



## 03N60-KW

Preliminary

Power MOSFET

### 0.3A, 600V N-CHANNEL POWER MOSFET

#### DESCRIPTION

The UTC **03N60-KW** is a high voltage power MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.

#### FEATURES

- \*  $R_{DS(on)} < 20\Omega @ V_{GS}=10V, I_D=0.15A$
- \* High breakdown voltage

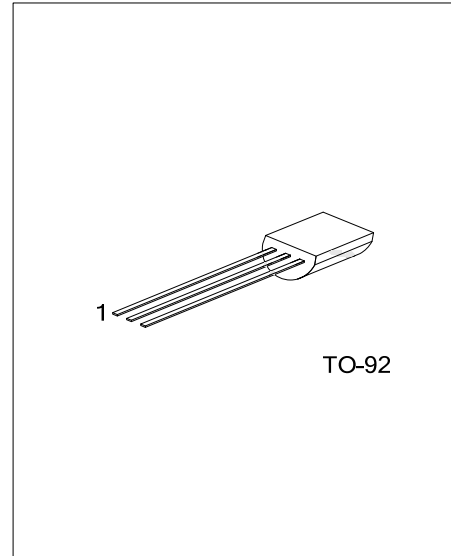
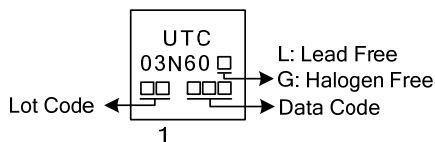
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
03N60L-T92-B	03N60G-T92-B	TO-92	G	D	S	Tape Box
03N60L-T92-K	03N60G-T92-K	TO-92	G	D	S	Bulk

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

<p>03N60L-T92-B</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) B: Tape Box, K: Bulk (2) T92: TO-92 (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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#### MARKING



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■ ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	600	V
Gate-Source Voltage		$V_{GSS}$	$\pm 30$	V
Drain Current	Continuous	$I_D$	0.3	A
	Pulsed	$I_{DM}$	1.2	A
Avalanche Current		$I_{AR}$	0.3	A
Power Dissipation		$P_D$	425	mW
Junction Temperature		$T_J$	150	$^\circ\text{C}$
Storage Temperature Range		$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

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

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	180	$^\circ\text{C}/\text{W}$
Junction to Case	$\theta_{JC}$	38	$^\circ\text{C}/\text{W}$

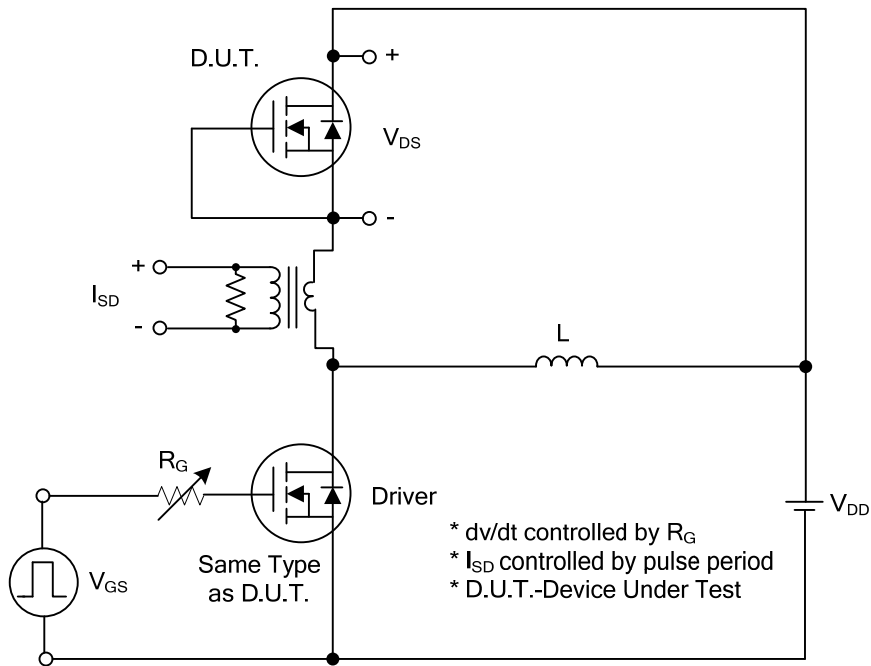
■ ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>							
Drain-Source Breakdown Voltage		$BV_{DSS}$	$I_D = 250\mu\text{A}$ , $V_{GS} = 0\text{V}$	600			V
Drain-Source Leakage Current		$I_{DSS}$	$V_{DS} = 600\text{V}$ , $V_{GS} = 0\text{V}$			10	$\mu\text{A}$
Gate-Source Leakage Current	Forward	$I_{GSS}$	$V_{GS} = +30\text{V}$ , $V_{DS} = 0\text{V}$			+100	nA
	Reverse		$V_{GS} = -30\text{V}$ , $V_{DS} = 0\text{V}$			-100	nA
<b>ON CHARACTERISTICS</b>							
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS} = V_{GS}$ , $I_D = 250\mu\text{A}$	2.0		4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	$V_{GS} = 10\text{V}$ , $I_D = 0.15\text{A}$			20	$\Omega$
<b>DYNAMIC PARAMETERS</b>							
Input Capacitance		$C_{ISS}$	$V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1.0\text{MHz}$		72		pF
Output Capacitance		$C_{OSS}$			11.5		pF
Reverse Transfer Capacitance		$C_{RSS}$			3.7		pF
<b>SWITCHING PARAMETERS</b>							
Total Gate Charge		$Q_G$	$V_{DS} = 50\text{V}$ , $V_{GS} = 10\text{V}$ , $I_D = 0.3\text{A}$ , $I_D = 100\mu\text{A}$ (Note 1, 2)		7.1		nC
Gate to Source Charge		$Q_{GS}$			0.7		nC
Gate to Drain Charge		$Q_{GD}$			0.6		nC
Turn-ON Delay Time		$t_{D(ON)}$	$V_{DS} = 30\text{V}$ , $V_{GS} = 10\text{V}$ , $I_D = 0.3\text{A}$ , $R_G = 25\Omega$ (Note 1, 2)		14		ns
Rise Time		$t_R$			12		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			40		ns
Fall-Time		$t_F$			11		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>							
Maximum Body-Diode Continuous Current		$I_S$				0.3	A
Maximum Body-Diode Pulsed Current		$I_{SM}$				1.2	A
Drain-Source Diode Forward Voltage		$V_{SD}$	$I_S = 0.3\text{A}$ , $V_{GS} = 0\text{V}$			1.4	V

