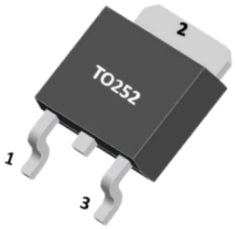
2A, 600V N-CHANNEL POWER MOSFET

■ DESCRIPTION



The 2N60 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 AC to DC converters and bridge circuits.

■ FEATURES

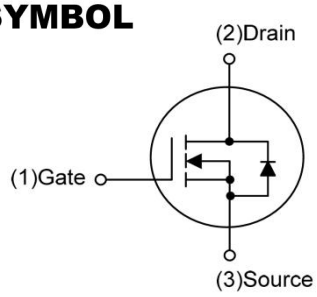
*$R_{DS(ON)}$ ≤ 5.0Ω @ V_{GS} = 10V, I_D =1.0A

* Fast switching capability

* Avalanche energy specified

* Improved dv/dt capability, high ruggedness

SYMBOL



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

SYMBOL	PARAMETER		VALUE	UNIT
VDS	Drain-Source Voltage		600	V
VGS	Gate Source Voltage		±30	V
IAR	Avalanche Current (Note 2)		2.0	A
ID	Continuous Drain Current (Note 1)		2.0	A
IDM	Pulsed Drain Current (Note 2)		8.0	A
EAS	Avalanche Energy	Single Pulsed (Note 3)	140	mJ
EAR		Repetitive (Note 2)	4.5	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 4)		4.5	V/ns
PD	Power Dissipation (Note 1)	TO-220F	23	W
		TO-252	44	W
TJ	Junction Temperature		150	°C
TSTG	Storage Temperature		-40 to 125	°C
θJA	Junction to Ambient	TO-220F	62.5	°C/W
		TO-252	100	
θJC	Junction to Case	TO-220F	5.5	°C/W
		TO-252	2.87	

Notes: 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 TJ.
3. L=64mH, I_{AS}=2.0A, V_{DD}=50V, R_G=25 Ω, Starting T_J = 25°C.
4. I_{SD}≤2.4A, di/dt≤200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C.

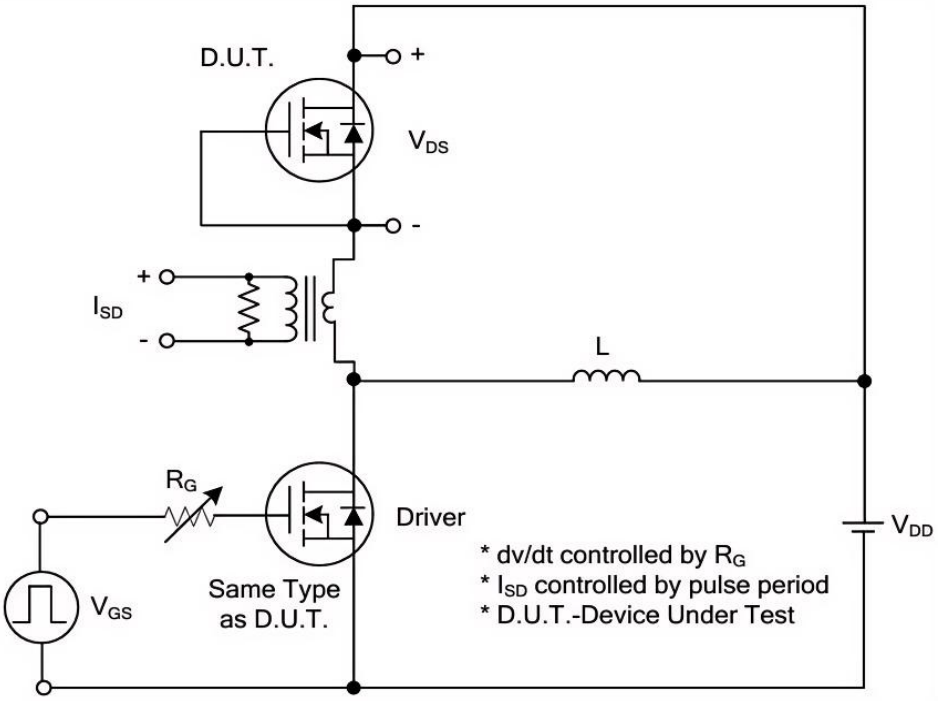
■ ELECTRICAL CHARACTERISTICS (TA=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	$V_{(BR)\ DSS}$	V_{GS}=0V, I_D=250μA	600			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=600V, V_{GS}=0V			10	μA
		V_{DS}=480V, Tc=125°C			100	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30V, V_{DS}=0V			±100	nA
Breakdown Voltage Temperature Coefficient	△BV_{DSS}/△TJ	I_D=250μA Referenced to 25°C		0.4		V/°C
ON CHARACTERISTICS						
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=1.0A		3.6	5	Ω
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS}=V_{DS},I_D=250μA	2.0		4.0	V
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{GS}=0V,V_{DS}=25V f=1.0MHz		300	350	pF
Output Capacitance	C_{OSS}			45	50	
Reverse Transfer Capacitance	C_{RSS}			10	13	
SWITCHING PARAMETERS						
Total gate charge	Qg	V_{DS}=48V,V_{GS}=10V,I_D=2.4A (Note 1, 2)		40	50	nC
Gate-source charge	Qgs			4.2		
Gate-drain charge	Qgd			8.4		
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=300V,I_D=2.4A R_G=25Ω(Note 1, 2)		40	60	ns
Turn-On Rise time	tr			35	55	
Turn-Off Delay Time	$t_{D(off)}$			90	120	
Turn-Off Fall time	tf			50	60	
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Continuous Drain-Source Current	I_S				2.0	A
Pulsed drain-source current	I_{SM}				8.0	A
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 2.0A			1.4	V
Reverse Recovery Time	trr	dIF/dt = 100A/μs, I_{SD} = 2.4A		180		ns
Reverse Recovery Charge	Qrr	V_{GS} = 0V(Note 1)		0.72		μC

