

**UTC** UNISONIC TECHNOLOGIES CO., LTD

# 30N06V-Q

Preliminary

**Power MOSFET** 

TO-251

# 60V, 30A N-CHANNEL **POWER MOSFET**

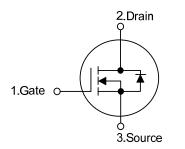
# DESCRIPTION

The UTC 30N06V-Q is a low voltage power MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and excellent avalanche characteristics. This power MOSFET is usually used at automotive applications in power supplies, high efficient DC to DC converters and battery operated products.



- \*  $R_{DS(ON)} < 40 m \Omega @V_{GS} = 10 V, I_D = 15A$
- \* Fast switching capability
- \* Avalanche energy specified

#### **SYMBOL**



ORDERING INFORMATION

Ordering Number		Dealerse	Pin Assignment			Dealizer	
Lead Free	Halogen Free	Package	1	2	3	Packing	
30N06VL-TM3-T	30N06VG-TM3-T	TO-251	G	D	S	Tube	

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



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V <sub>DSS</sub>	60	V
Gate to Source Voltage		V <sub>GSS</sub>	±20	V
Continuous Drain Current	$T_c = 25^{\circ}C$	1	30	А
	T <sub>C</sub> = 100°C	l <sub>D</sub>	21.3	А
Pulsed Drain Current (Note 2)		I <sub>DM</sub>	120	А
Avalanche Energy	Single Pulsed (Note 3)	E <sub>AS</sub>	250	mJ
	Repetitive (Note 2)	E <sub>AR</sub>	8	mJ
Power Dissipation		PD	46	W
Junction Temperature		ΤJ	+150	°C
Operation Temperature		T <sub>OPR</sub>	-55 ~ +150	°C
Storage Temperature		T <sub>STG</sub>	-55 ~ +150	°C

Note: 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.

Repeativity rating: pulse width limited by junction temperature

3. L=0.66mH,  $I_{AS}$ =30A,  $V_{DD}$ =25V,  $R_G$ =20 $\Omega$ , Starting  $T_J$ =25°C

#### ■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT	
Junction to Ambient	θ <sub>JA</sub>	110	°C/W	
Junction to Case	θ <sub>JC</sub>	2.85	°C/W	



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

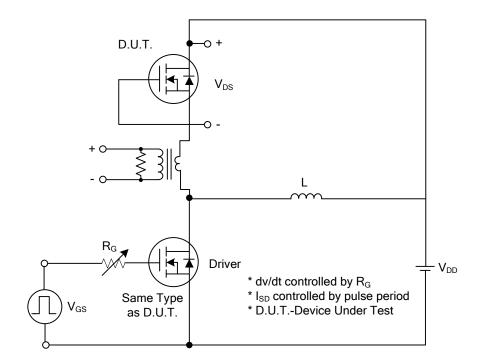
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV <sub>DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	60			V
Drain-Source Leakage Current		I <sub>DSS</sub>	V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V			10	μA
Cata Cauraa Laakana Currant	orward	less	V <sub>GS</sub> = 20V, V <sub>DS</sub> = 0 V			100	nA
Gate-Source Leakage Current	Reverse		V <sub>GS</sub> = -20V, V <sub>DS</sub> = 0 V			-100	nA
Breakdown Voltage Temperature Coefficient		$\triangle BV_{DSS} / \triangle T_J$	I <sub>D</sub> =250μA,		0.06		V/°C
			Referenced to 25°C				
ON CHARACTERISTICS				i	i	ii	
Gate Threshold Voltage		V <sub>GS(TH)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	1.6		2.4	V
Static Drain-Source On-State Resistance		R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A			40	mΩ
DYNAMIC CHARACTERISTICS						-	
Input Capacitance	nput Capacitance				800		рF
Output Capacitance		C <sub>OSS</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1MHz		300		рF
Reverse Transfer Capacitance		C <sub>RSS</sub>			50		рF
SWITCHING CHARACTERISTICS	6						
Turn-On Delay Time		t <sub>D(ON)</sub>			30		ns
Turn-On Rise Time		t <sub>R</sub>	V <sub>DD</sub> = 30V, I <sub>D</sub> =15 A, V <sub>GS</sub> =10V		50		ns
Turn-Off Delay Time		t <sub>D(OFF)</sub>	(Note 1, 2)		280		ns
Turn-Off Fall Time		t <sub>F</sub>			120		ns
Total Gate Charge	otal Gate Charge				30		nC
Gate-Source Charge		$Q_{GS}$	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 24A (Note 1, 2)		5		nC
Gate-Drain Charge		$Q_{GD}$	$I_D = 24A$ (Note 1, 2)		8		nC
SOURCE-DRAIN DIODE RATING	S AND CH	ARACTERIST	ICS				
Drain-Source Diode Forward Volta	ge	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 30A			1.4	V
Maximum Continuous Drain-Source Diode		I <sub>S</sub>				20	٨
Forward Current						30	A
Maximum Pulsed Drain-Source Did	ode					120	А
Forward Current		I <sub>SM</sub>				120	А
Natao 4 Dulas Test Dulas width							

