

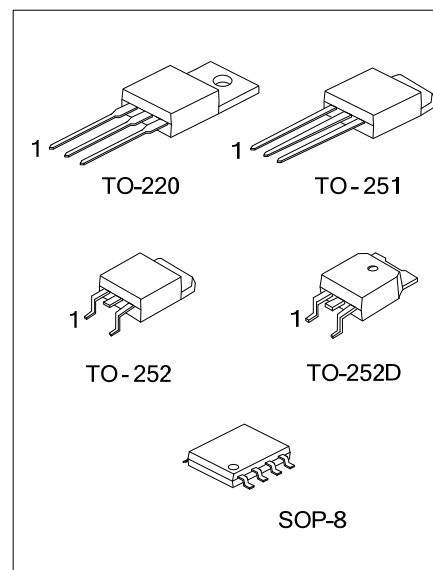
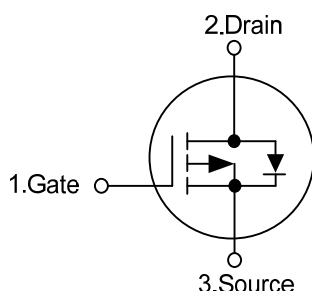
**UTT40P04****Power MOSFET****-40A, -40V P-CHANNEL
POWER MOSFET****DESCRIPTION**

The UTC **UTT40P04** 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.

This UTC **UTT40P04** is suitable for Inverter or Power supplies.

FEATURES

- * $R_{DS(ON)} \leq 20 \text{ m}\Omega$ @ $V_{GS} = -10\text{V}$, $I_D = -20\text{A}$,
- $R_{DS(ON)} \leq 30 \text{ m}\Omega$ @ $V_{GS} = -4.5\text{V}$, $I_D = -20\text{A}$

SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT40P04L-TA3-T	UTT40P04G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UTT40P04L-TM3-T	UTT40P04G-TM3-T	TO-251	G	D	S	-	-	-	-	-	Tube
UTT40P04L-TN3-R	UTT40P04G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UTT40P04L-TND-R	UTT40P04G-TND-R	TO-252D	G	D	S	-	-	-	-	-	Tape Reel
UTT40P04L-S08-R	UTT40P04G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

UTT40P04G-TA3-T (1) Packing Type (2) Package Type (3) Green Package	(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TM3: TO-251, TN3: TO-252, TND: TO-252D, S08: SOP-8 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

TO-220 / TO-251 / TO-252 / TO-252D	SOP-8
UTC UTT40P04 Lot Code 1 L: Lead Free G: Halogen Free Data Code	8 7 6 5 UTC UTT40P04 Lot Code 1 2 3 4 Date Code L: Lead Free G: Halogen Free

■ ABSOLUTE MAXIMUM RATINGS (T_C=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		I _D	-40	A
Pulsed Drain Current (Note 2)		I _{DM}	-80	A
Single Pulsed Avalanche Energy (Note 3)		E _{AS}	71	mJ
Power Dissipation	TO-220	P _D	60	W
	TO-251/TO-252		46	W
	TO-252D			
	SOP-8		1.8	W
Junction Temperature		T _J	+150	°C
Storage Temperature		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} = -37.8A, V_{DD} = -20V, R_G = 25Ω, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ _{JA}	62.5	°C/W
	TO-251/TO-252		110 (Note)	°C/W
	TO-252D			
	SOP-8		90 (Note)	°C/W
Junction to Case	TO-220	θ _{JC}	2.08	°C/W
	TO-251/TO-252		2.7 (Note)	°C/W
	TO-252D			
	SOP-8		69 (Note)	°C/W