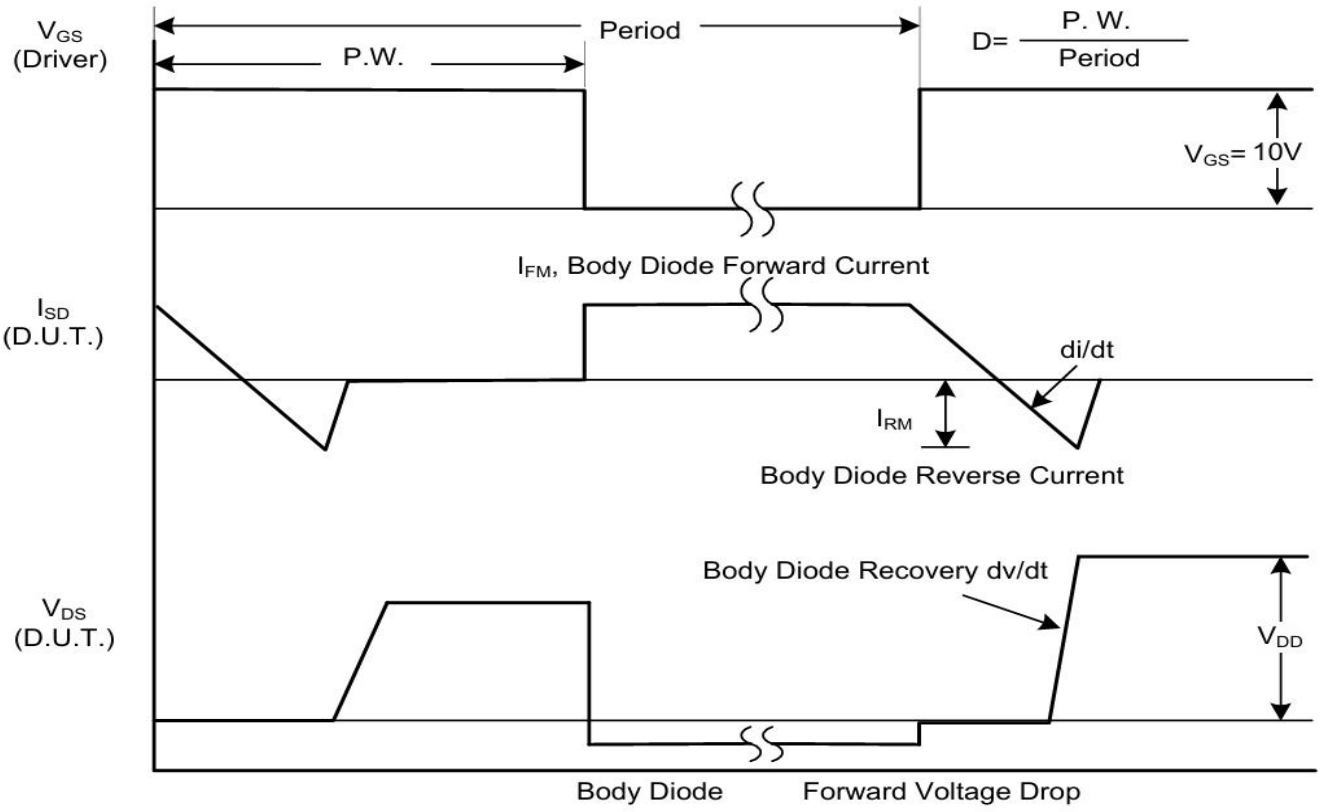
Notes：

1. Pulse Test : Pulse Width≤300μs, duty cycle ≤2%.
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

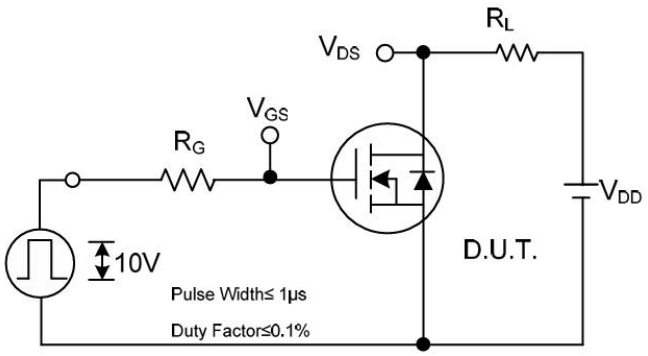


