



HY3N80

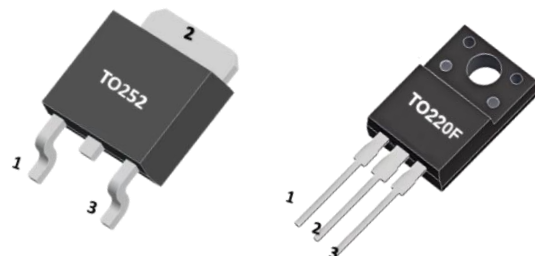
N-CHANNEL POWER MOSFET

3A, 800V N-CHANNEL POWER MOSFET

DESCRIPTION

The HY3N80A provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

The HY3N80A meet the ROHS and Green Product requirement with full function reliability approved.



FEATURES

- * $R_{DS(ON)} \leq 3.8 \Omega$ @ $V_{GS}=10V$, $I_D=1.5A$
- * Fast Switching Capability
- * Avalanche Energy Specified
- * Improved dv/dt Capability, High Ruggedness

MARKING



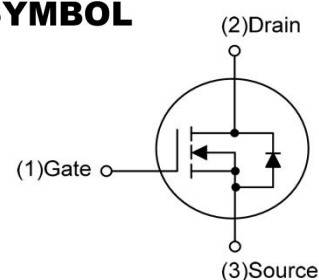
: HY LOGO

HY3N80A=Device Code

XXXX=Date Code

Solid Dot=Green molding compound

SYMBOL



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

SYMBOL	PARAMETER		VALUE	UNIT
V_{DS}	Drain-Source Voltage($V_{GS}=0V$)		800	V
V_{DGR}	Drain-Gate Voltage ($R_G=20k\Omega$)		800	V
V_{GS}	Gate Source Voltage		± 30	V
I_D	Continuous Drain Current		3	A
I_{DM}	Pulsed Drain Current		6.0	A
E_{AS}	Single Pulsed Avalanche Energy (Note 3)		126	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 4)		1.7	V/ns
P_D	Power Dissipation	TO-220F	25	W
		TO-252	50	W
T_J	Junction Temperature		150	$^\circ C$
T_{STG}	Storage Temperature		-55 to 150	$^\circ C$

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. $L = 30mH$, $I_{AS} = 2.9A$, $V_{DD} = 50V$, $R_G = 25 \Omega$, Starting $T_J = 25^\circ C$.

4. $I_{SD} \leq 3.0A$, $di/dt \leq 200A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ C$.



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■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F	θ_{JA}	62.5	°C/W
	TO-252		110	
Junction to Case	TO-220F	θ_{JC}	5	°C/W
	TO-252		2.5	

■ 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	800			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =800V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±30V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Drain-source on-state resistance	R _{DS(ON)}	v _{GS} =10V, I _D =1.5A			3.8	Ω
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} ,I _D =250μA	3.0		5.0	V
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{GS} =0V,V _{DS} =25V f=1.0MHz		525		pF
Output Capacitance	C _{OSS}			68.6		
Reverse Transfer Capacitance	C _{RSS}			7.5		
SWITCHING CHARACTERISTICS						
Total gate charge	Q _g	V _{DS} =640V,V _{GS} =10V I _D =3A		20.8		nC
Gate-source charge	Q _{gs}			9		
Gate-drain charge	Q _{gd}			4.5		
Turn-On Delay Time	t _(on)	V _{DD} =400V,I _D =3A V _{GS} =10V,R _G =25Ω		11		nS
Turn-On Rise time	tr			17		
Turn-Off Delay Time	t _(off)			41		
Turn-Off Fall time	tf			29		
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	V _{GS} = 0 V, I _S = 3A			1.4	V
Maximum Continuous Drain-Source Diode Forward Current	I _S				3	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				6	A
Reverse Recovery Time	trr	I _S =3.0A,V _{GS} = 0V		472		ns
Reverse Recovery Charge	Q _{rr}	dI _F /dt = 100A/μs (Note 1)		3.1		μC

Notes: 1. Pulse width = 300 μs , Duty cycle $\leq 1.5\%$.

