



## 30N06V-Q

Preliminary

Power MOSFET

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

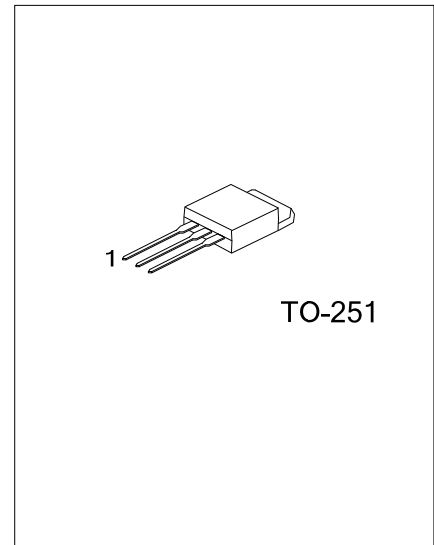
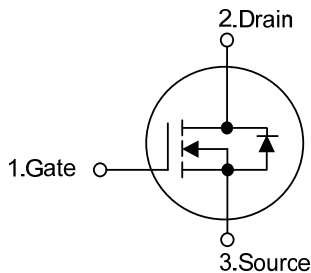
#### DESCRIPTION

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.

#### FEATURES

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

#### SYMBOL



#### ORDERING INFORMATION

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

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

<p>30N06VL-TM3-T</p>	<p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Lead Free</p>	<p>(1) T: Tube</p> <p>(2) TM3: TO-251</p> <p>(3) L: Lead Free, G: Halogen Free</p>
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■ ABSOLUTE MAXIMUM RATINGS( $T_C = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DSS}$	60	V
Gate to Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	$T_C = 25^\circ\text{C}$	30
		$T_C = 100^\circ\text{C}$	21.3
Pulsed Drain Current (Note 2)	$I_{DM}$	120	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	250
	Repetitive (Note 2)	$E_{AR}$	8
Power Dissipation	$P_D$	46	W
Junction Temperature	$T_J$	+150	$^\circ\text{C}$
Operation Temperature	$T_{OPR}$	-55 ~ +150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

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.

2. Repeativity rating: pulse width limited by junction temperature

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

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	$\theta_{JA}$	110	$^\circ\text{C/W}$
Junction to Case	$\theta_{JC}$	2.85	$^\circ\text{C/W}$

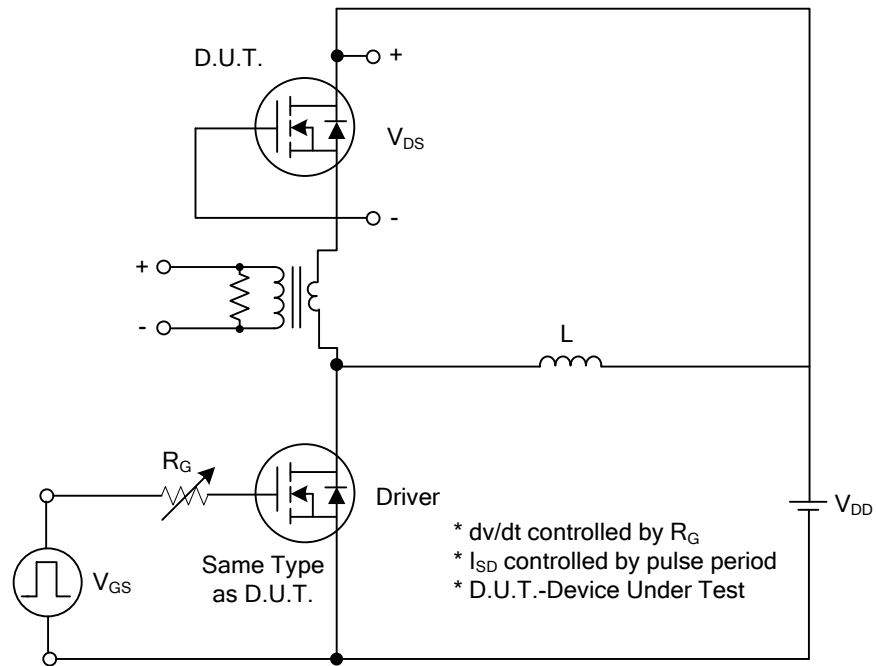
■ ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
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
Gate-Source Leakage Current	Forward	I <sub>GSS</sub>			100	nA
	Reverse				-100	nA
Breakdown Voltage Temperature Coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	I <sub>D</sub> = 250 μA, Referenced to 25°C		0.06		V/°C
<b>ON CHARACTERISTICS</b>						
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
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1MHz		800		pF
Output Capacitance	C <sub>OSS</sub>			300		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			50		pF
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> = 30V, I <sub>D</sub> = 15 A, V <sub>GS</sub> = 10V (Note 1, 2)		30		ns
Turn-On Rise Time	t <sub>R</sub>			50		ns
Turn-Off Delay Time	t <sub>D(OFF)</sub>			280		ns
Turn-Off Fall Time	t <sub>F</sub>			120		ns
Total Gate Charge	Q <sub>G</sub>	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 24A (Note 1, 2)		30		nC
Gate-Source Charge	Q <sub>GS</sub>			5		nC
Gate-Drain Charge	Q <sub>GD</sub>			8		nC
<b>SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 30A			1.4	V
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>				30	A
Maximum Pulsed Drain-Source Diode Forward Current	I <sub>SM</sub>				120	A

