current	Continuous	15	A
	Pulsed (Note 2)	30	A
Single Pulsed Avalanche Energy (Note 3)	E_{AS}	1	mJ
Peak Diode Recovery dv/dt (Note 4)	dv/dt	2.7	V/ns
Power Dissipation	P_D	9.7	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. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

3. $L = 0.1\text{mH}$, $I_{AS} = 4.4\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 5.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, $T_J \leq T_{JMAX}$, $T_J = 25^\circ\text{C}$.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	130	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	12.9	$^\circ\text{C}/\text{W}$

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

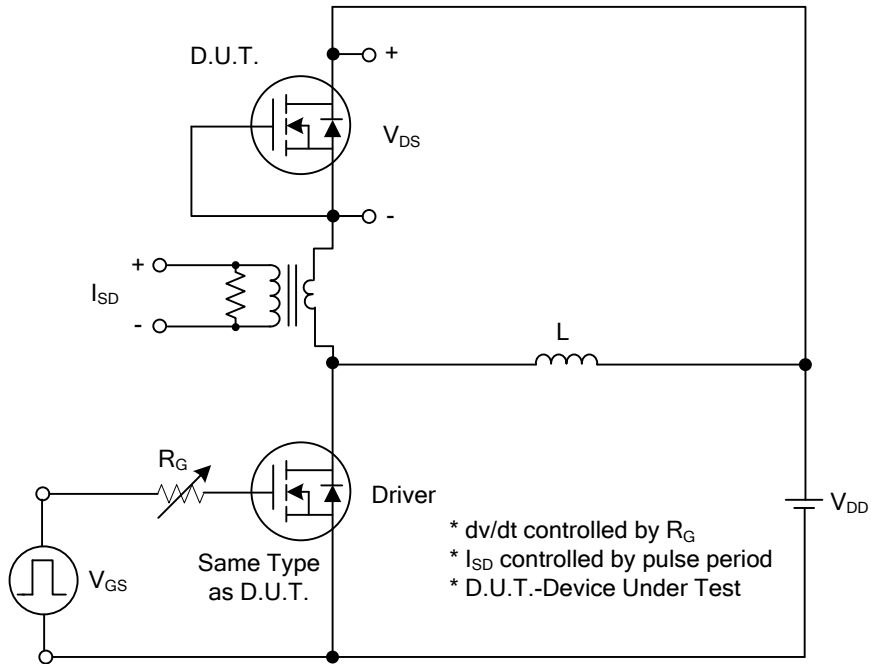
■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	100			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=100\text{V}$, $V_{GS}=0\text{V}$			1	μA
Gate-Source Leakage Current	Forward	$V_{GS}=+20\text{V}$, $V_{DS}=0\text{V}$			+100	nA
	Reverse	$V_{GS}=-20\text{V}$, $V_{DS}=0\text{V}$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1.0		2.5	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=5.0\text{A}$			55	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}$, $I_D=3.0\text{A}$			70	$\text{m}\Omega$
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=25\text{V}$, $V_{GS}=0\text{V}$, $f=1.0\text{MHz}$		357		pF
Output Capacitance	C_{OSS}			196		pF
Reverse Transfer Capacitance	C_{RSS}			28		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{DS}=80\text{V}$, $V_{GS}=10\text{V}$, $I_D=5.0\text{A}$		18		nC
Gate to Source Charge	Q_{GS}			3		nC
Gate to Drain Charge	Q_{GD}			5		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=50\text{V}$, $V_{GS}=10\text{V}$, $I_D=5.0\text{A}$, $R_G=3\Omega$		3		ns
Rise Time	t_R			17		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			10		ns
Fall-Time	t_F			15		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				15	A
Maximum Body-Diode Pulsed Current	I_{SM}				30	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_{SD}=5.0\text{A}$			1.4	V
Body Diode Reverse Recovery Time	t_{rr}	$I_S=5.0\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		31		ns
Body Diode Reverse Recovery Charge	Q_{rr}			32		nC

