UTT48NN06-Q POWER MOSFET

# 48A, 60V N-CHANNEL POWER MOSFET

#### DESCRIPTION

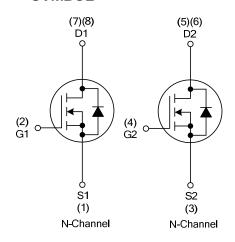
The UTC **UTT48NN06-Q** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance, low gate charge and high switching speed.

The UTC **UTT48NN06-Q** is suitable for high voltage synchronous rectifier and DC/DC converters, etc.

#### **■ FEATURES**

- \*  $R_{DS(ON)} \le 18 \text{ m}\Omega$  @  $V_{GS}=10\text{V}$ ,  $I_{D}=24\text{A}$  $R_{DS(ON)} \le 21 \text{ m}\Omega$  @  $V_{GS}=4.5\text{V}$ ,  $I_{D}=24\text{A}$
- \* High Switching Speed
- \* High Cell Density Trench Technology

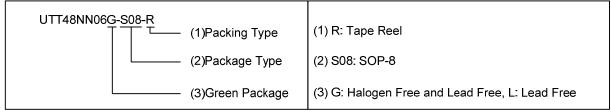


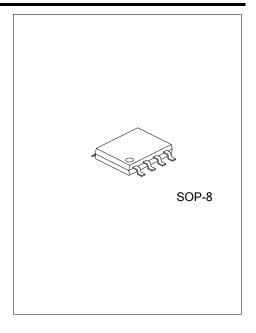


## **■ ORDERING INFORMATION**

Ordering Number		Dookogo	Pin Assignment							Daaldaa	
Lead Free	Halogen Free	Package	1	2	3	4	5	6	7	8	Packing
UTT48NN06L-S08-R	UTT48NN06G-S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

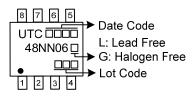
Note: Pin Assignment: G: Gate D: Drain S: Source





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## ■ MARKING



UTT48NN06-Q Power MOSFET

## ■ ABSOLUTE MAXIMUM RATING (T<sub>C</sub>=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT	
Drain-Source Voltage		$V_{DSS}$	60	V	
Gate-Source Voltage		$V_{GSS}$	±20	V	
Drain Current	Continuous	I <sub>D</sub>	24	Α	
	Pulsed (Note 2)	I <sub>DM</sub>	48	Α	
Avalanche Energy	Single Pulsed (Note 3)	E <sub>AS</sub>	48	mJ	
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.6	V/nS	
Power Dissipation (Note 5)		P <sub>D</sub>	5	W	
Junction Temperature		$T_J$	+150	°C	
Storage Temperature Range		T <sub>STG</sub>	-55 ~ <b>+</b> 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,  $I_{AS}$ =31A,  $V_{DD}$ =50V,  $R_G$  = 25 $\Omega$ , Starting  $T_J$  = 25 $^{\circ}$ C
- 4.  $I_{SD} \le 30A$ ,  $di/dt \le 100A/\mu s$ ,  $V_{DD} \le V_{(BR)DSS}$ ,  $T_J \le 25^{\circ}C$

### **■ THERMAL DATA**

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	°C/W	
Junction to Case	$\theta_{JC}$	25	°C/W

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

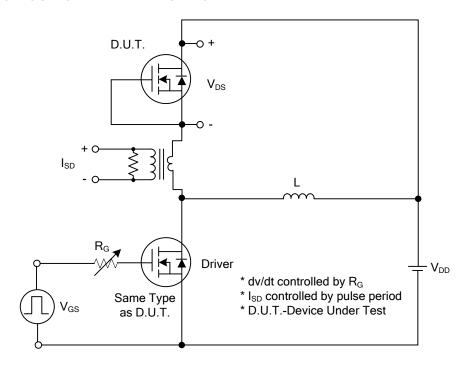
### ■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub> =25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT			
OFF CHARACTERISTICS									
Drain-Source Breakdown Voltage	$BV_DSS$	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	60			V			
Drain-Source Leakage Current	$I_{DSS}$	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V			1	μΑ			
Coto Source Leekoge Current Forward	1	V <sub>GS</sub> =+20V, V <sub>DS</sub> =0V			+100	nA			
Gate-Source Leakage Current Reverse	I <sub>GSS</sub>	V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V			-100	nA			
ON CHARACTERISTICS									
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_{D}=250\mu A$			3.0	V			
Static Drain-Source On-State Resistance	D	V <sub>GS</sub> =10V, I <sub>D</sub> =24A			18	mΩ			
Static Dialii-Source Off-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =24A			21	mΩ			
DYNAMIC PARAMETERS									
Input Capacitance	C <sub>ISS</sub>			1900		рF			
Output Capacitance	Coss	$V_{GS}$ =0V, $V_{DS}$ =25V, f=1.0MHz		140		pF			
Reverse Transfer Capacitance	C <sub>RSS</sub>			115		pF			
SWITCHING PARAMETERS									
Total Gate Charge (Note 1)	$Q_G$	V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =48A		50		nC			
Gate to Source Charge	$Q_GS$	$I_{G}$ =1mA (Note 1, 2)		6		nC			
Gate to Drain Charge	$Q_GD$	IG-IIIIA (Note 1, 2)		15		nC			
Turn-on Delay Time (Note 1)	t <sub>D(ON)</sub>			10		ns			
Rise Time	$t_{R}$	$V_{DS}$ =30V, $V_{GS}$ =10V, $I_{D}$ =48A,		17.5		ns			
Turn-off Delay Time	t <sub>D(OFF)</sub>	R <sub>G</sub> =3Ω (Note 1, 2)		35		ns			
Fall-Time	$t_{F}$			18		ns			
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS									
Maximum Body-Diode Continuous Current	Is				24	Α			
Maximum Body-Diode Pulsed Current	I <sub>SM</sub>				48	Α			
Drain-Source Diode Forward Voltage (Note 1)	$V_{SD}$	I <sub>S</sub> =48A, V <sub>GS</sub> =0V			1.4	V			
Reverse Recovery Time (Note 1)	t <sub>rr</sub>	I <sub>S</sub> =48A, V <sub>GS</sub> =0V,		53		nS			
Reverse Recovery Charge	$Q_{rr}$	dI/dt=100A/μs		35		nC			