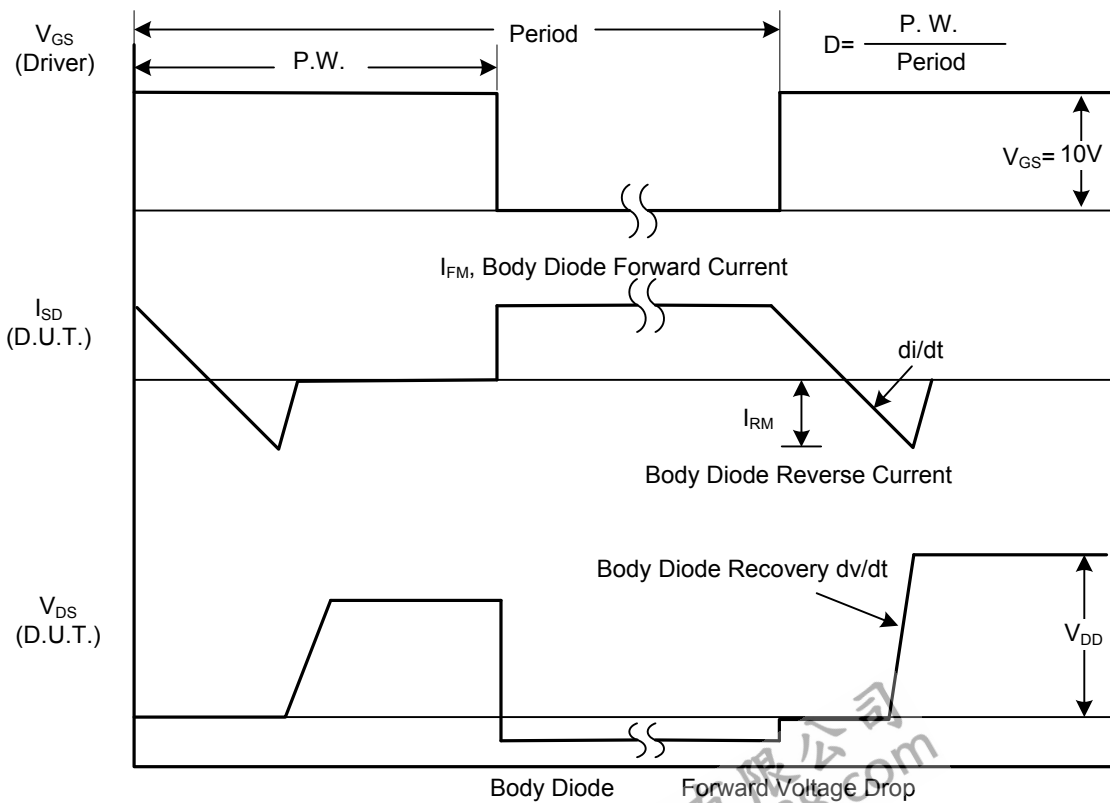
Notes: 1. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