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

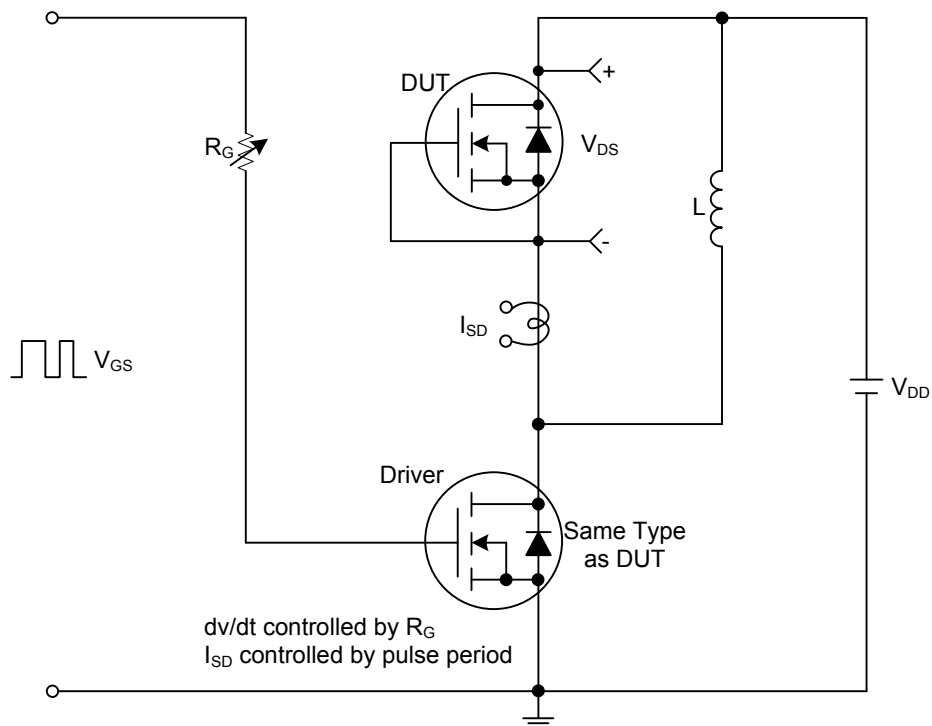
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =-250μA, V _{GS} =0V	-40			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =-32V, 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	-1.0		-3.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =-10V, I _D =-20A			20	mΩ
			V _{GS} =-4.5V, I _D =-20A			30	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =-20V, f=1.0MHz		2400		pF
Output Capacitance		C _{OSS}			270		pF
Reverse Transfer Capacitance		C _{RSS}			240		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DD} =-32V, V _{GS} =-10V, I _D =-40A I _G =-1mA (Note1, 2)		55		nC
Gate to Source Charge		Q _{GS}			8		nC
Gate to Drain Charge		Q _{GD}			14		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =-20V, V _{GS} =-10V, I _D =-40A, R _G =3Ω (Note1, 2)		10		ns
Rise Time		t _R			18		ns
Turn-OFF Delay Time		t _{D(OFF)}			88		ns
Fall-Time		t _F			46		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage		V _{SD}	I _S =-40A, V _{GS} =0V (Note 1)			-1.4	V
Body Diode Reverse Recovery Time		t _{rr}	I _F =-30A, di/dt=100A/μs		92		ns
Body Diode Reverse Recovery Charge		Q _{rr}			400		nC

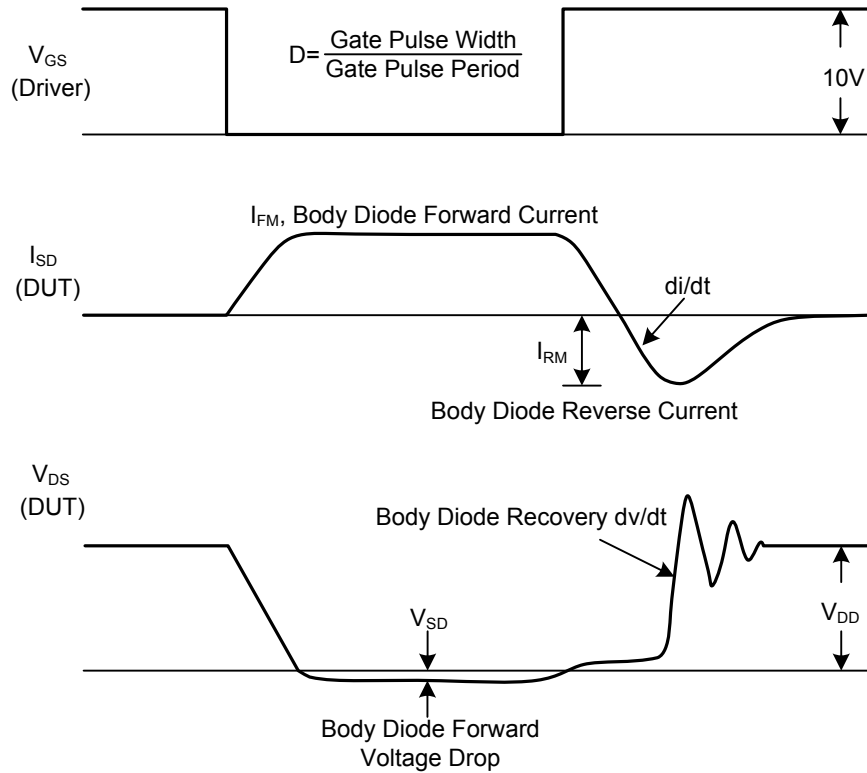
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