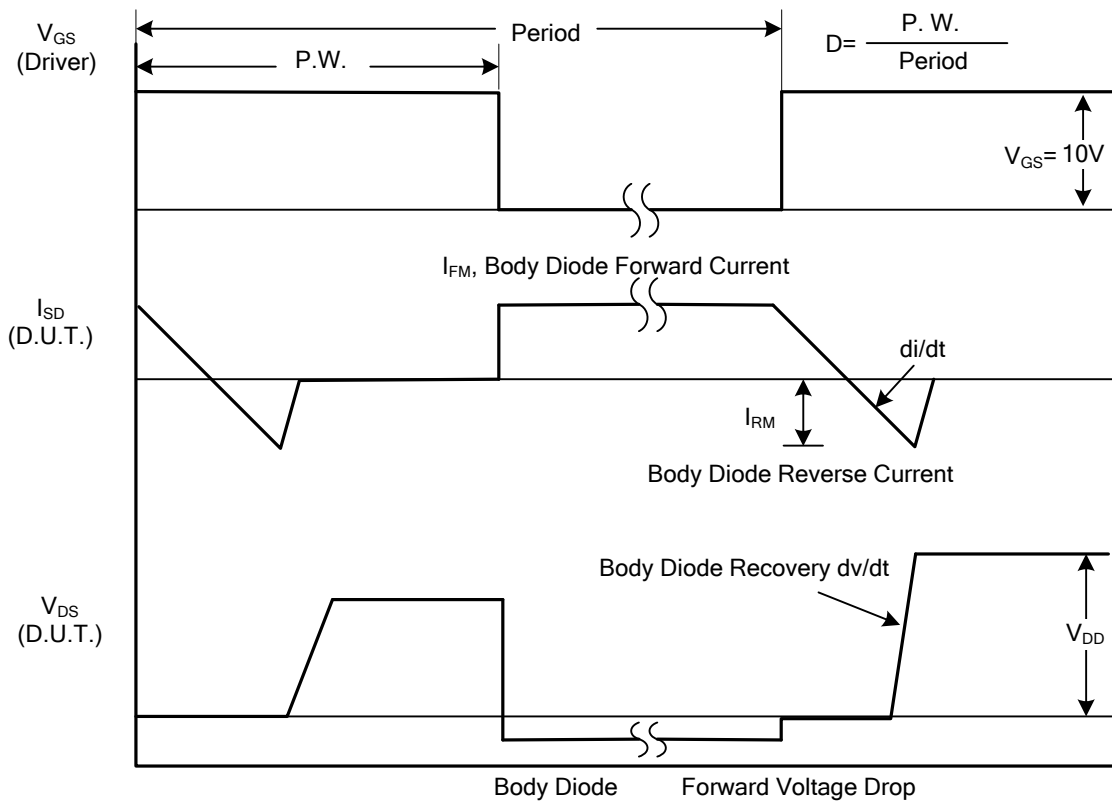
Notes: 1. Pulse Test : Pulse width ≤ 300 μs, Duty cycle ≤ 2%