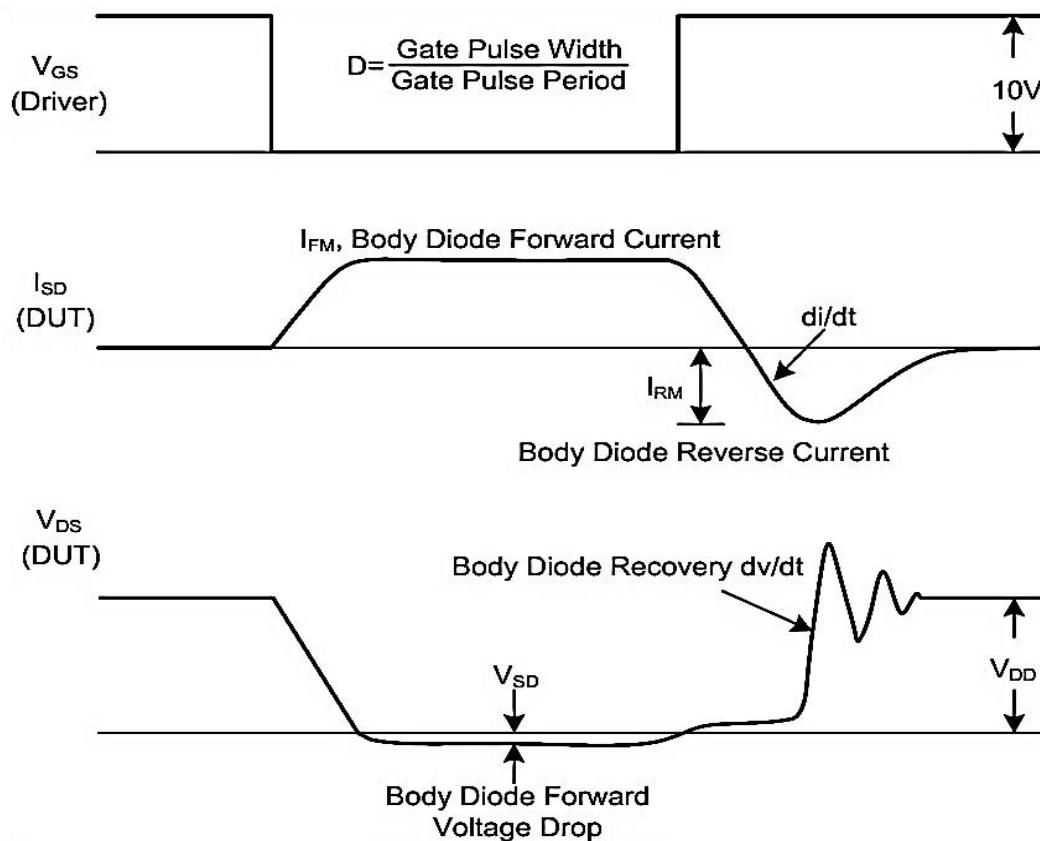
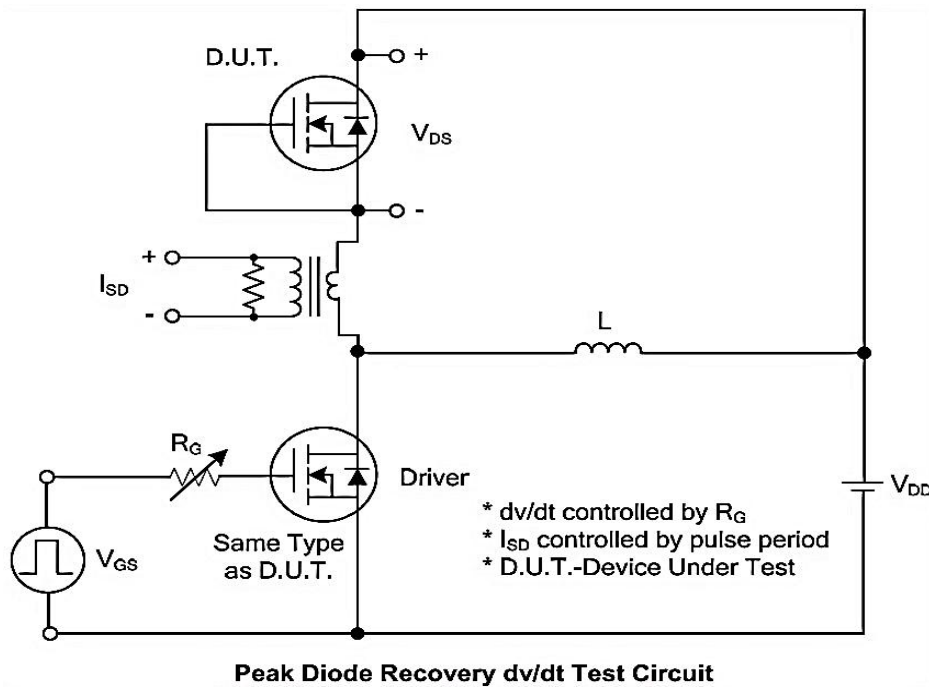
2. $C_{OSS(EQ)}$ is defined as constant equivalent capacitance giving the same charging time as C_{OSS} when V_{DS} increases from 0 to 80% V_{DSS} .



