



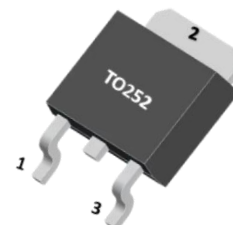
HY20N10

N-CHANNEL POWER MOSFET

20A, 100V N-CHANNEL ENHANCEMENT MODE POWER MOSFET

DESCRIPTION

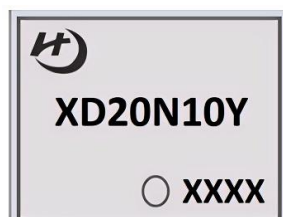
The XD20N10Y is a high voltage power MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.



FEATURE

- * $R_{DS(ON)} \leq 50 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=10\text{A}$
- * High switching speed
- * 100% avalanche tested

MARKING



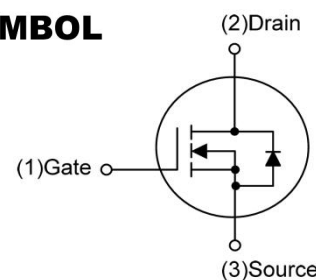
: HY LOGO

XD20N10Y=Device Code

XXXX=Date Code

Solid Dot=Green molding compound

SYMBOL



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

SYMBOL	PARAMETER		VALUE	UNIT
V_{DS}	Drain-Source Voltage		100	V
V_{GS}	Gate Source Voltage		± 20	V
I_D	Continuous Drain Current		20	A
I_{DM}	Pulsed Drain Current		60	A
EAS	Single Pulsed Avalanche Energy		275	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 4)		5.03	V/ns
P_D	Maximum Power Dissipation (Note 1)	TO-252	58	W
T_J	Storage Temperature		150	$^\circ\text{C}$
T_{STG}	Thermal Resistance Fr .00m Junction To Ambient		-55~150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient(Note 5)	TO-252	110	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance From Junction To Case	TO-252	2.15	$^\circ\text{C/W}$

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. $L=1.0\text{mH}$, $I_{AS}=23\text{A}$, $V_{DD}=50\text{V}$, $R_G=25 \Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 20\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DS}$, Starting $T_J = 25^\circ\text{C}$

5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.



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■ 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	100			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =48V, V _{GS} =0V			1	μA
Gate-body leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Drain-source on-state resistance	R _{DS(ON)}	V _{GS} =10V, I _D =10A			50	mΩ
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		1840		pF
Output Capacitance	C _{OSS}			245		
Reverse Transfer Capacitance	C _{RSS}			20		
SWITCHING PARAMETER						
Total gate charge (Note 1)	Q _g	V _{DS} =80V,V _{GS} =10V I _D =20A,I _G =1mA (Note 1, 2)		42		nC
Gate-source charge	Q _{gs}			14		
Gate-drain charge	Q _{gd}			7		
Turn-On Delay Time (Note 1)	td(on)	V _{DD} =50V,I _D =20A V _{GS} =10V, R _G =25Ω (Note 1, 2)		20		nS
Turn-On Rise time	tr			20.5		
Turn-Off Delay Time	td(off)			100		
Turn-Off Fall time	tr			23		
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Continuous drain-source diode forward current	I _S				20	A
Pulsed drain-source diode forward current	I _{SM}				60	A
Drain-source diode forward voltage(Note 1)	V _{SD}	I _S =10A,V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)	trr	I _S =20A, V _{GS} =0V		80		ns
Body Diode Reverse Recovery Charge	Q _{rr}	dI _F /dt = 100A/μs		0.56		μC

Notes:

