



D4N60-KW

Power MOSFET

0.4A, 600V N-CHANNEL POWER MOSFET

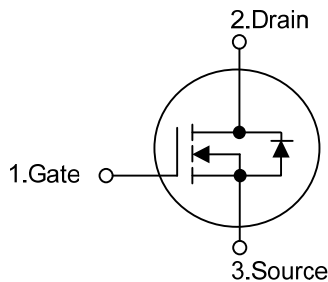
DESCRIPTION

The UTC **D4N60-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

- * $R_{DS(ON)} < 21\Omega @ V_{GS} = 10V, I_D = 0.2A$
- * Fast Switching Capability
- * Avalanche Energy Specified
- * Improved dv/dt Capability, High Ruggedness

SYMBOL

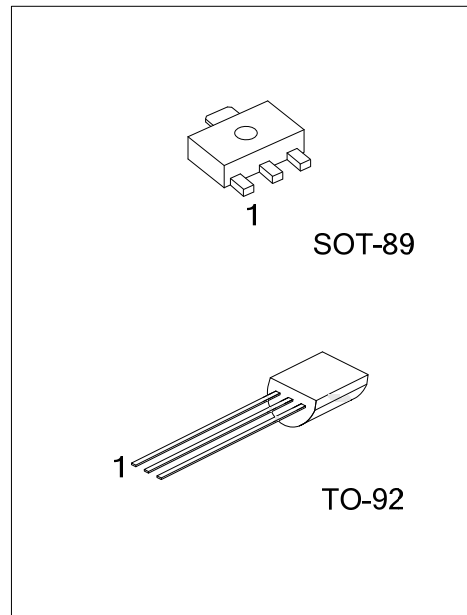


ORDERING INFORMATION

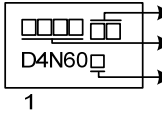
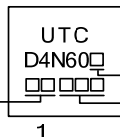
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
D4N60L-AB3-R	D4N60G-AB3-R	SOT-89	G	D	S	Tape Reel
D4N60L-T92-B	D4N60G-T92-B	TO-92	G	D	S	Tape Box
D4N60L-T92-K	D4N60G-T92-K	TO-92	G	D	S	Bulk

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

<p>D4N60G-AB3-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) R: Tape Reel, B: Tape Box, K: Bulk</p> <p>(2) AB3: SOT-89, T92: TO-92</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING

SOT-89	TO-92
 <p> Lot Code Data Code D4N60 L: Lead Free G: Halogen Free </p> <p>1</p>	 <p> UTC D4N60 Lot Code L: Lead Free G: Halogen Free Data Code </p> <p>1</p>

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■ ABSOLUTE MAXIMUM RATINGS (T_C =25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	600	V
Gate-Source Voltage		V _{GSS}	±30	V
Continuous Drain Current		I _D	0.4	A
Pulsed Drain Current		I _{DM}	1.6	A
Avalanche Energy	Single Pulsed	E _{AS}	10 (Note 3)	mJ
Power Dissipation	SOT-89	P _D	625	mW
	TO-92		425	mW
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 = 125mH, I_{AS} = 0.4A, V_{DD} = 25V, R_G = 25 Ω, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		θ _{JA}	180	°C/W
Junction to Case	SOT-89	θ _{JC}	88	°C/W
	TO-92		38	°C/W

