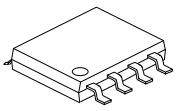
UTT13P04-H

Power MOSFET

-13A, -40V P-CHANNEL POWER MOSFET



SOP-8

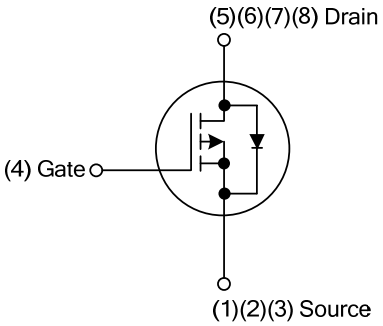
■ DESCRIPTION

The UTC **UTT13P04-H** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed and a minimum on-state resistance. It can also withstand high energy in the avalanche.

■ FEATURES

* $R_{DS(ON)}$ < 12 mΩ @ V_{GS}=-10V, I_D=-12A
  $R_{DS(ON)}$ < 17 mΩ @ V_{GS}=-4.5V, I_D=-12A
* Improved dv/dt capability
* Fast switching
* Green device available

■ SYMBOL



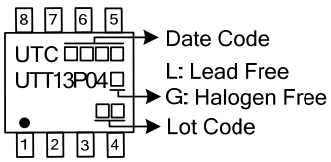
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT13P04L-S08-R	UTT13P04G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

UTT13P04G-S08-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) S08: SOP-8 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_A=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	-40	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current	Continuous	I_D	-13	A
Pulsed Drain Current	Pulsed (Note 2)	I_{DM}	-39	A
Avalanche Energy, Single Pulsed (Note 3)		E_{AS}	58	mJ
Power Dissipation		P_D	2.5	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}=-34A, V_{DD}=20V, R_G=25 Ω, Starting T_J=25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	50	°C/W

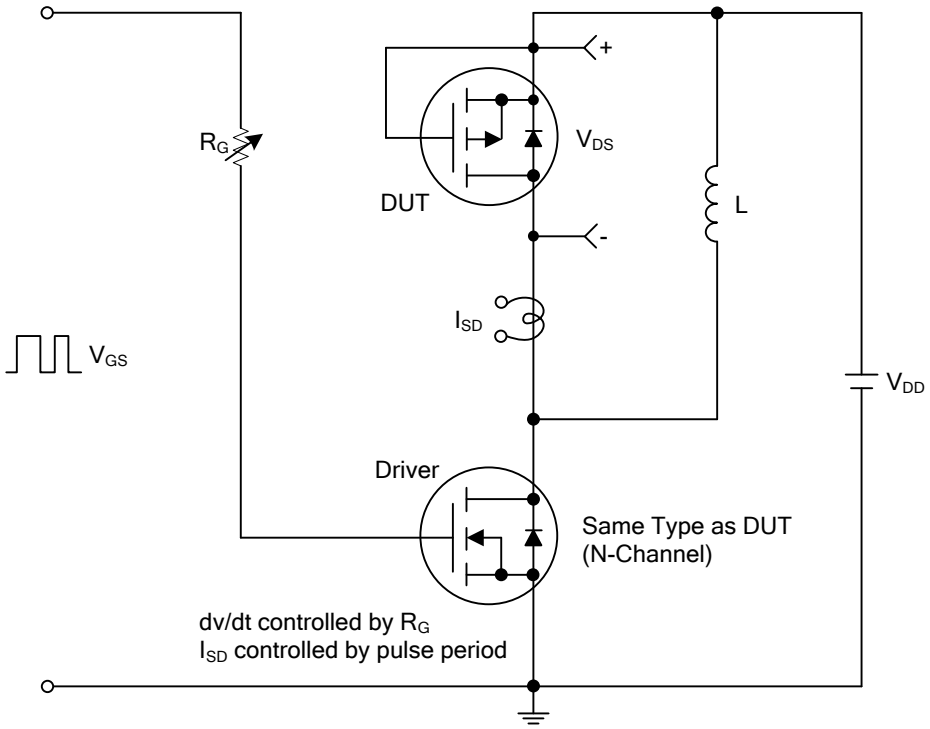
Note: The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