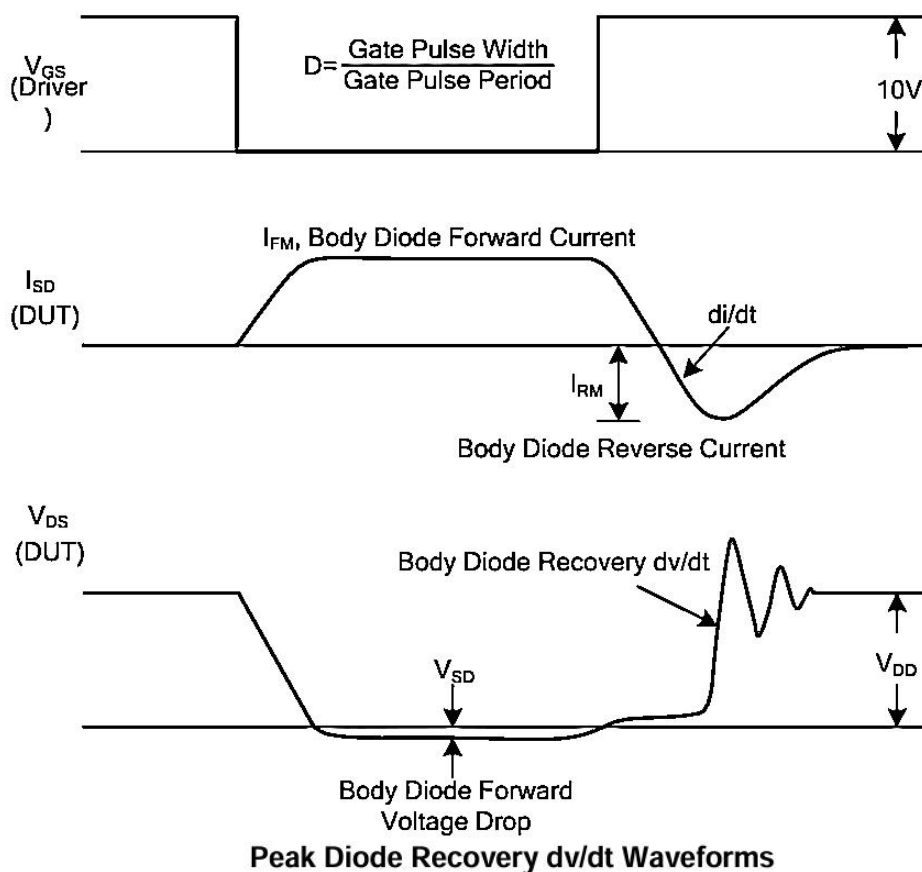
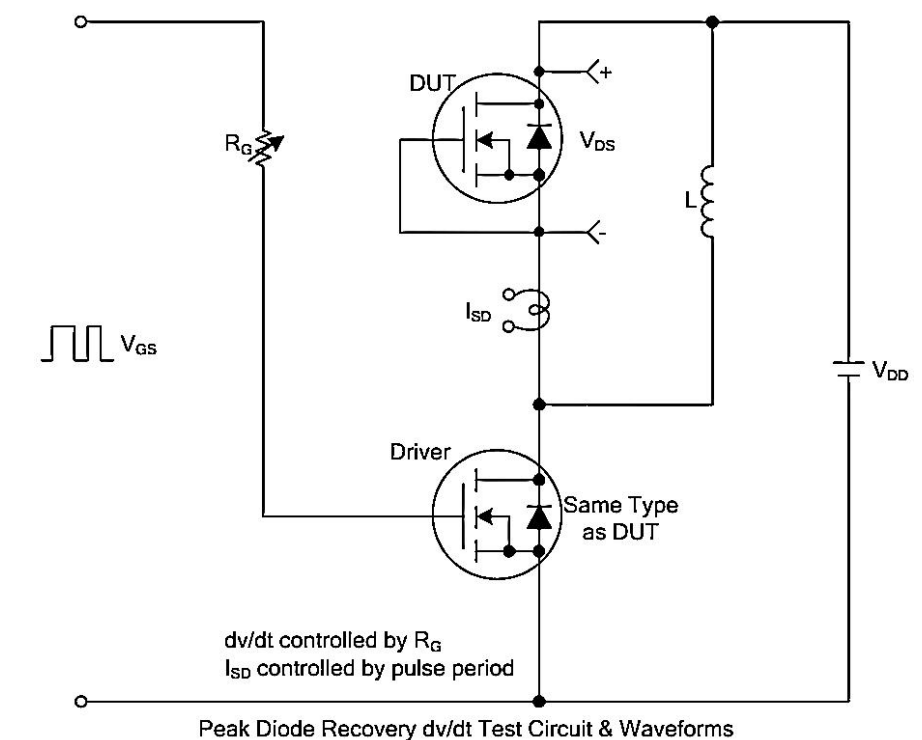
1. Pulse Test : Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
2. Essentially independent of operating temperature.



