

**USG085R035H-T**

Preliminary

POWER MOSFET**100A, 85V N-CHANNEL
POWER MOSFET****DESCRIPTION**

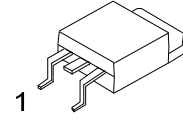
The UTC **USG085R035H-T** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with low $R_{DS(ON)}$ characteristic by high cell density trench technology.

The UTC **USG085R035H-T** is suitable for high efficiency synchronous rectification in SMPS, UPS, hard switched and high frequency circuits.

FEATURES

* $R_{DS(ON)} \leq 3.5 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=50\text{A}$

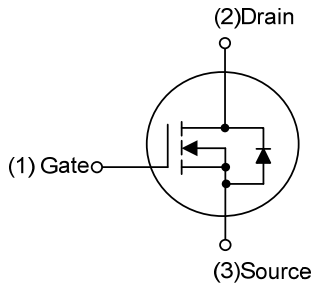
* High Switching Speed



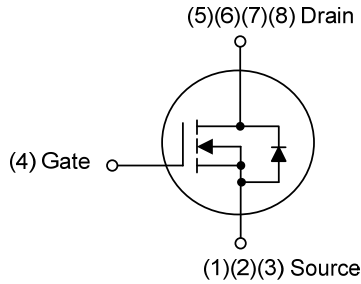
TO-263



PDFN5x6

SYMBOL

TO-263



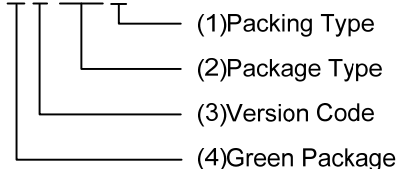
PDFN5x6

ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
USG085R035HL-T-TQ2-T	USG085R035HG-T-TQ2-T	TO-263	G	D	S	-	-	-	-	-	Tube
USG085R035HL-T-TQ2-R	USG085R035HG-T-TQ2-R	TO-263	G	D	S	-	-	-	-	-	Tape Reel
USG085R035HL-T-P5060-R	USG085R035HG-T-P5060-R	PDFN5x6	S	S	S	G	D	D	D	D	Tape Reel

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

USG085R035HG-T-TQ2-T



- (1) T: Tube, R: Tape Reel
(2) TQ2: TO-263, P5060: PDFN5x6
(3) Version T
(4) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

PACKAGE	MARKING
TO-263	UTC USG085R035H T 085 1 Version Code Lot Code L: Lead Free G: Halogen Free Date Code
PDFN5×6	UTC USG 085R035H • T 085 Version Code Lot Code Date Code

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	85	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	Continuous	I_D	100	A
	Pulsed (Note 2)	I_{DM}	200	A
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	118	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.55	V/ns
Power Dissipation	TO-263	P_D	138	W
	PDFN5×6		100	W
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Storage Temperature Range		T_{STG}	-20 ~ +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. $L = 0.1\text{mH}$, $I_{AS} = 49\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq 50\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-263	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
	PDFN5×6		65	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-263	θ_{JC}	0.9	$^{\circ}\text{C}/\text{W}$
	PDFN5×6		1.25	$^{\circ}\text{C}/\text{W}$

