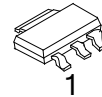
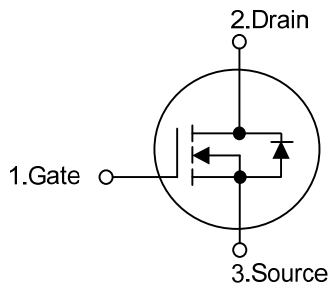


**1N60-KWQ***Power MOSFET***1A, 600V N-CHANNEL
POWER MOSFET****■ DESCRIPTION**

The UTC **1N60-KWQ** 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

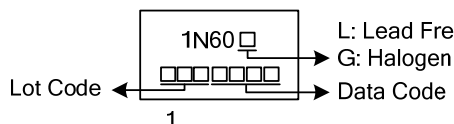
- * $R_{DS(ON)} < 23 \Omega$ @ $V_{GS}=10V$, $I_D=0.5A$
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness

■ SYMBOL**SOT-223****■ ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
1N60L-AA3-R	1N60G-AA3-R	SOT-223	G	D	S	Tape Reel

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

1N60G-AA3-R	
(1) Packing Type	(1) R: Tape Reel
(2) Package Type	(2) AA3: SOT-223
(3) Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

■ 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	1	A
Avalanche Energy	E _{AS}	12	mJ
Single Pulsed (Note 2)			
Peak Diode Recovery dv/dt (Note 3)	dv/dt	3.8	V/ns
Power Dissipation (T _A =25°C)	P _D	0.8	W
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. L = 46mH, I_{AS} = 0.7A, 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}	150	°C/W
Junction to Case	θ _{JC}	14	°C/W

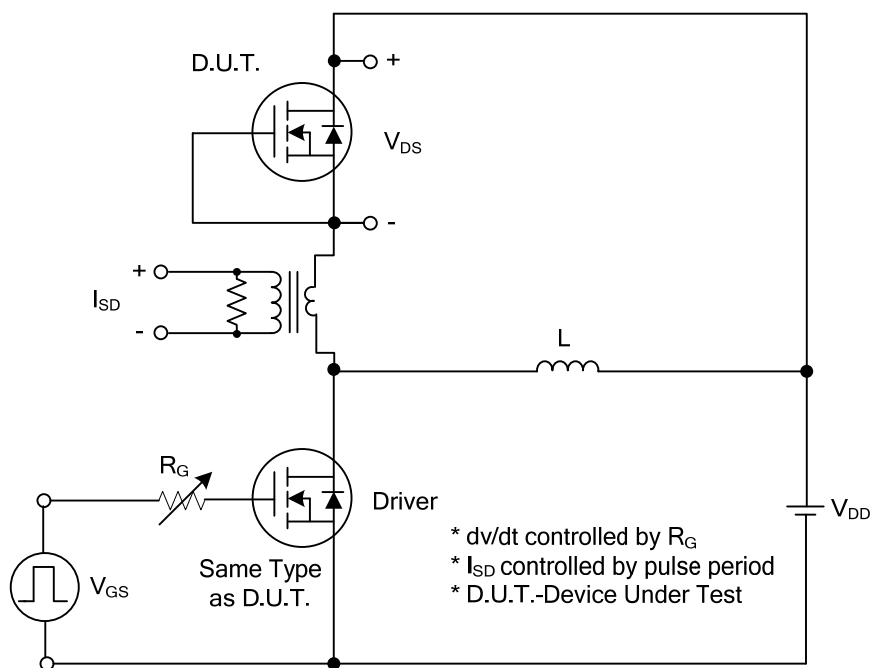
■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise specified.)

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			10	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
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} =10V, I _D =0.5A			23	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz		80		pF
Output Capacitance		C _{OSS}			14		pF
Reverse Transfer Capacitance		C _{RSS}			2		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge		Q _G	V _{DS} =50V, I _D =1.3A, R _G =3.3kΩ V _{GS} =10V (Note 2,3)				nC
Gate-Source Charge		Q _{GS}					nC
Gate-Drain Charge		Q _{GD}					nC
Turn-On Delay Time		t _{D(ON)}	V _{DD} =300V, I _D =1A, R _G =25Ω, V _{GS} =10V (Note 2,3)		1.6		ns
Turn-On Rise Time		t _R			8.5		ns
Turn-Off Delay Time		t _{D(OFF)}			1.6		ns
Turn-Off Fall Time		t _F			32.2		ns
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				1.0	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =1.0A, V _{GS} =0V			1.4	V
Reverse Recovery Time		t _{rr}	I _S =1.0A, V _{GS} =0V		300		μs
Reverse Recovery Charge		Q _{rr}	dI _F /dt=100A/μs (Note 1)		0.44		μC