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■ TEST CIRCUITS AND WAVEFORMS



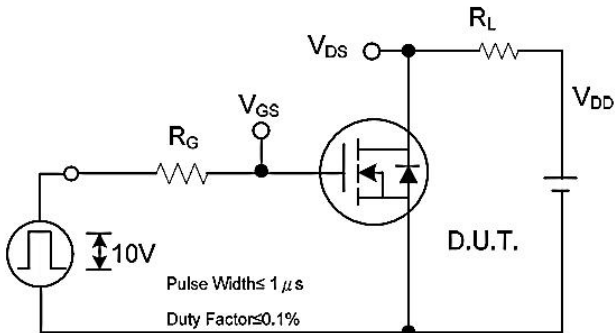
Peak Diode Recovery dv/dt Waveforms



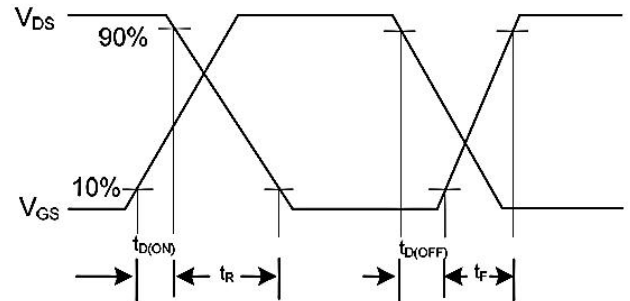
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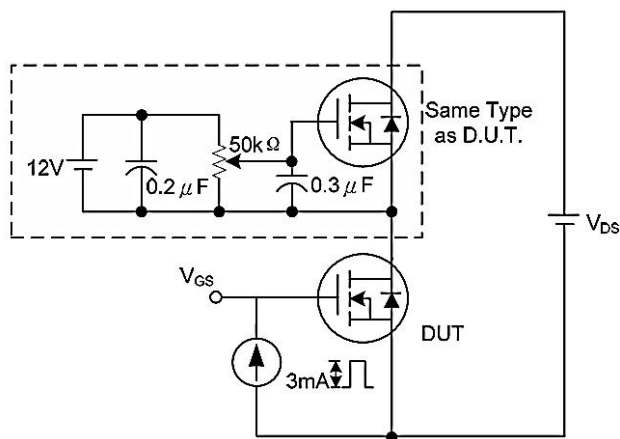
■ TEST CIRCUITS AND WAVEFORMS(Con.t)