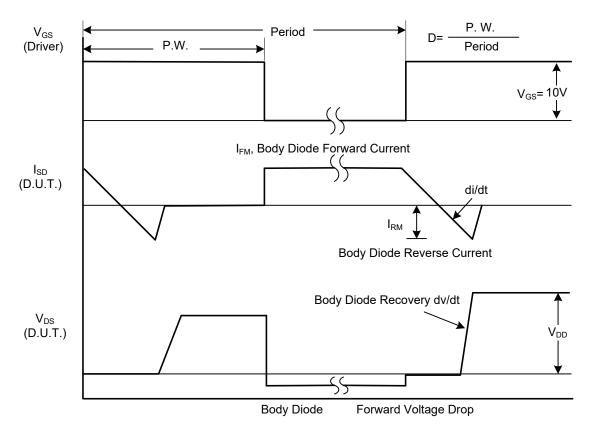
Notes: 1. Pulse Test: Pulse width ≤ 300µs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

## ■ TEST CIRCUITS AND WAVEFORMS

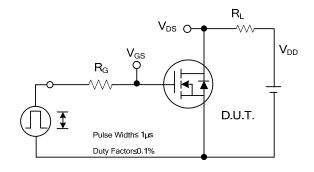


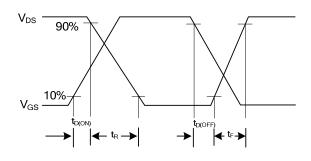
Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms

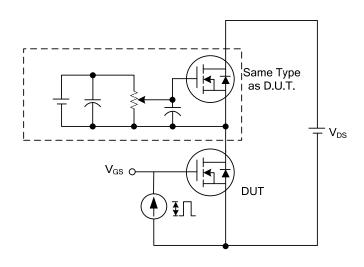
## **■ TEST CIRCUITS AND WAVEFORMS**

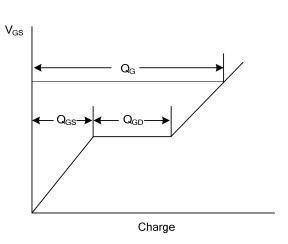




**Switching Test Circuit** 

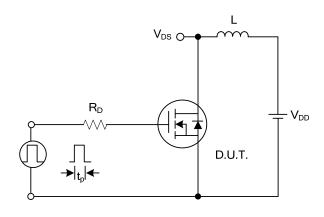
**Switching Waveforms** 

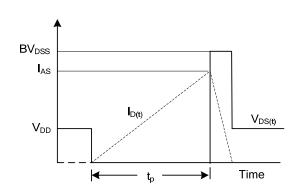




**Gate Charge Test Circuit** 

**Gate Charge Waveform** 

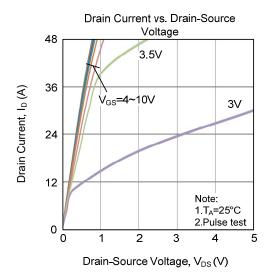


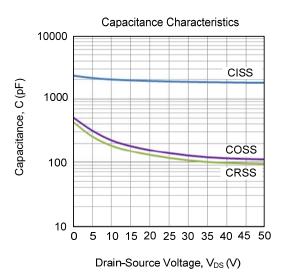


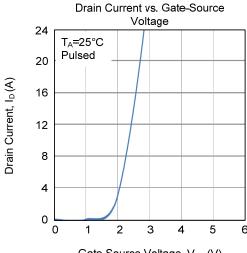
**Unclamped Inductive Switching Test Circuit** 

**Unclamped Inductive Switching Waveforms** 

### ■ TYPICAL CHARACTERISTICS







4 0 0 1 2 3 4 5 6
Gate-Source Voltage, V<sub>GS</sub>(V)

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