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

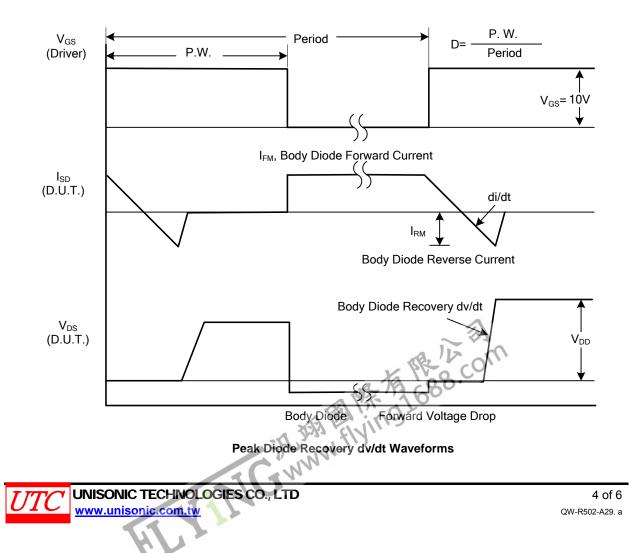
2. Essentially independent of operating temperature.

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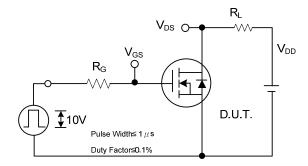
## ■ TEST CIRCUITS AND WAVEFORMS



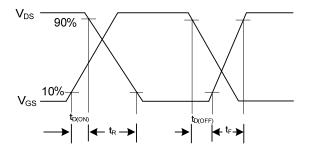
### Peak Diode Recovery dv/dt Test Circuit



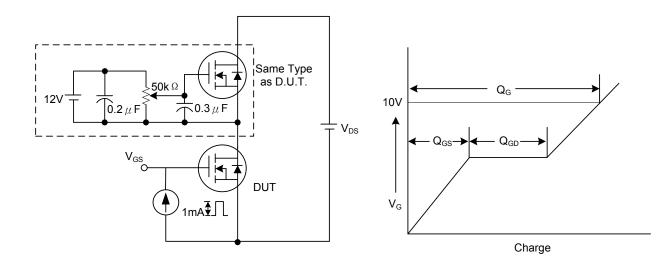
# **TEST CIRCUITS AND WAVEFORMS (Cont.)**



#### **Switching Test Circuit**

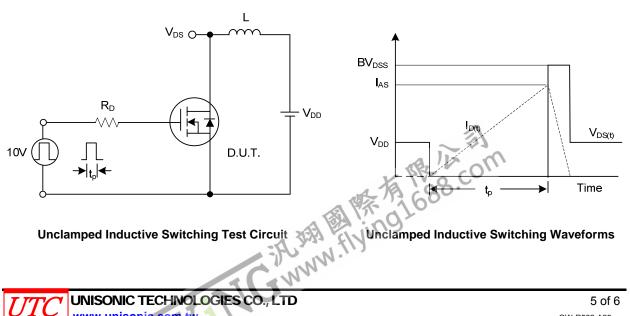


Switching Waveforms



**Gate Charge Test Circuit** 

**Gate Charge Waveform** 



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