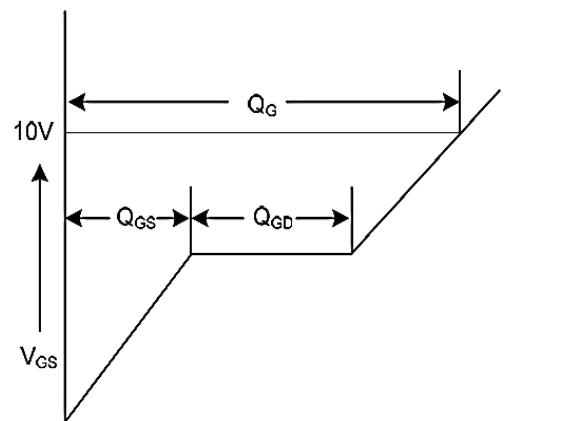
Switching Test Circuit



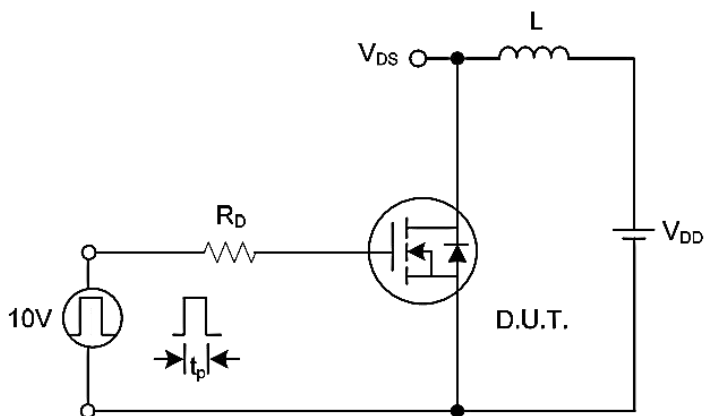
Switching Waveforms



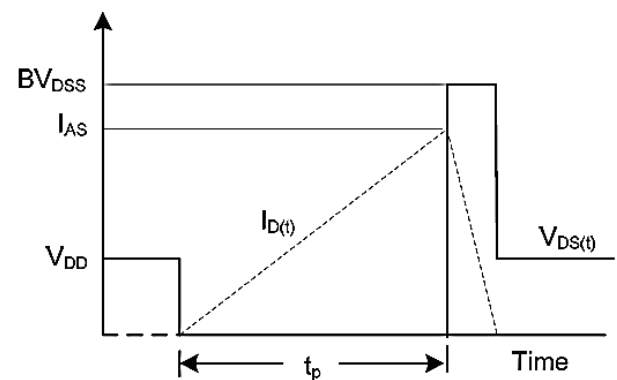
Gate Charge Test Circuit



Charge Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