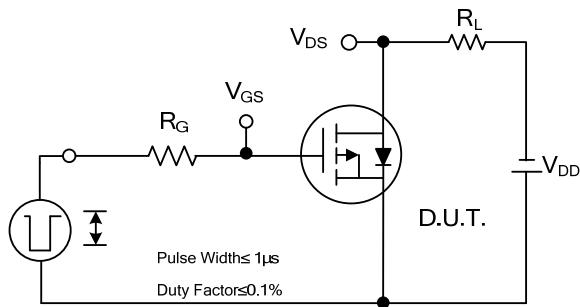
Peak Diode Recovery dv/dt Test Circuit



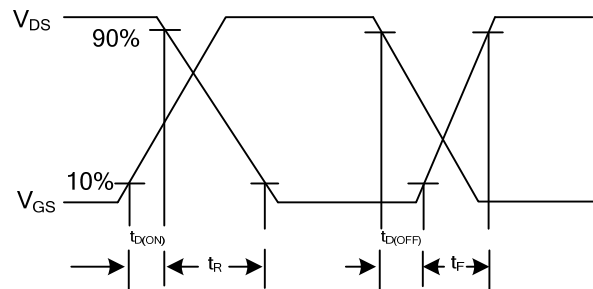
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

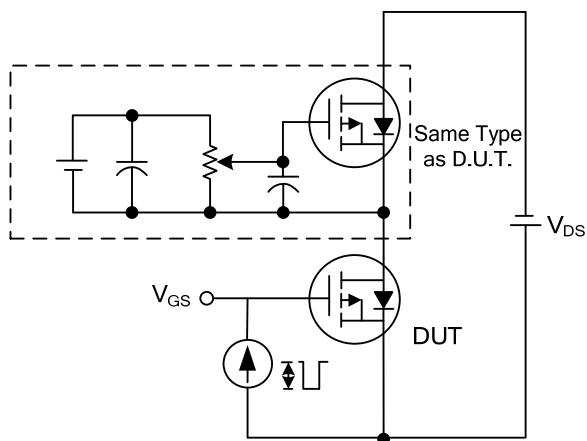
■ TEST CIRCUITS AND WAVEFORMS



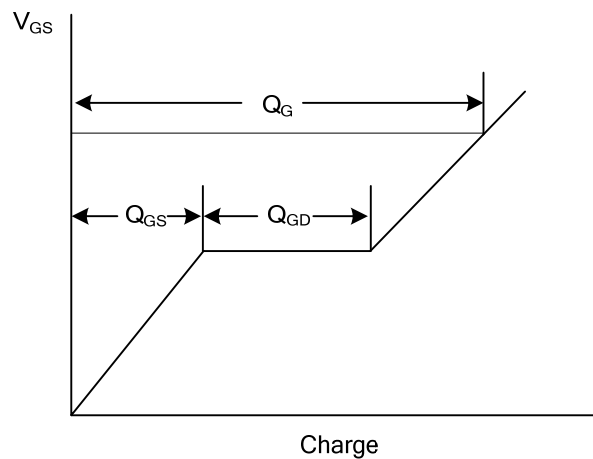
Switching Test Circuit



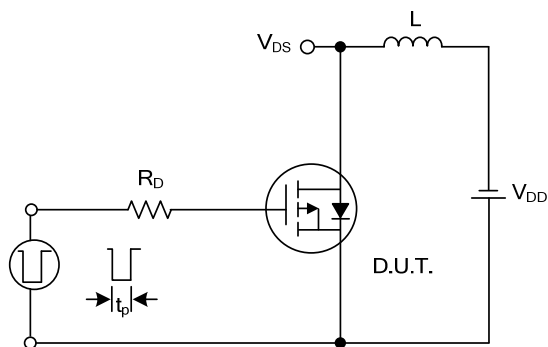
Switching Waveforms



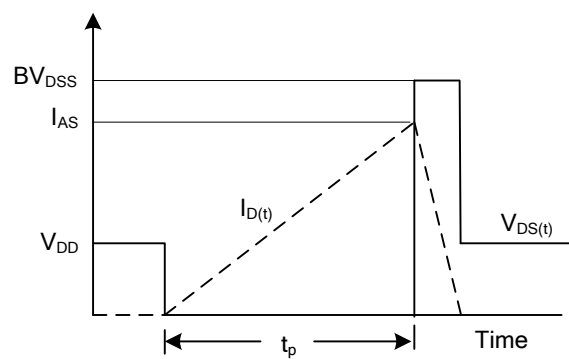
Gate Charge Test Circuit



Gate Charge Waveform

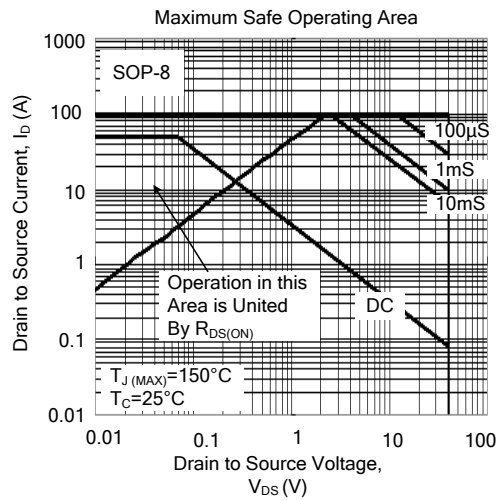


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



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