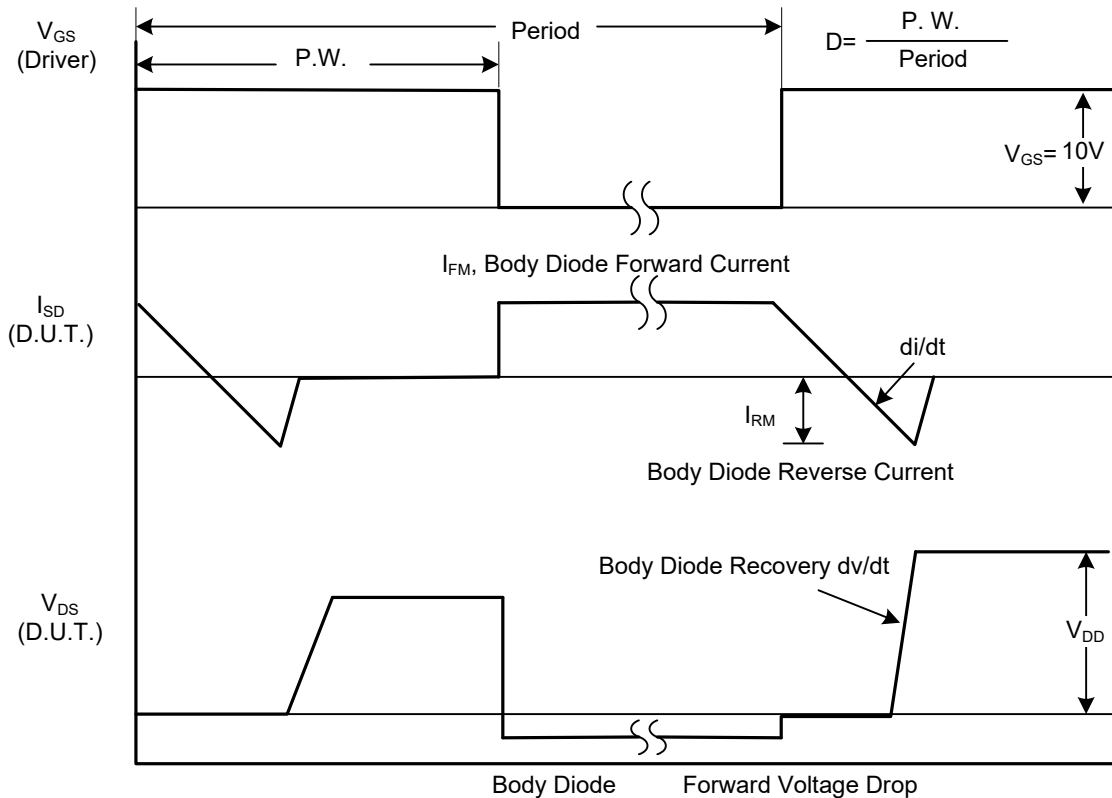
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