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■ TEST CIRCUITS AND WAVEFORMS(1)

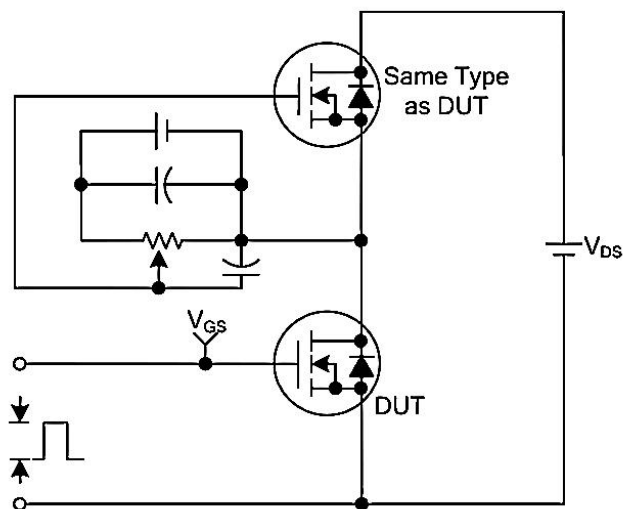




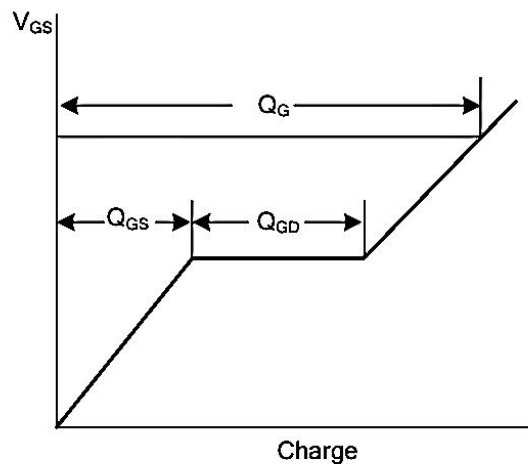
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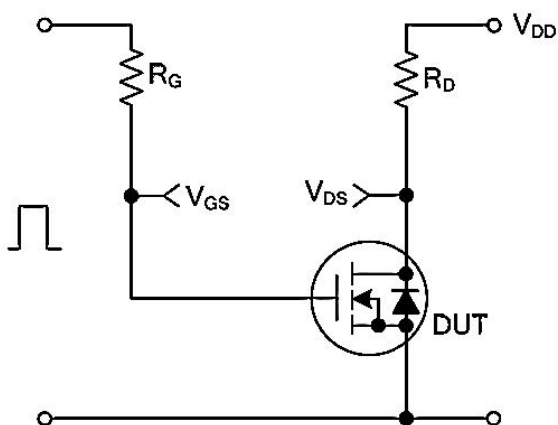
■ TEST CIRCUITS AND WAVEFORMS(2)