Peak Diode Recovery dv/dt Test Circuit

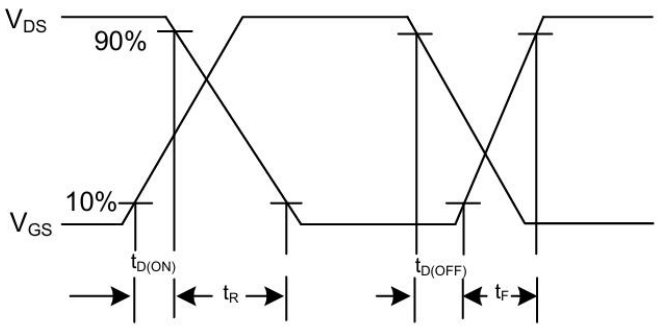


Peak Diode Recovery dv/dt Waveforms

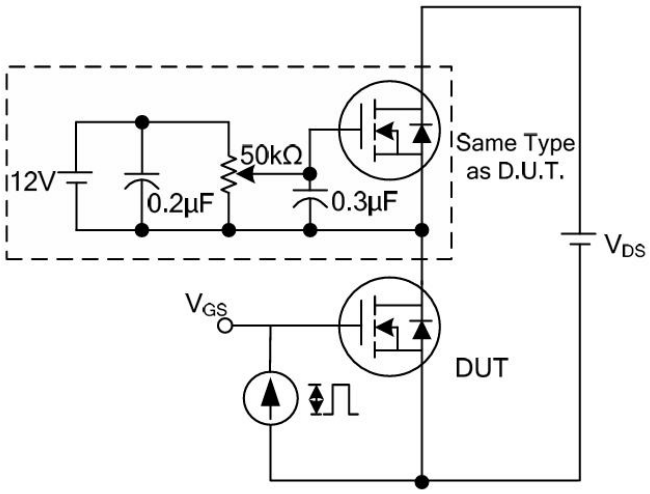
■ TEST CIRCUITS AND WAVEFORMS(Con.t)