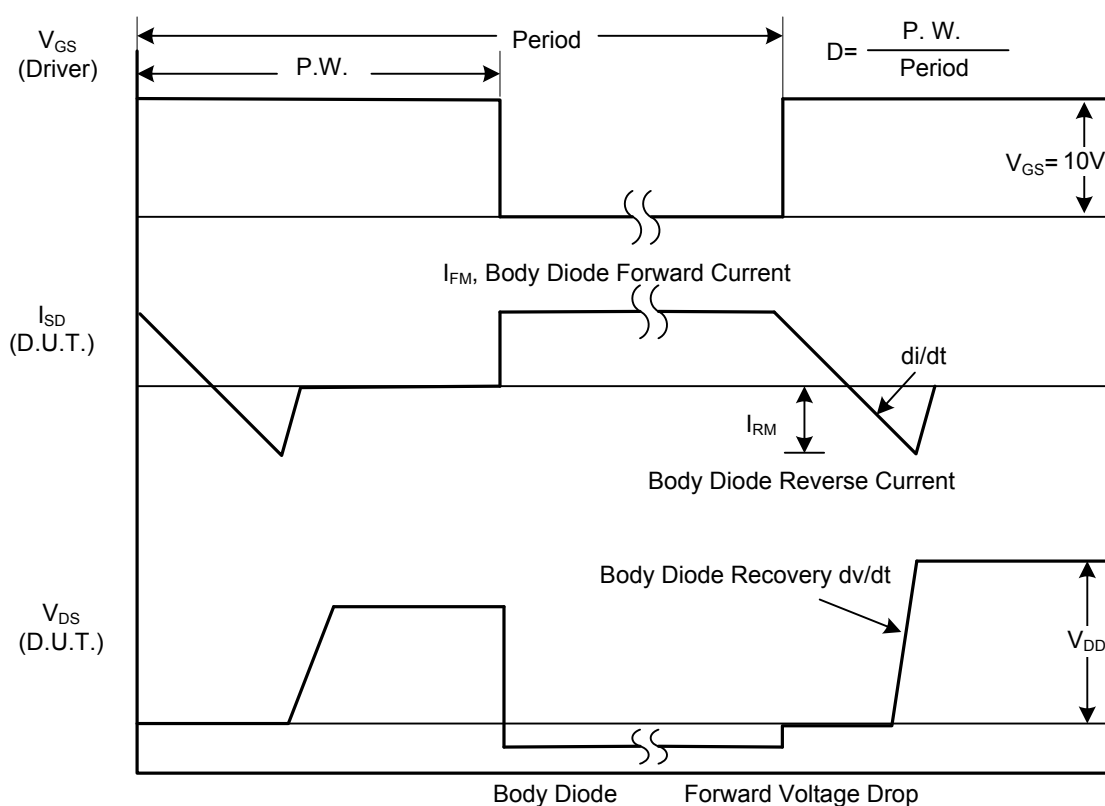
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