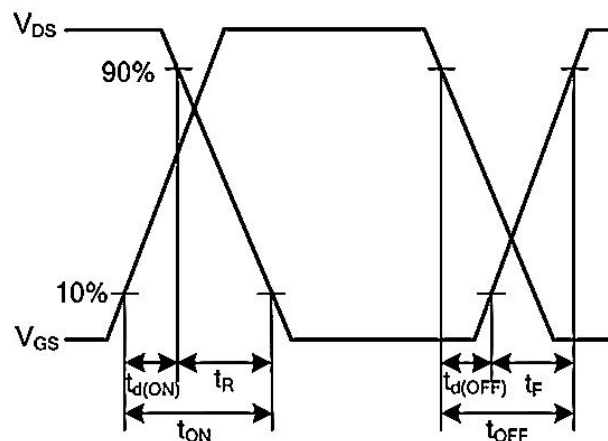
Gate Charge Test Circuit



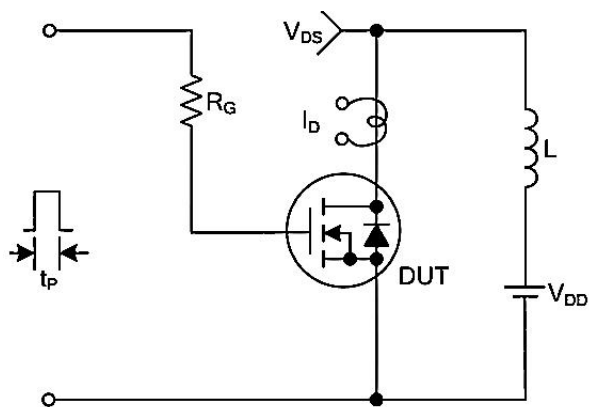
Gate Charge Waveforms



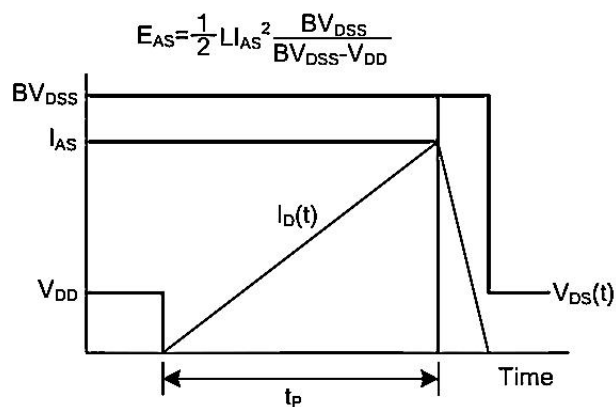
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



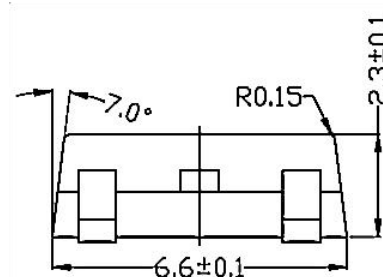
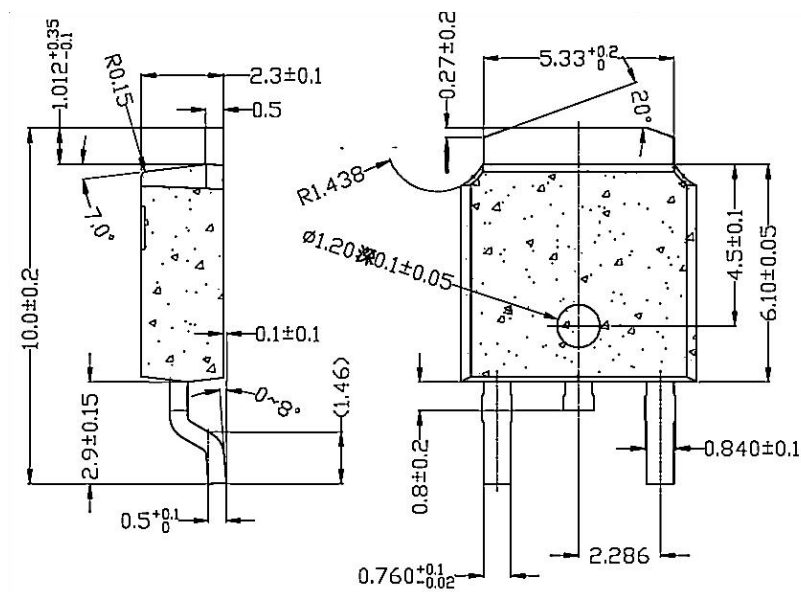
Unclamped Inductive Switching Waveforms



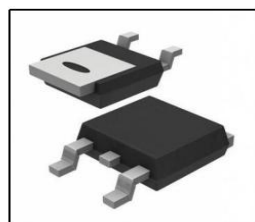
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TO - 252 PACKAGE OUTLINE DIMENSIONS



TO - 252 PACKING INFORMATION



2500PC
S/reel



2 Reel/BOX



Outer box

5 Inner
Box



Inner box

Package version	Reel dimensions $\Phi \times H$ (mm)	Per Reel (pcs)	Reels per box	Inner box dimensions $L \times W \times H$ (mm)	Outer box (pcs)	Outer box dimensions $L \times W \times H$ (mm)
TO-252	$\Phi 330 \times 20$	2500	2	360*340*50	25000	375*375*280