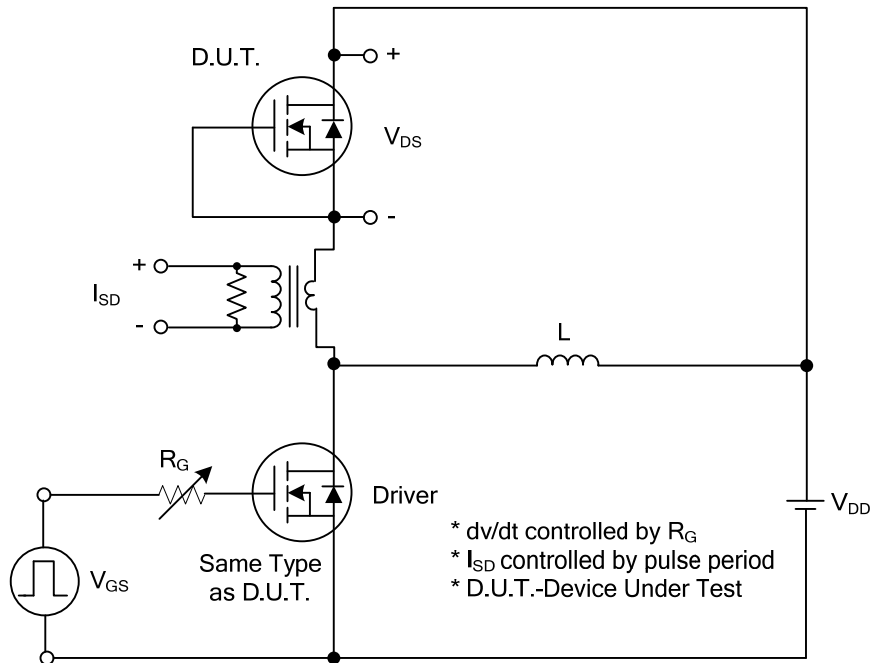
■ ELECTRICAL CHARACTERISTICS (T_C =25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS								
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} = 0V, I _D = 250μA	600			V	
Drain-Source Leakage Current		I _{DSS}	V _{DS} = 600V, V _{GS} = 0V			1	μA	
			V _{DS} = 480V, T _C = 125°C			100	μA	
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} = 30V, V _{DS} = 0V			100	nA	
	Reverse		V _{GS} = -30V, V _{DS} = 0V			-100	nA	
Breakdown Voltage Temperature Coefficient		ΔBV _{DSS} /ΔT _J	I _D =250μA, Referenced to 25°C		0.6		V/°C	
ON CHARACTERISTICS								
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} = V _{GS} , I _D = 250μA	2.0		4.0	V	
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} = 10 V, I _D = 0.2A		17	21	Ω	
DYNAMIC CHARACTERISTICS								
Input Capacitance		C _{ISS}	V _{DS} = 25V, V _{GS} = 0V, f = 1MHz		70		pF	
Output Capacitance		C _{OSS}				13		pF
Reverse Transfer Capacitance		C _{RSS}				5		pF
SWITCHING CHARACTERISTICS								
Total Gate Charge		Q _G	V _{DS} = 50V, I _D = 0.4A, V _{GS} = 10V (Note 1, 2)		6		nC	
Gate-Source Charge		Q _{GS}				1.1		nC
Gate-Drain Charge		Q _{GD}				1.0		nC
Turn-On Delay Time		t _{D(ON)}	V _{DD} = 30V, I _D = 0.4A, R _G = 25Ω (Note 1, 2)		10		ns	
Turn-On Rise Time		t _R				25		ns
Turn-Off Delay Time		t _{D(OFF)}				22		ns
Turn-Off Fall Time		t _F				25		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS								
Maximum Continuous Drain-Source Diode Forward Current		I _S				0.4	A	
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				1.6	A	
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} = 0V, I _S = 0.4A			1.4	V	

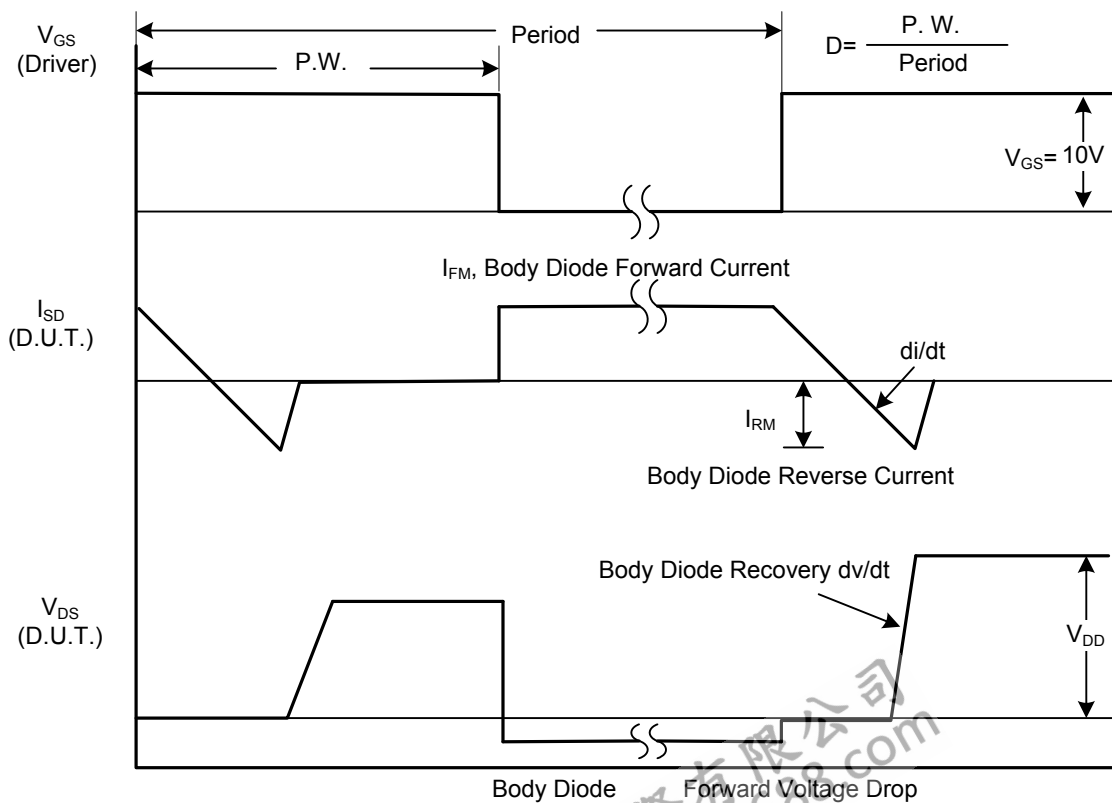
Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%

2. Essentially independent of operating ambient temperature.

TEST CIRCUITS AND WAVEFORMS

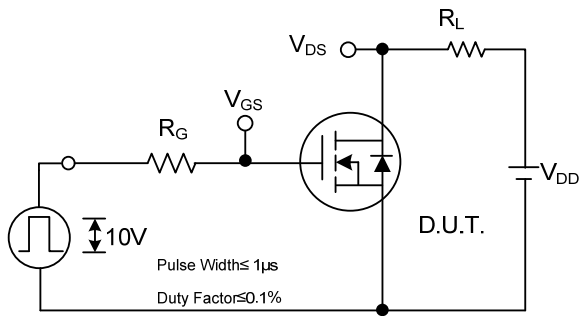


Peak Diode Recovery dv/dt Test Circuit

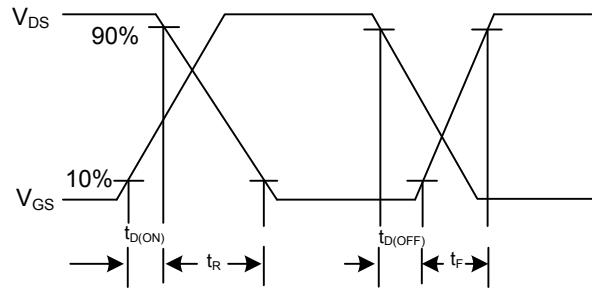


Peak Diode Recovery dv/dt Waveforms

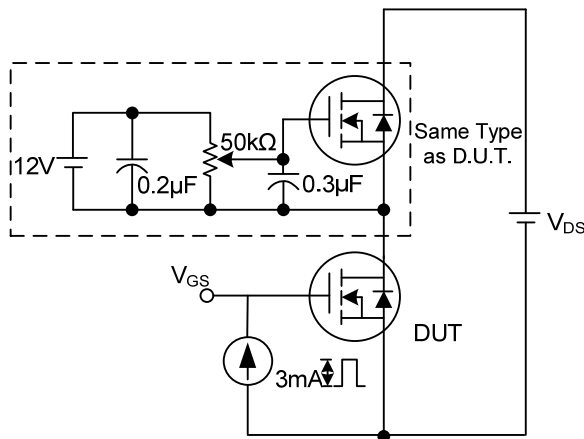
TEST CIRCUITS AND WAVEFORMS (Cont.)



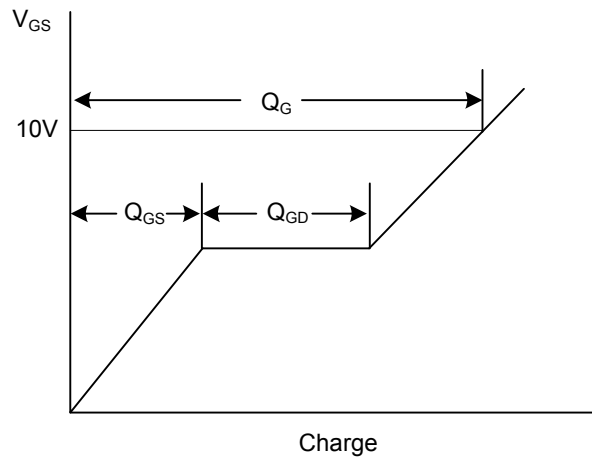
Switching Test Circuit



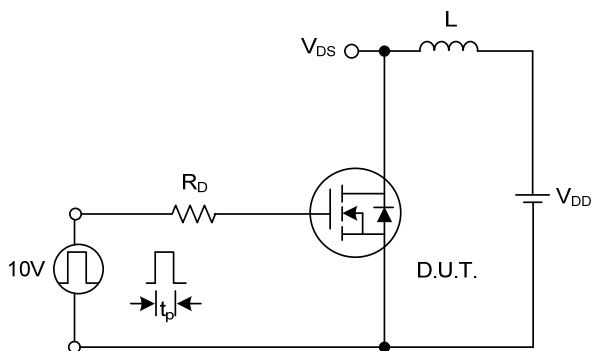
Switching Waveforms



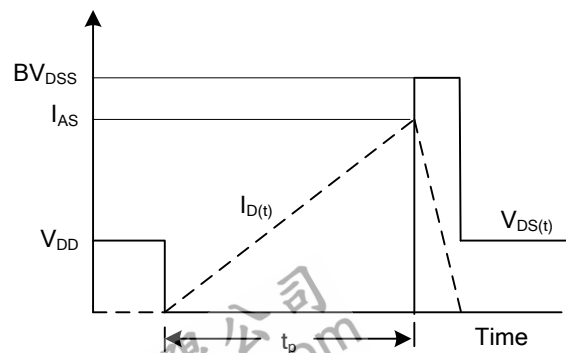
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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