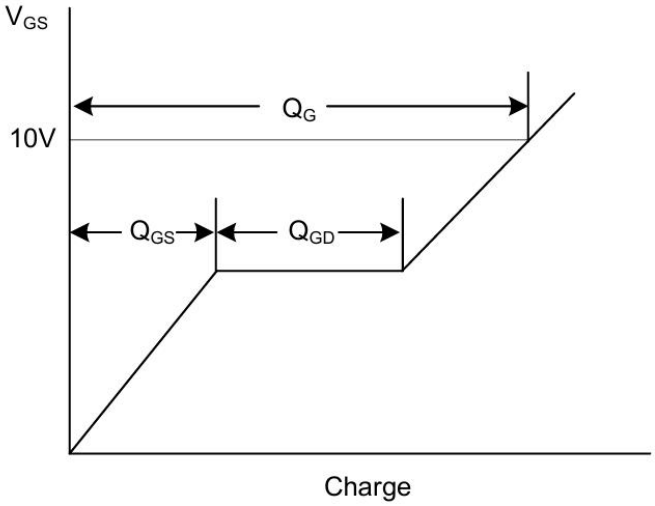
Switching Test Circuit



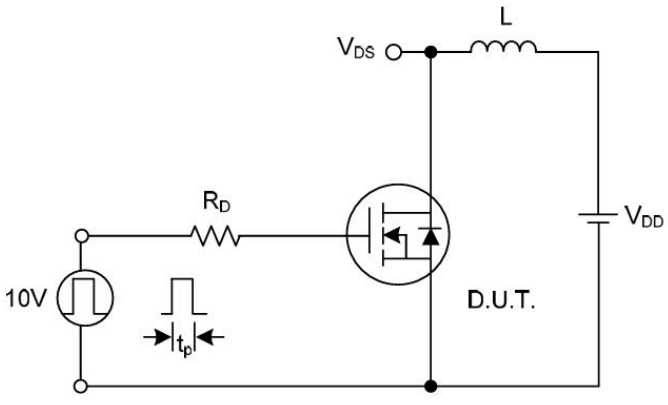
Switching Waveforms



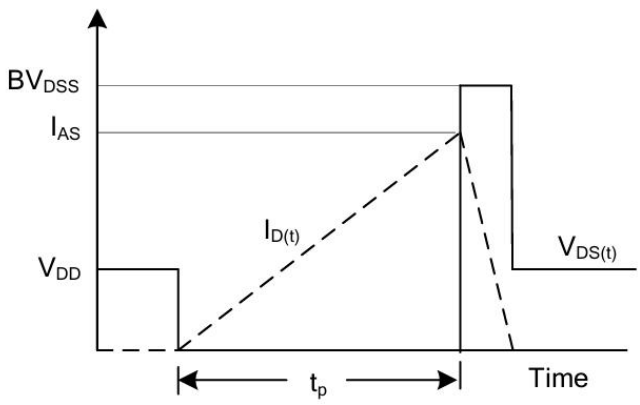
Gate Charge Test Circuit



Gate Charge Waveform

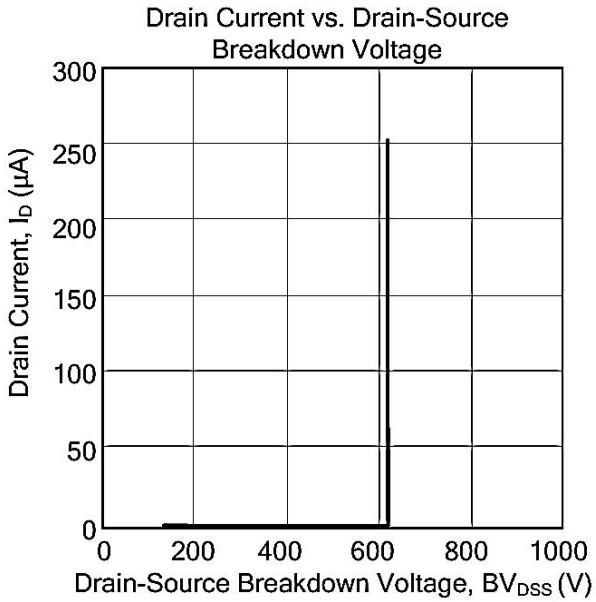


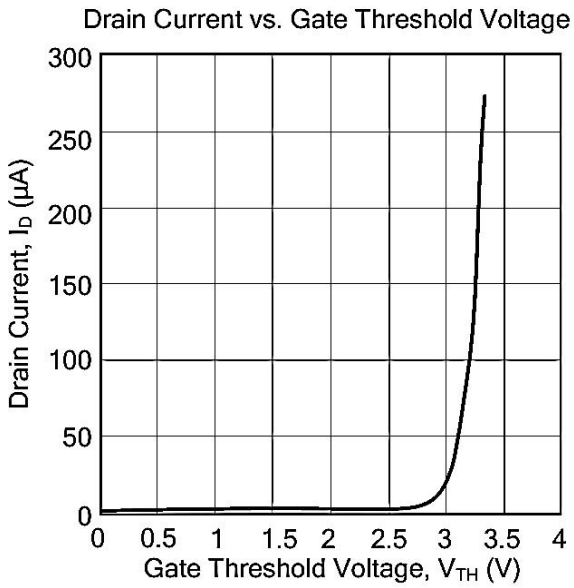
Unclamped Inductive Switching Test Circuit