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

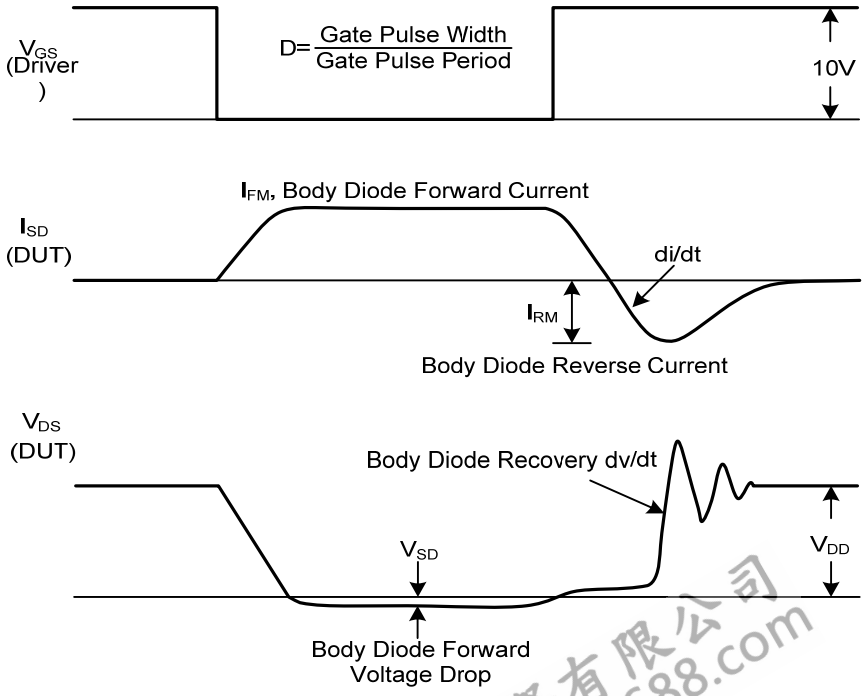
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250μA	-40			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-40V, V_{GS}=0V			-1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{DS}=0V ,V_{GS}=+20V			+100	nA
	Reverse		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		-3.0	V
Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-12A			12	mΩ
			V_{GS}=-4.5V, I_D=-12A			17	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{DS}=-20V, V_{GS}=0V, f=1.0MHz		2900		pF
Output Capacitance		C_{OSS}			330		pF
Reverse Transfer Capacitance		C_{RSS}			220		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=-32V, V_{GS}=-10V, I_D=-13A I_G=-1mA (Note 1, 2)		58		nC
Gate to Source Charge		Q_{GS}			14		nC
Gate to Drain Charge		Q_{GD}			12		nC
Turn-on Delay Time (Note 1)		$t_{D(ON)}$	V_{DD}=-20V, V_{GS}=-10V, I_D=-13A, R_G=-25Ω (Note 1, 2)		28		ns
Rise Time		t_R			70		ns
Turn-off Delay Time		$t_{D(OFF)}$			192		ns
Fall-Time		t_F			170		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Pulsed Current		I_S				-13	A
Drain-Source Diode Forward Voltage (Note 1)		I_{SM}				-39	A
Maximum Body-Diode Continuous Current		V_{SD}	I_S =-12A, V_{GS}=0V			-1.2	V

Note: 1. Pulse Test : Pulse width ≤ 400μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