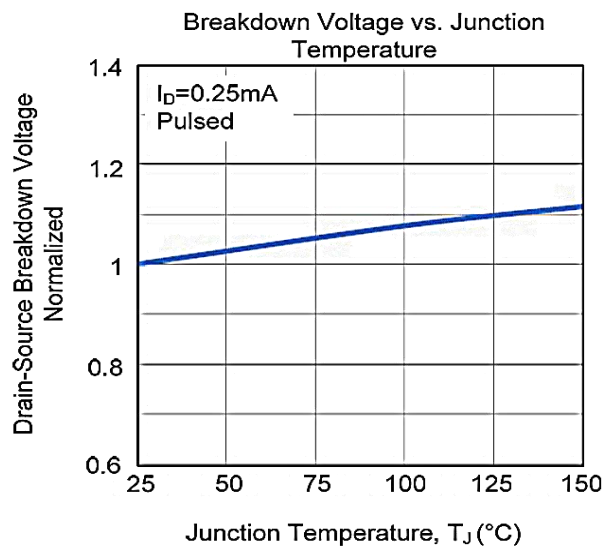
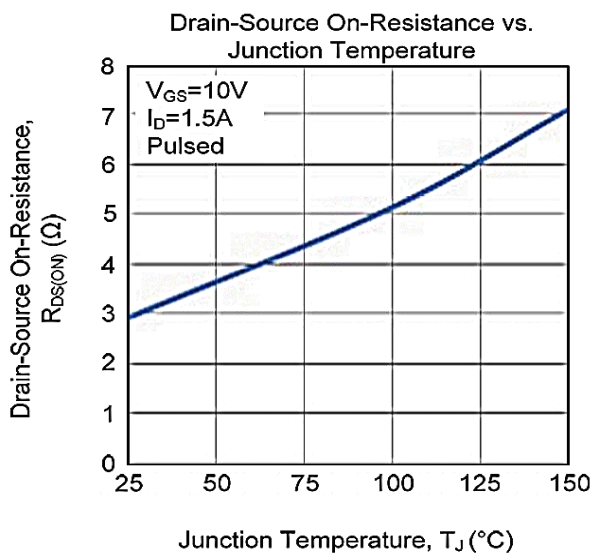
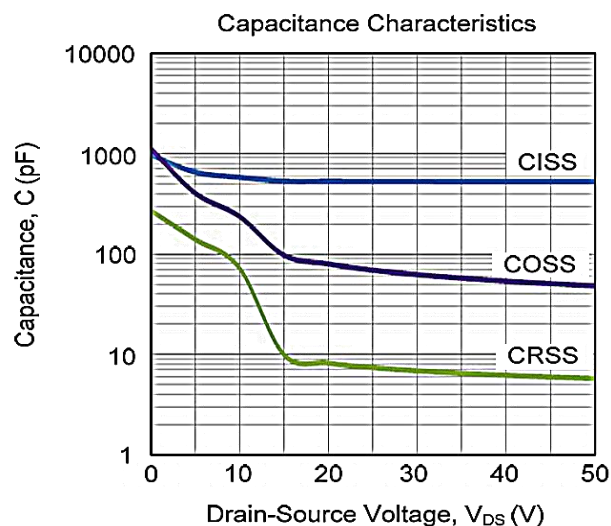
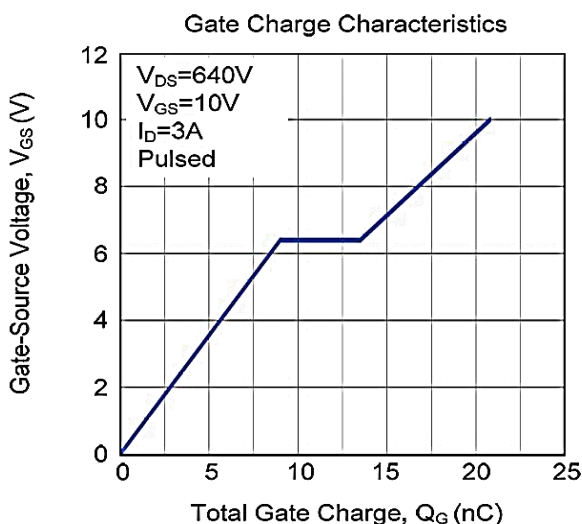
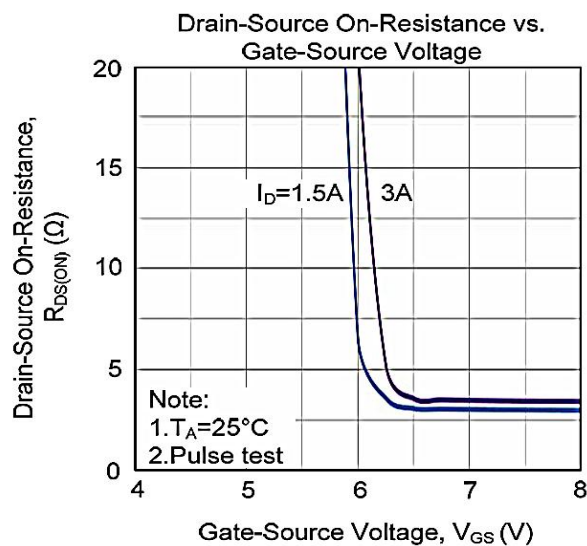
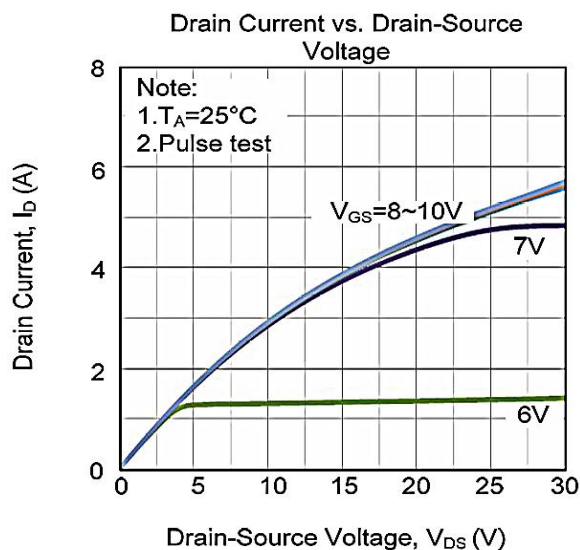
Unclamped Inductive Switching Waveforms