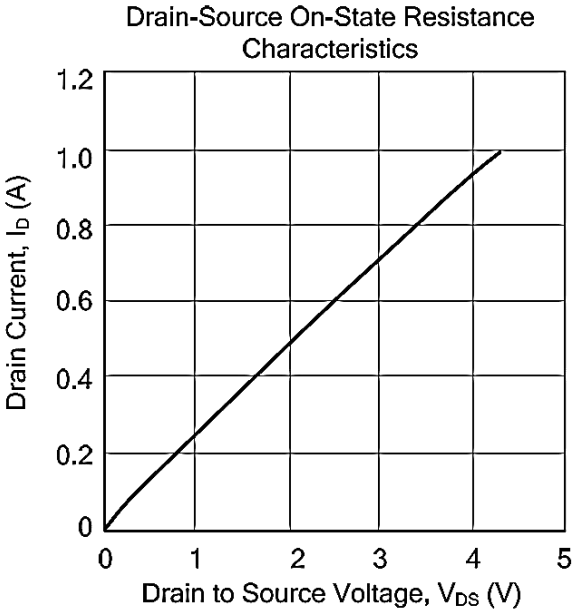


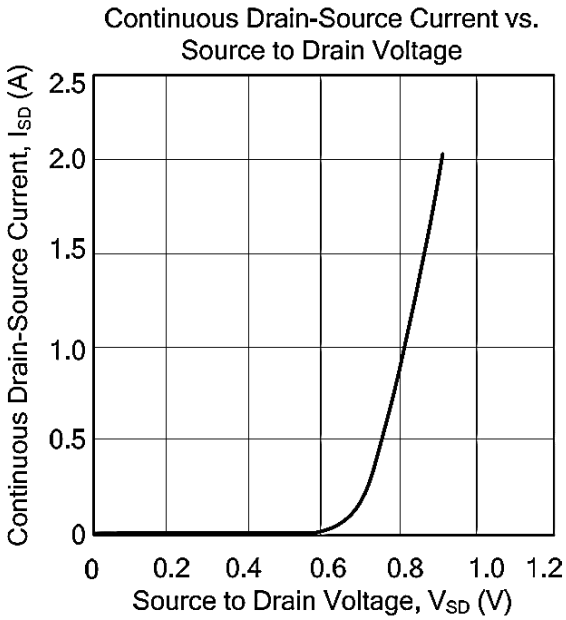
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

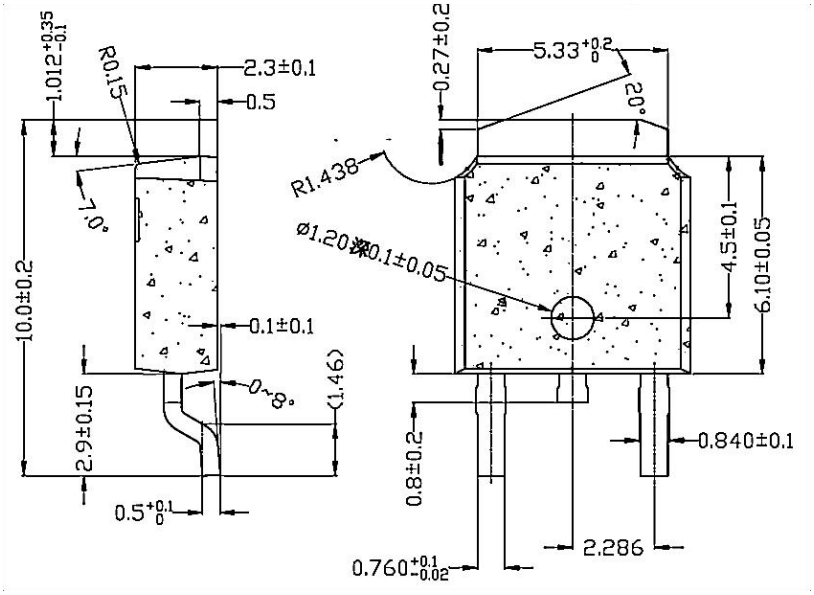


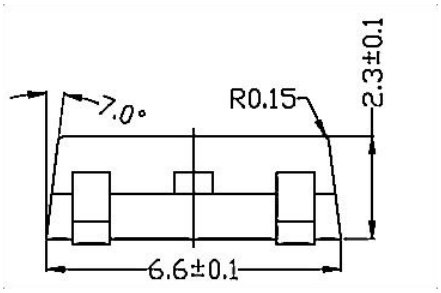






■ TO - 252 PACKAGE OUTLINE DIMENSIONS





■ TO - 252 PACKING INFORMATION

Package version	Reel dimensions Φ×H (mm)	Per Reel (pcs)	Reels per box	Inner box dimensions L×W×H(mm)	Outer box (pcs)	Outer box dimensions L×W×H (mm)
TO-252	Φ330*20	2500	2	360*340*50	25000	375*375*280