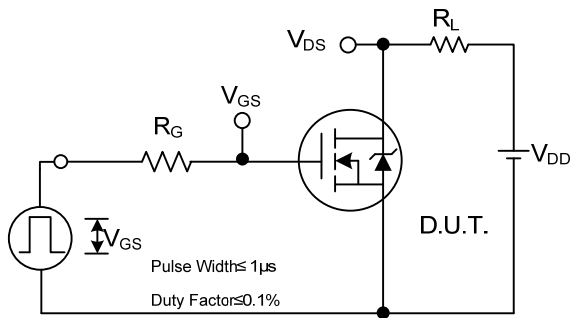


Peak Diode Recovery dv/dt Test Circuit

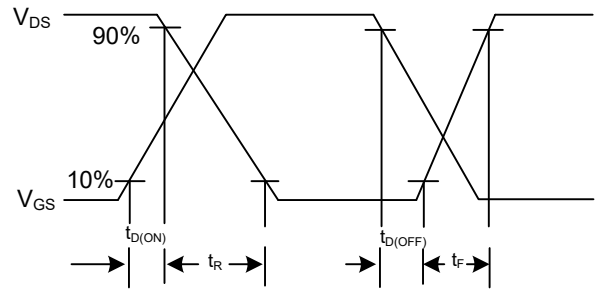


Peak Diode Recovery dv/dt Waveforms

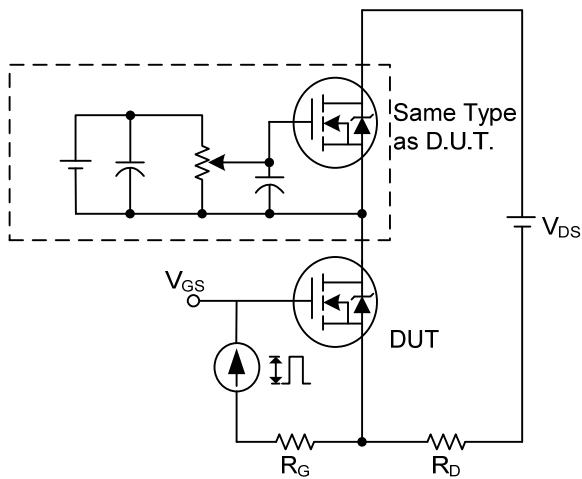
■ TEST CIRCUITS AND WAVEFORMS



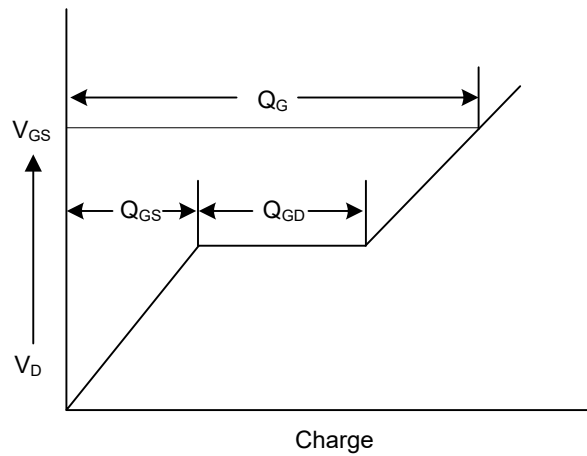
Switching Test Circuit



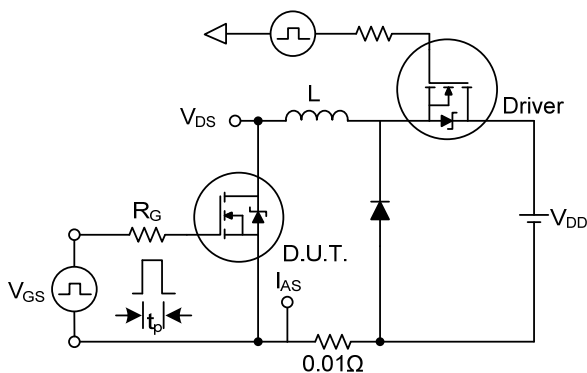
Switching Waveforms



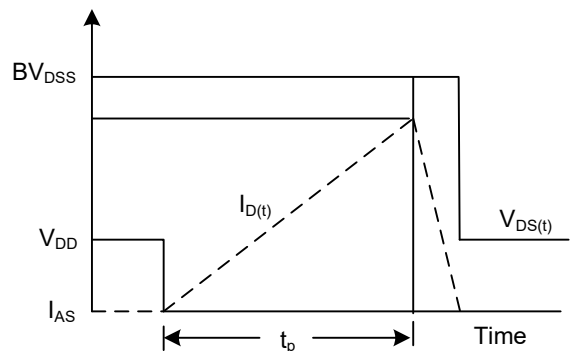
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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