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

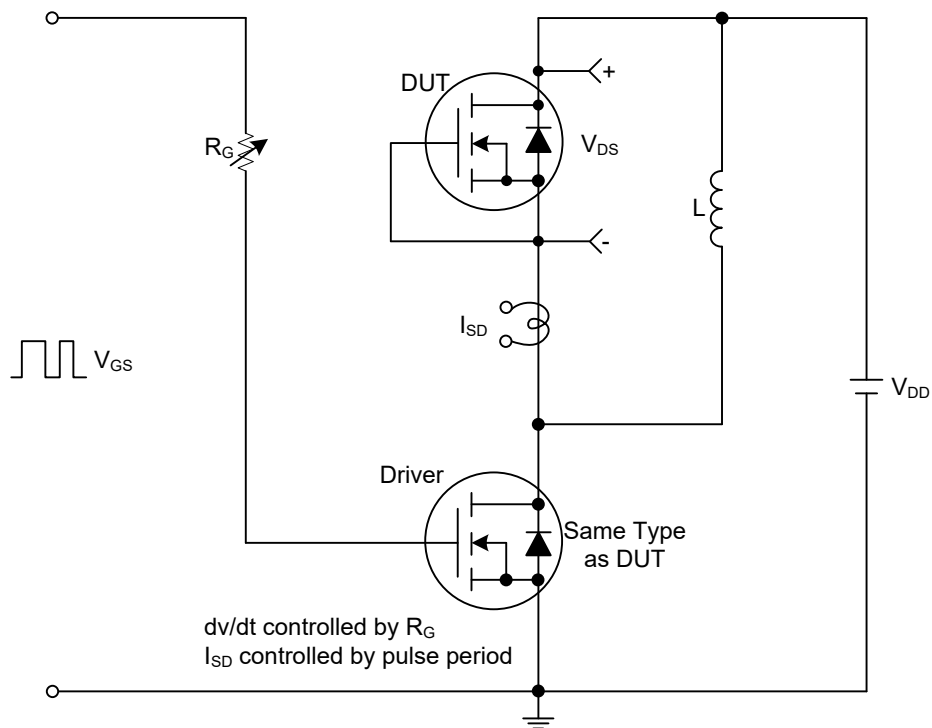
■ ELECTRICAL CHARACTERISTICS (T_J = 25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	85			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =80V, 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			3.5	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		5965		pF
Output Capacitance		C _{OSS}			2155		pF
Reverse Transfer Capacitance		C _{RSS}			106		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =68V, V _{GS} =10V, I _D =100A, (Note 1, 2)		140		nC
Gate to Source Charge		Q _{GS}			40		nC
Gate to Drain Charge		Q _{GD}			36		nC
Turn-on Delay Time (Note 1)		t _{D(ON)}	V _{DD} =40V, V _{GS} =10V, I _D =100A, R _G =3.3Ω (Note 1, 2)		23		ns
Rise Time		t _R			21		ns
Turn-off Delay Time		t _{D(OFF)}			55		ns
Fall-Time		t _F			25		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				100	A
Maximum Body-Diode Pulsed Current		I _{SM}				200	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =100A, 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}	dl _F /dt =85A/μs		125		nC

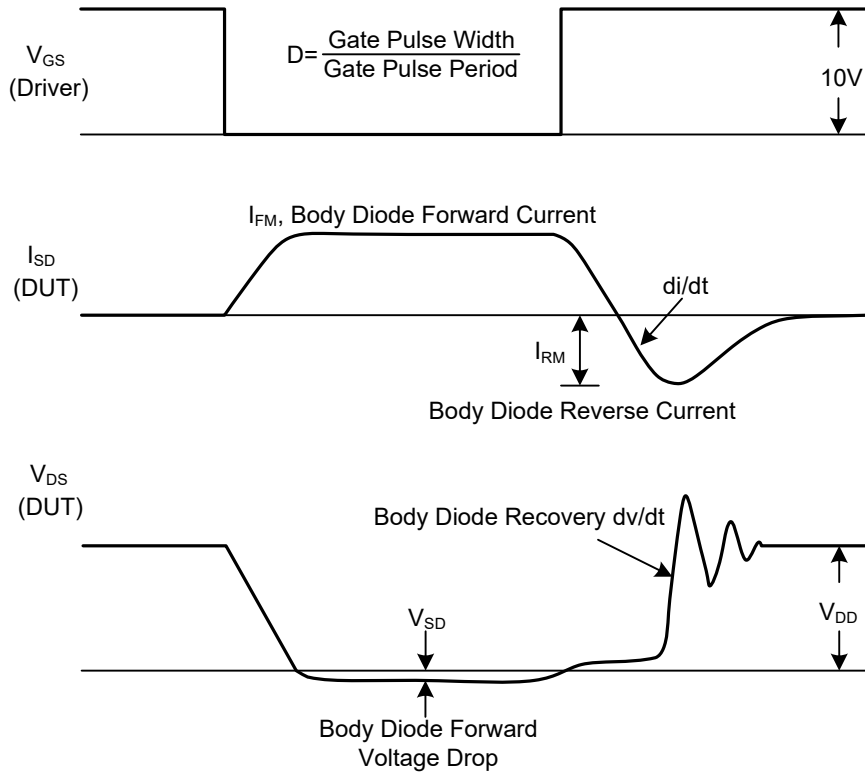
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS