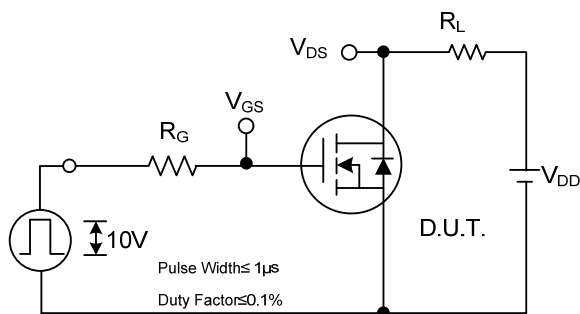


Peak Diode Recovery dv/dt Test Circuit

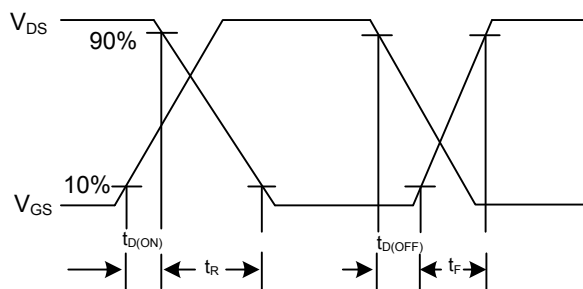


Peak Diode Recovery dv/dt Waveforms

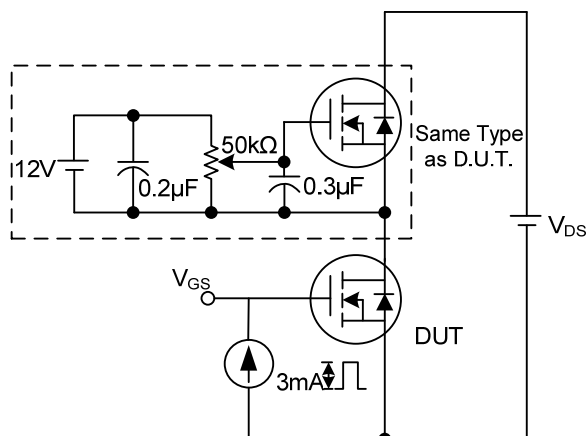
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



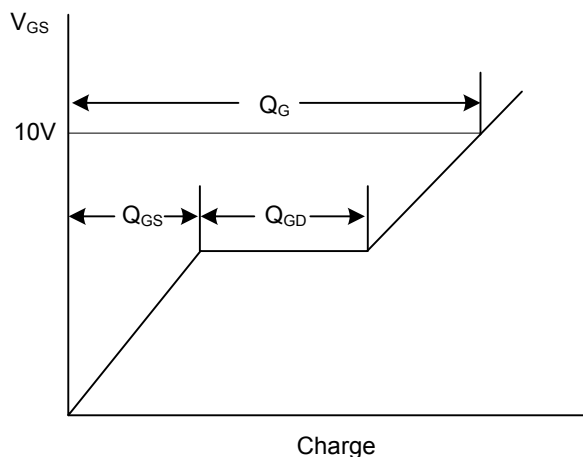
Switching Test Circuit



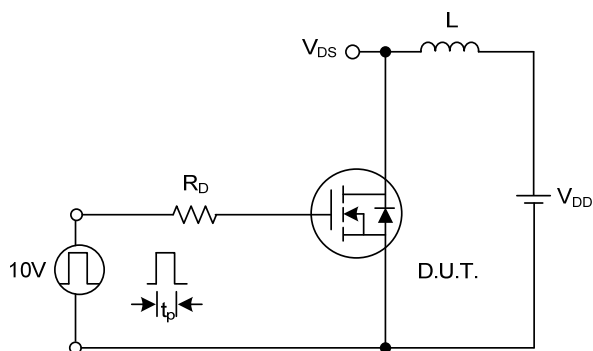
Switching Waveforms



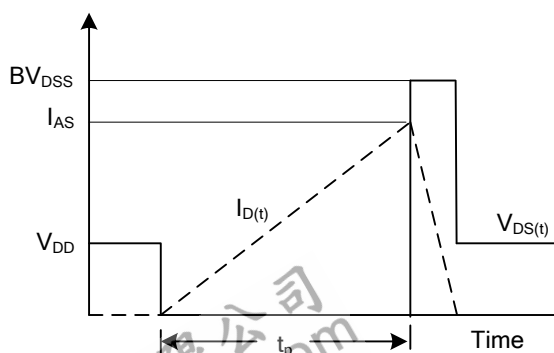
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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