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

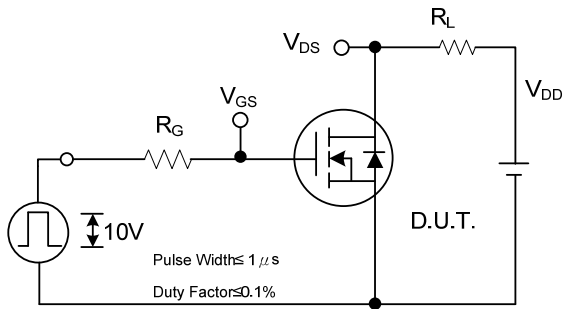


Peak Diode Recovery dv/dt Test Circuit

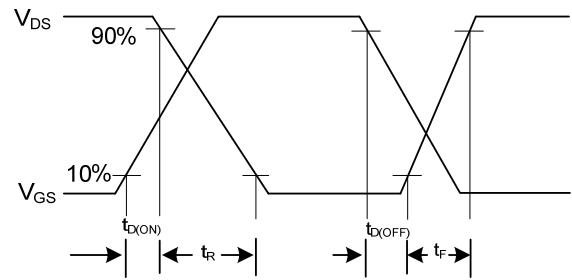


Peak Diode Recovery dv/dt Waveforms

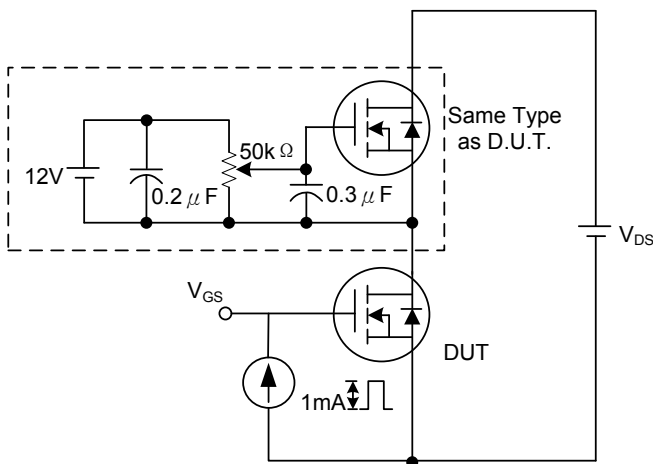
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



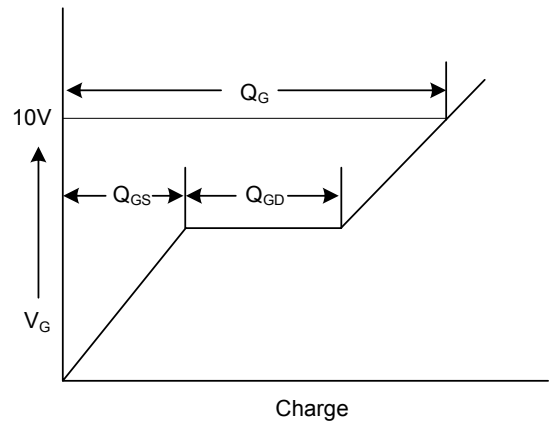
Switching Test Circuit



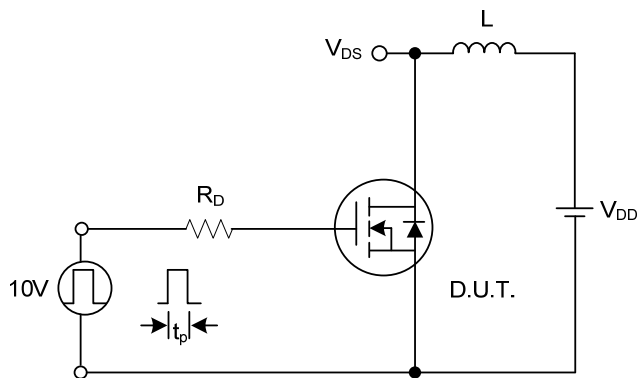
Switching Waveforms



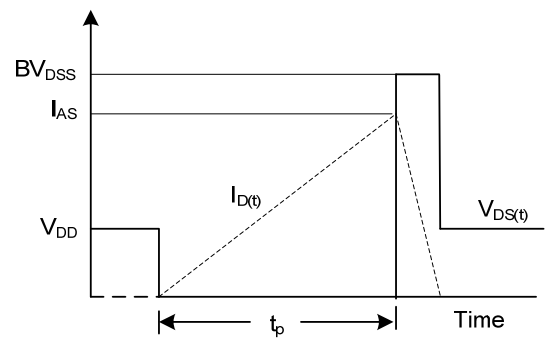
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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