



USG15R240HE

Preliminary

Power MOSFET

N-CHANNEL SGT ENHANCEMENT POWER MOSFET

DESCRIPTION

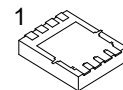
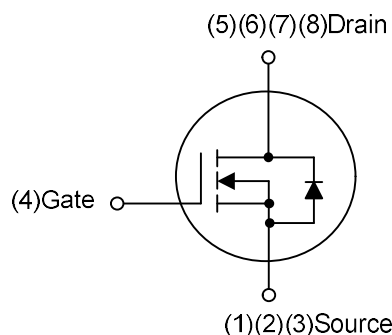
The UTC **USG15R240HE** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed and low gate charge, etc.

The UTC **USG15R240HE** applies to primary side switch, synchronous rectifier, Motor Drives, etc.

FEATURES

- * $R_{DS(ON)} \leq 24 \text{ m}\Omega$ @ $V_{GS} = 10\text{V}$, $I_D = 20\text{A}$
- * High Cell Density Trench Technology
- * High Power and Current Handling Capability
- * Green Product

SYMBOL



PDFN5×6

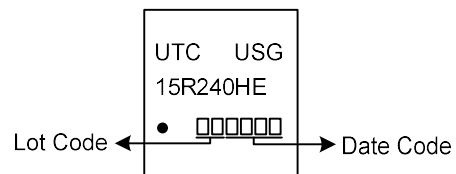
ORDERING INFORMATION

Ordering Number	Package	Pin Assignment								Packing
		1	2	3	4	5	6	7	8	
USG15R240HEG-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

USG15R240HEG-P5060-R	(1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) P5060: PDFN5×6 (3) G: Halogen Free and Lead Free
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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_{DS}	150	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	DC	I_D	40	A
	Pulsed (Note 2)	I_{DM}	120	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	11.3	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	8.3	V/ns
Power Dissipation		P_D	55	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. $L = 0.1\text{mH}$, $I_{AS} = 15\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, 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	θ_{JA}	65	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	2.27	$^\circ\text{C}/\text{W}$

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

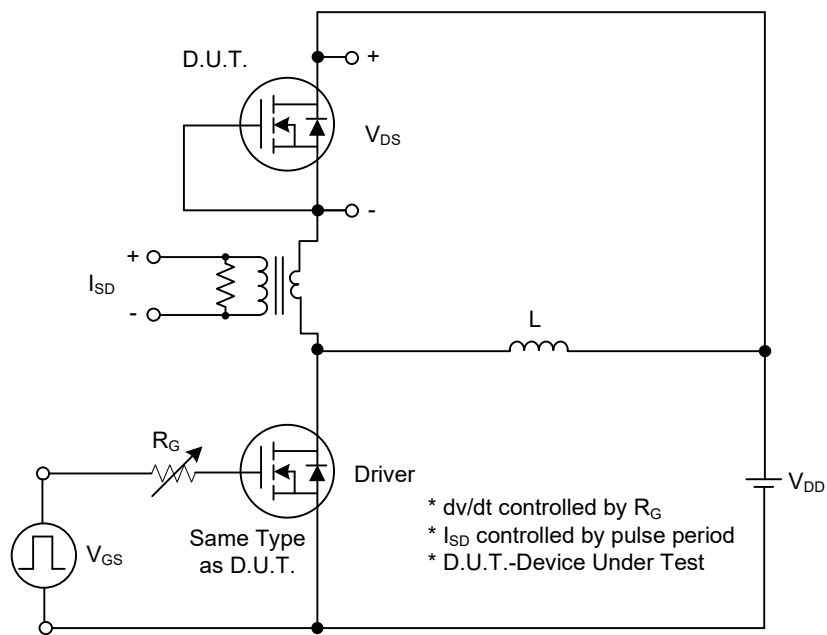
■ **ELECTRICAL CHARACTERISTICS** ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	150			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =150V, 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 =20A			24	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		3030		pF
Output Capacitance		C _{OSS}			543		pF
Reverse Transfer Capacitance		C _{RSS}			58		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =75V, V _{GS} =10V, I _D =20A (Note 1, 2)		94		nC
Gate to Source Charge		Q _{GS}			18		nC
Gate to Drain Charge		Q _{GD}			15		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =120V, V _{GS} =10V, I _D =20A, R _G =3Ω (Note 1, 2)		16		ns
Rise Time		t _R			18		ns
Turn-OFF Delay Time		t _{D(OFF)}			35		ns
Fall-Time		t _F			17		ns
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				70	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				140	A
Diode Forward Voltage		V _{SD}	I _F =70A, V _{GS} =0V			1.4	V
Reverse Recovery Time (Note 1)		t _{rr}	I _S =30A, V _{GS} =0V,		66		nS
Reverse Recovery Charge		Q _{rr}	dI _F /dt =100A/μs		162		nC