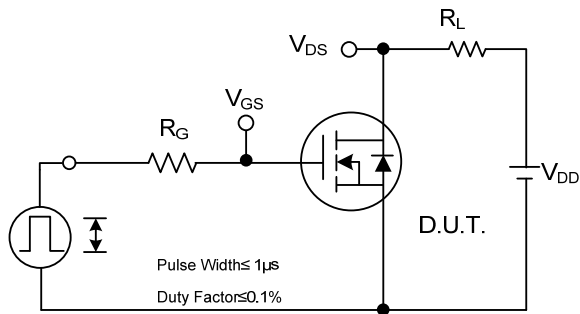
Peak Diode Recovery dv/dt Test Circuit



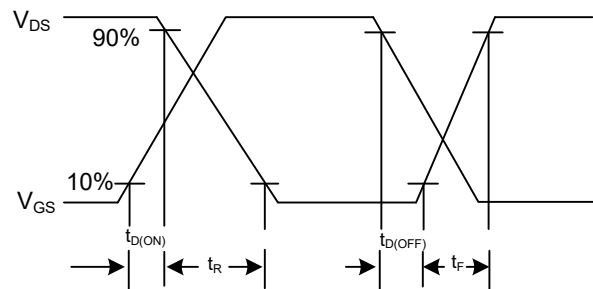
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

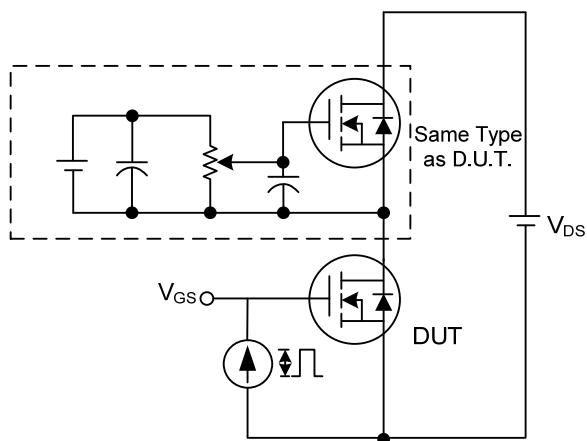
■ TEST CIRCUITS AND WAVEFORMS



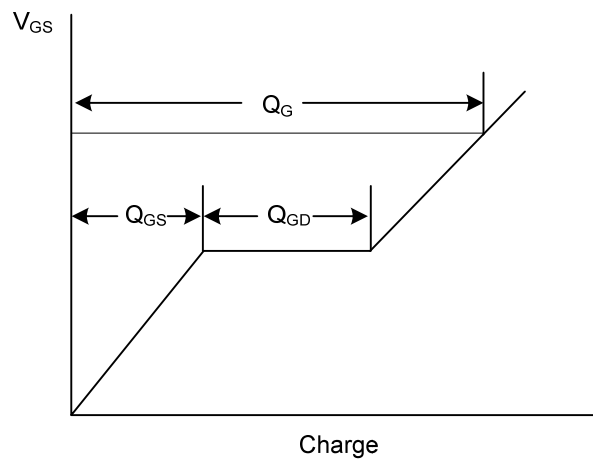
Switching Test Circuit



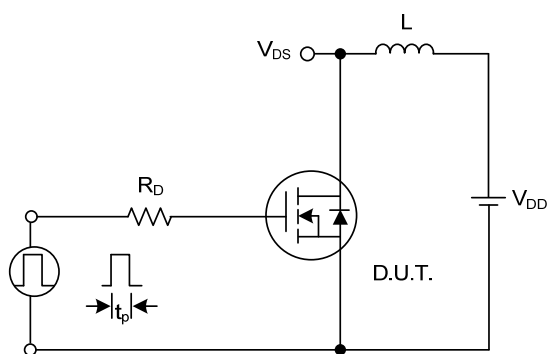
Switching Waveforms



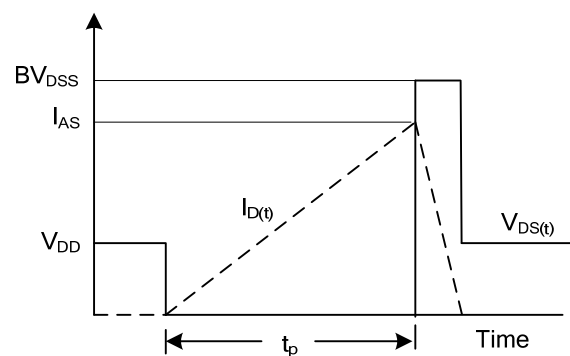
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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