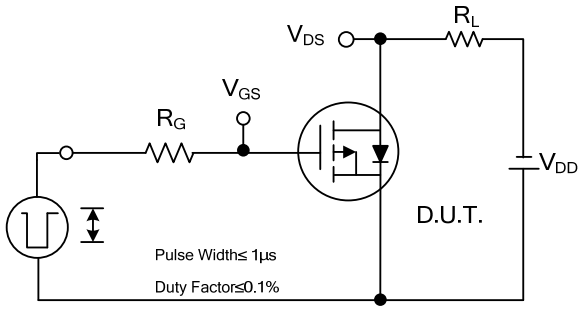


Peak Diode Recovery dv/dt Test Circuit

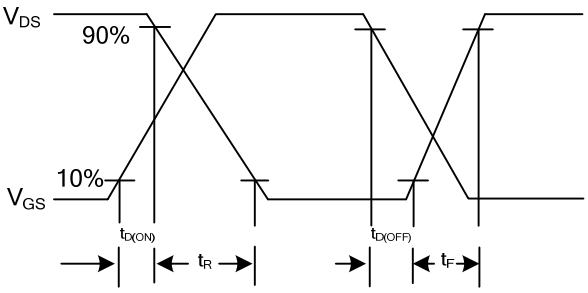


Peak Diode Recovery dv/dt Waveforms

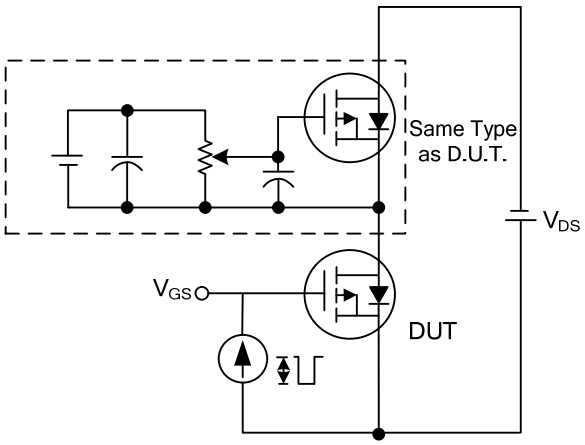
■ TEST CIRCUITS AND WAVEFORMS



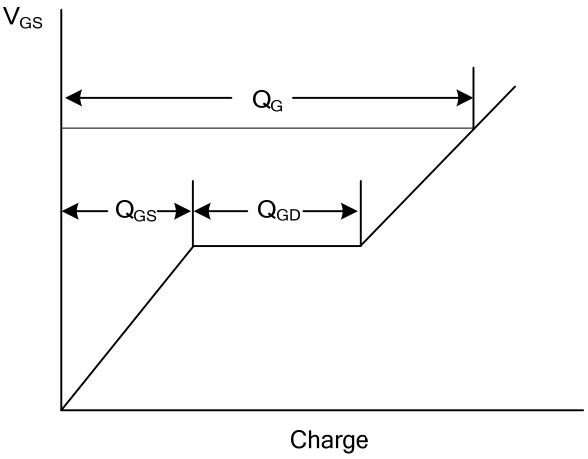
Switching Test Circuit



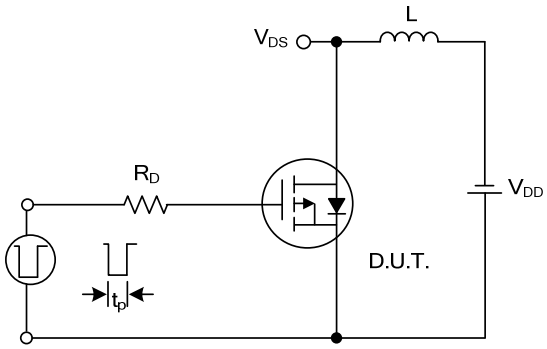
Switching Waveforms



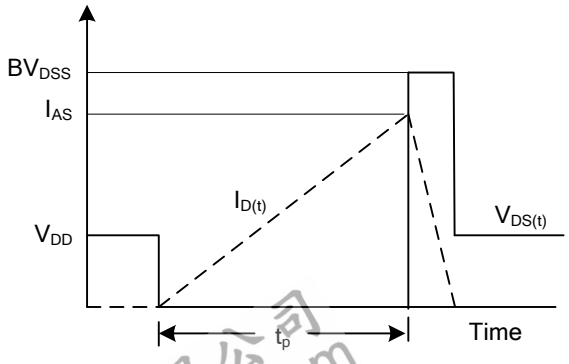
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS