



1N50-KW

Preliminary

Power MOSFET

1A, 500V N-CHANNEL POWER MOSFET

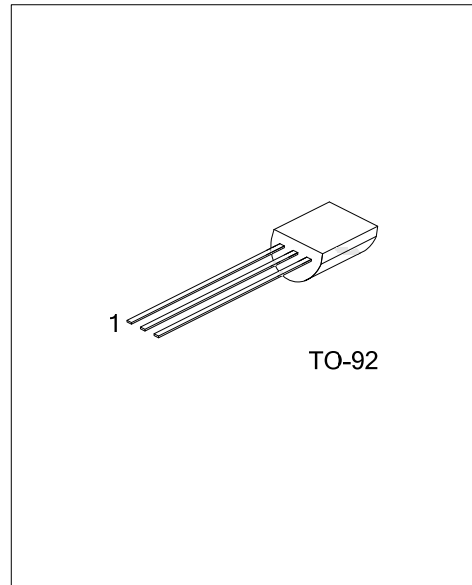
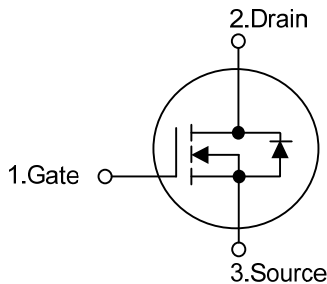
DESCRIPTION

The UTC 1N50-KW is a high voltage 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

- * $R_{DS(ON)} < 10\Omega @ V_{GS}=10V, I_D=0.5A$
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness

SYMBOL



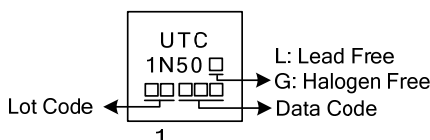
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
1N50L-T92-B	1N50G-T92-B	TO-92	G	D	S	Tape Box
1N50L-T92-K	1N50G-T92-K	TO-92	G	D	S	Bulk

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

<p>1N50L-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



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

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V _{DSS}	500	V
Gate-Source Voltage	V _{GSS}	±30	V
Continuous Drain Current	I _D	1	A
Avalanche Energy	E _{AS}	50	mJ
Single Pulsed (Note 2)			
Peak Diode Recovery dv/dt (Note 3)	dv/dt	4.5	V/ns
Power Dissipation (T _A =25°C)	P _D	0.6	W
Junction Temperature	T _J	+150	°C
Operating Temperature	T _{OPR}	-55 ~ +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. L = 100mH, I_{AS} = 1A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C

3. I_{SD} ≤ 1.2A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ _{JA}	180	°C/W
Junction to Case	θ _{JC}	88	°C/W

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

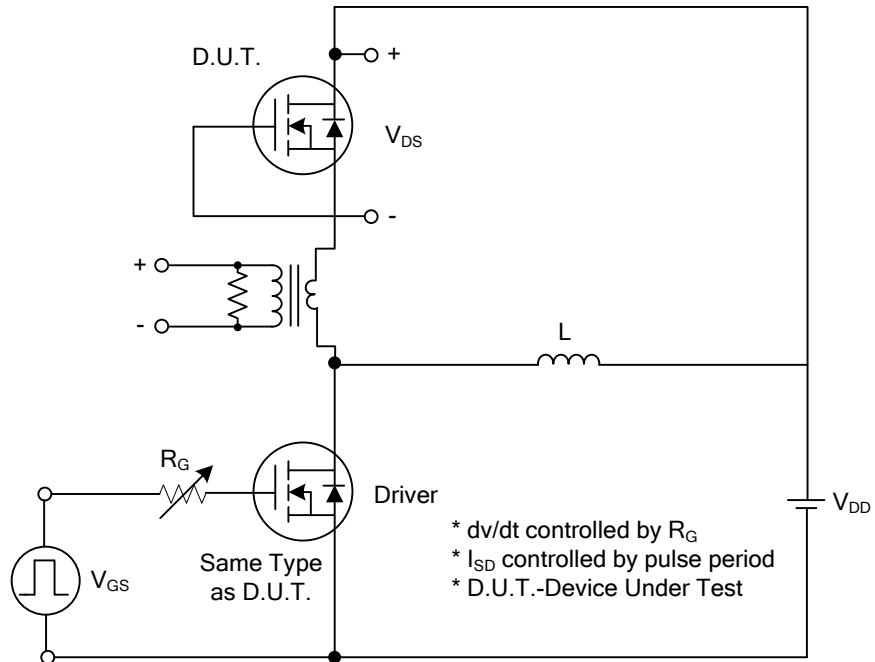
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	500			V	
Drain-Source Leakage Current	I _{DSS}	V _{DS} =500V, V _{GS} =0V			10	μA	
Gate-Source Leakage Current	I _{GSS}	Forward			100	nA	
		Reverse			-100	nA	
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D =250μA		0.4		V/°C	
ON CHARACTERISTICS							
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	3.0		5.5	V	
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =0.5A		8.6	10	Ω	
DYNAMIC CHARACTERISTICS							
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz		135		pF	
Output Capacitance	C _{OSS}				17		pF
Reverse Transfer Capacitance	C _{RSS}				4.7		pF
SWITCHING CHARACTERISTICS							
Turn-On Delay Time	t _{D(ON)}	V _{DD} =30V, I _D =1A, R _G =25Ω, V _{GS} =10V (Note 2,3)		16.5		ns	
Turn-On Rise Time	t _R				30		ns
Turn-Off Delay Time	t _{D(OFF)}				23		ns
Turn-Off Fall Time	t _F				30		ns
Total Gate Charge	Q _G	V _{DS} =50V, V _{GS} =10V, I _D =1.3A R _G =3.3kΩ(Note 2, 3)		8		nC	
Gate-Source Charge	Q _{GS}				2.0		nC
Gate-Drain Charge	Q _{GD}				1.4		nC
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =1A			1.4	V	
Maximum Continuous Drain-Source Diode Forward Current	I _S				1.0	A	
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				4.0	A	

Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature

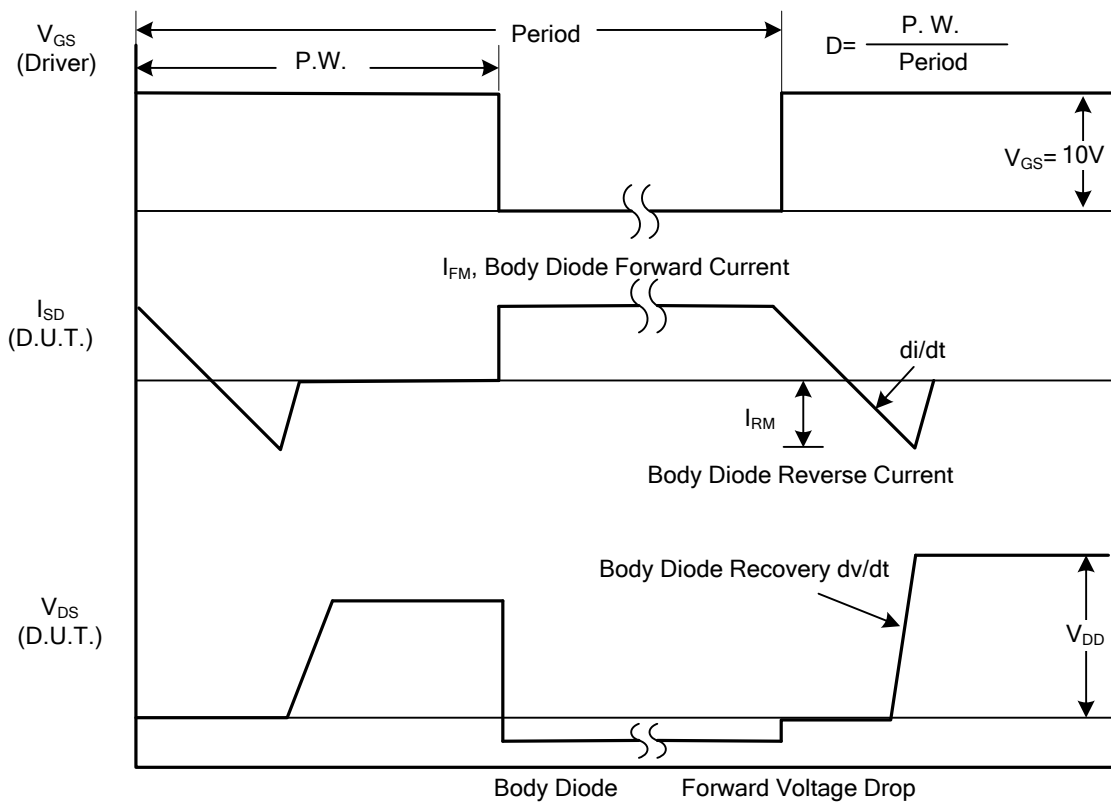
2. Pulse Test: Pulse Width ≤300μs, Duty Cycle≤2%

3. Essentially Independent of Operating Temperature

■ TEST CIRCUITS AND WAVEFORMS

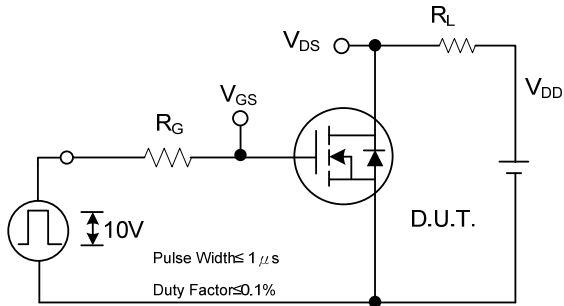


Peak Diode Recovery dv/dt Test Circuit

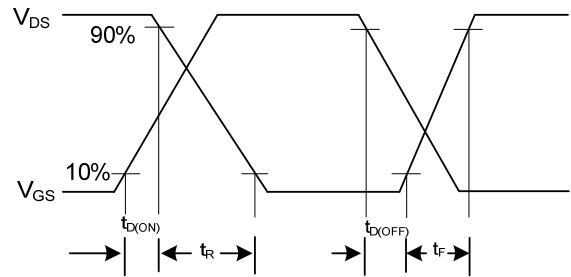


Peak Diode Recovery dv/dt Waveforms

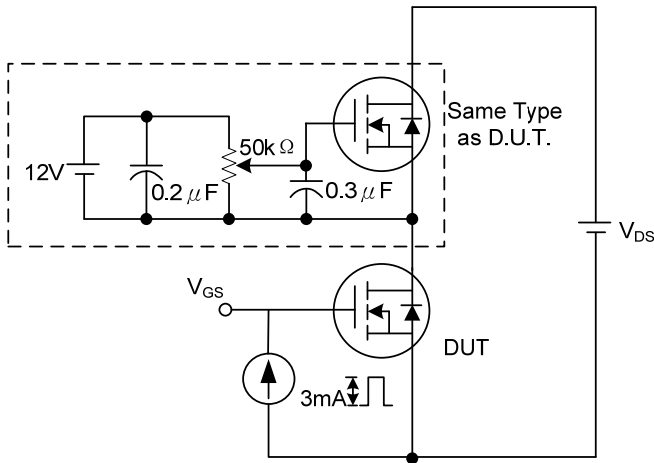
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



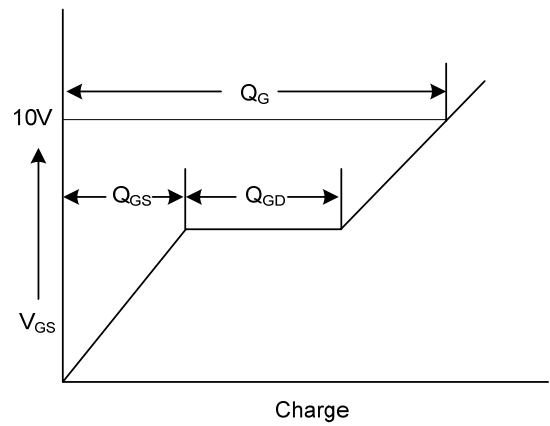
Switching Test Circuit



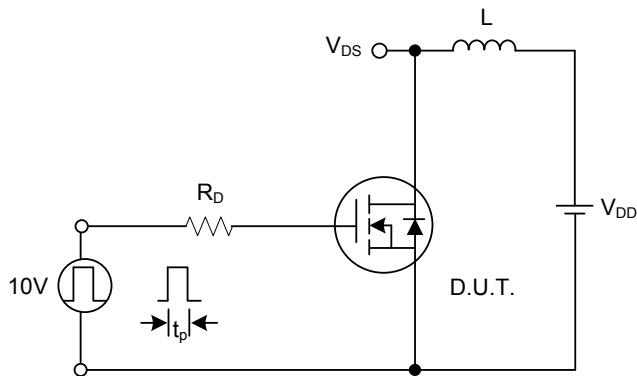
Switching Waveforms



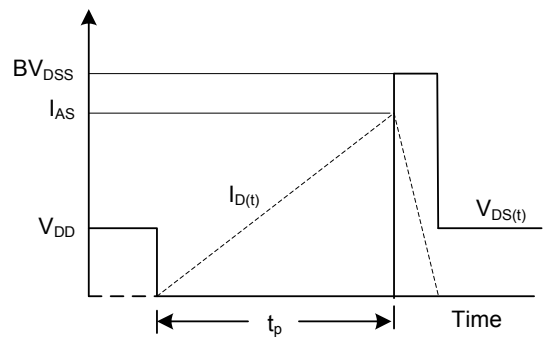
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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