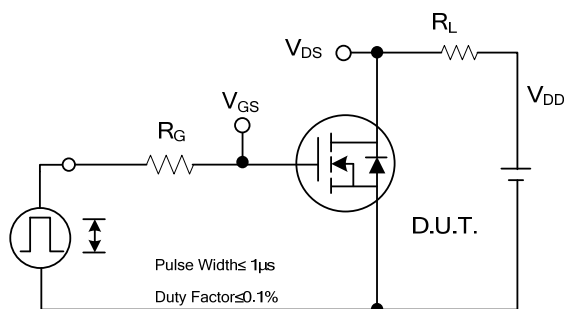


Peak Diode Recovery dv/dt Test Circuit

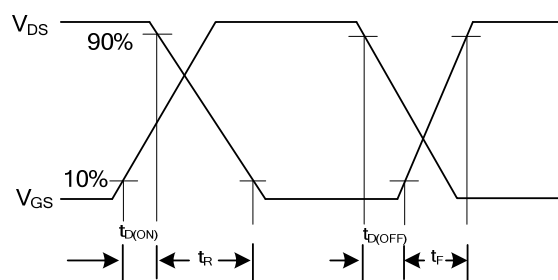


Peak Diode Recovery dv/dt Waveforms

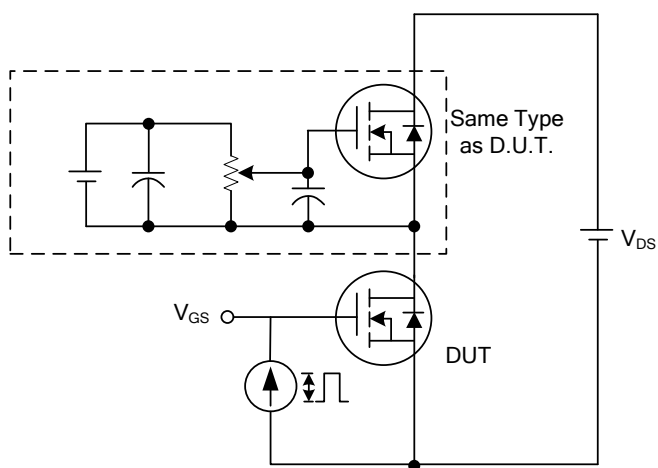
■ TEST CIRCUITS AND WAVEFORMS



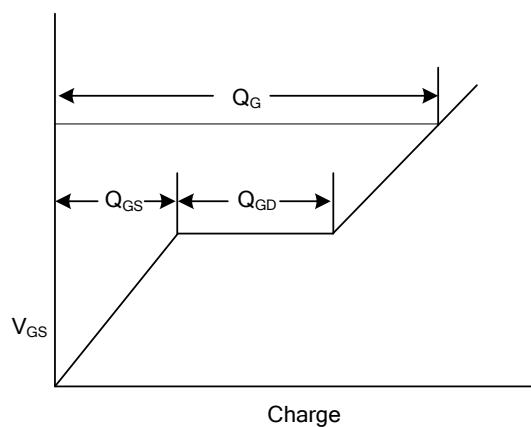
Switching Test Circuit



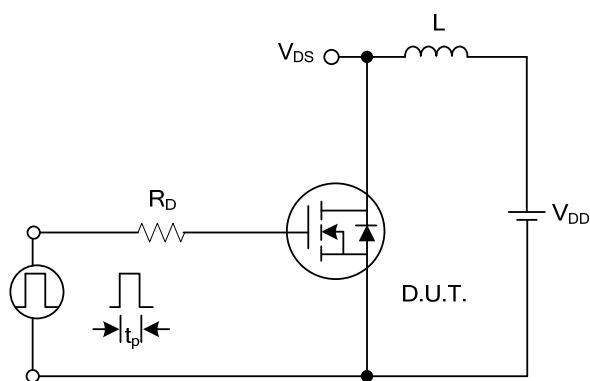
Switching Waveforms



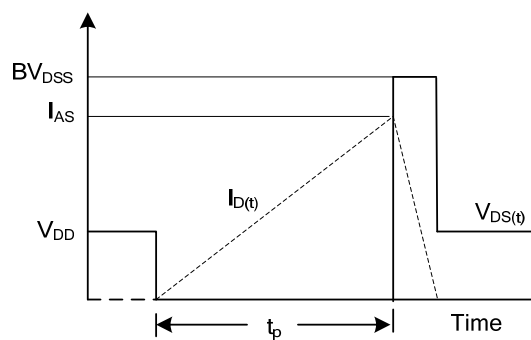
Gate Charge Test Circuit



Gate Charge Waveform

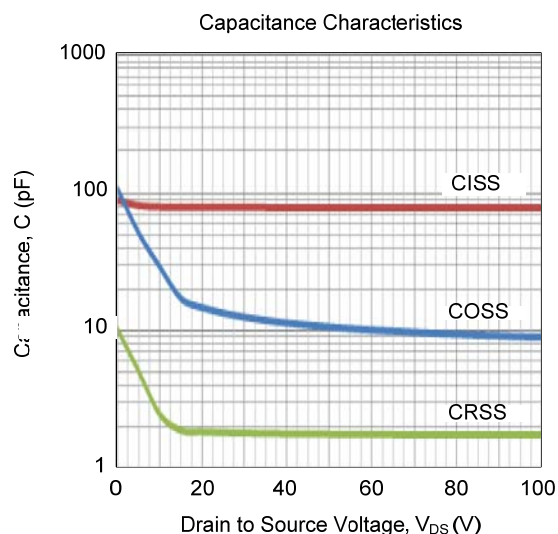
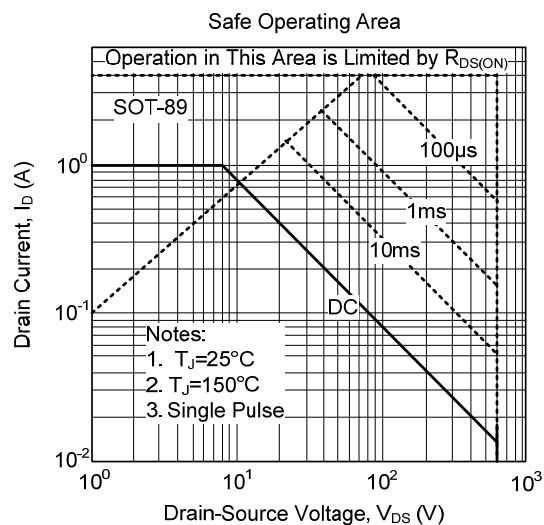


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



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