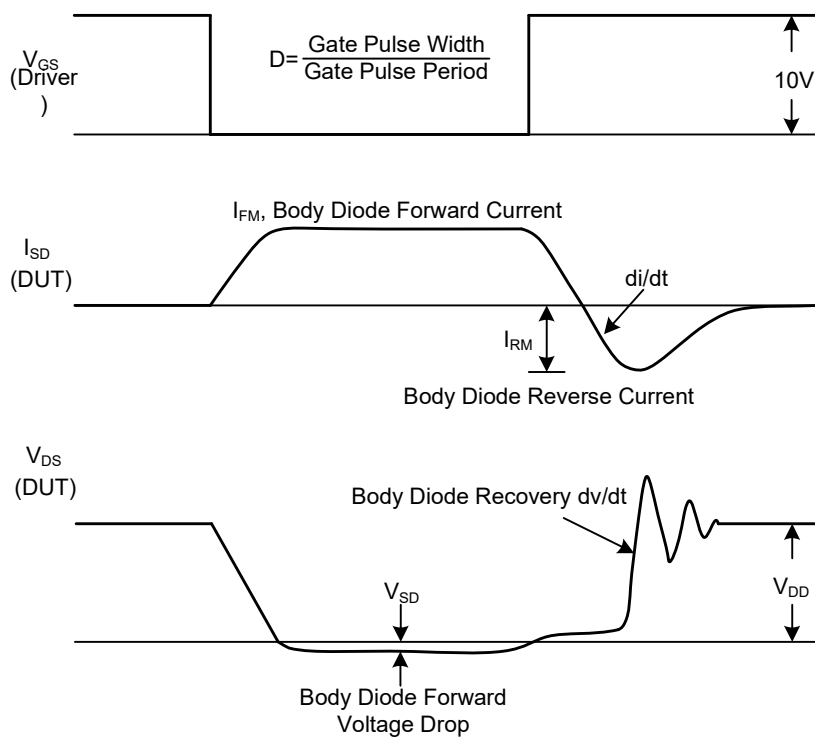
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

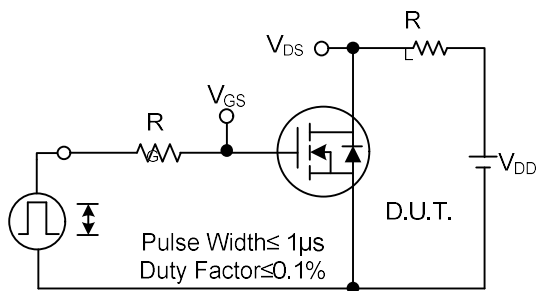


Peak Diode Recovery dv/dt Test Circuit

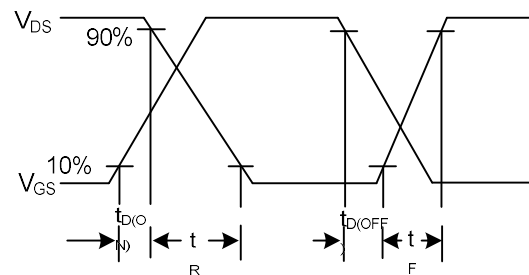


Peak Diode Recovery dv/dt Waveforms

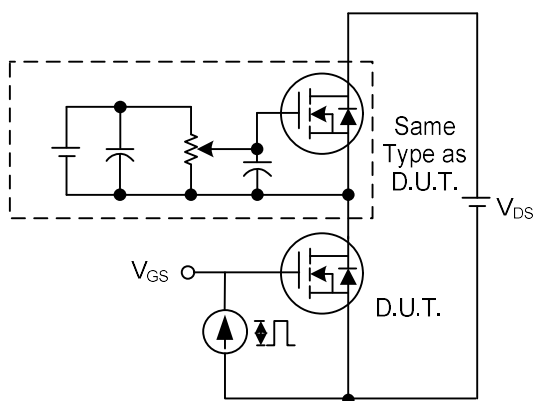
■ TEST CIRCUITS AND WAVEFORMS



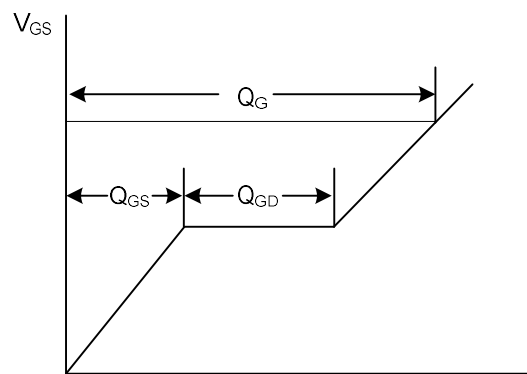
Switching Test Circuit



Switching Waveforms

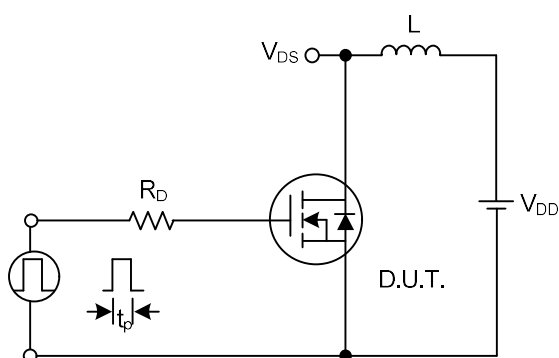


Gate Charge Test Circuit

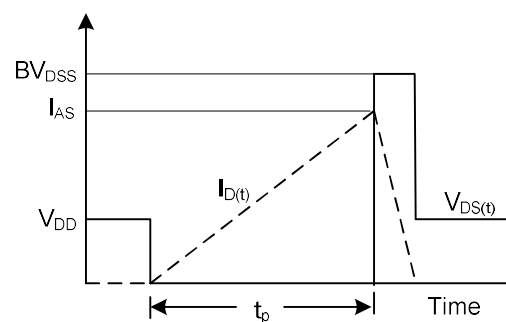


Charge

Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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