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TYPICAL CHARACTERISTICS

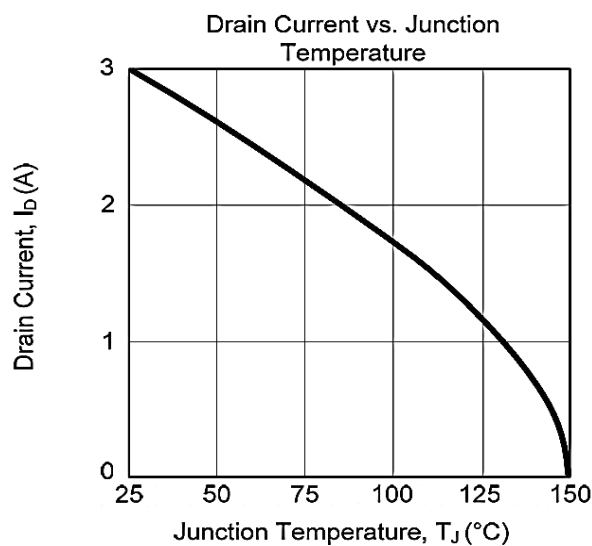
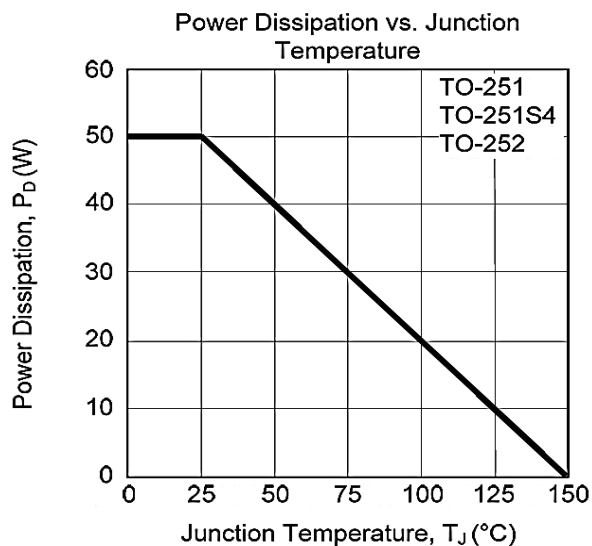
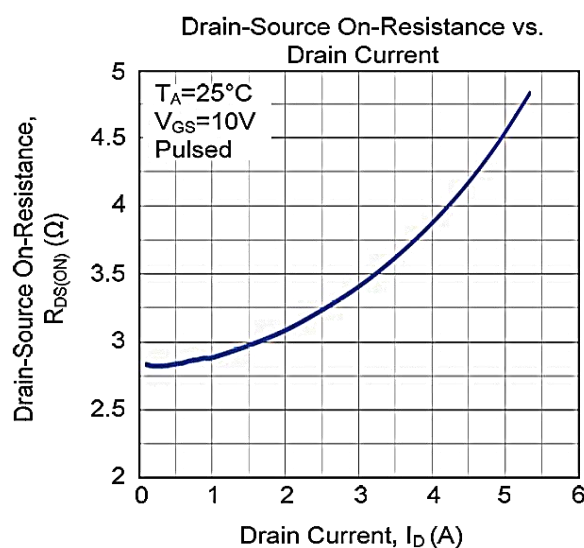
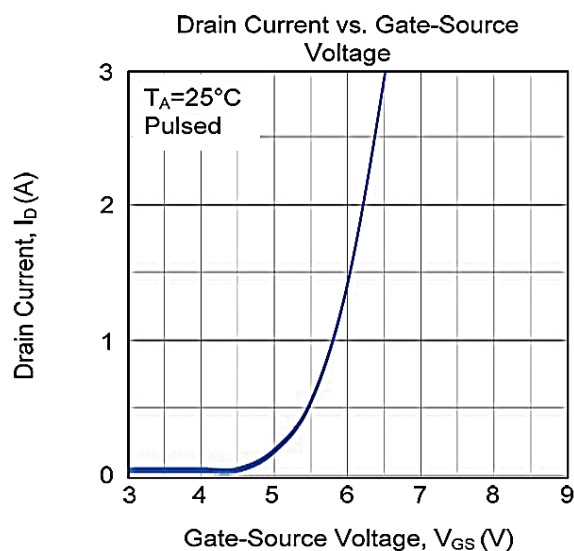
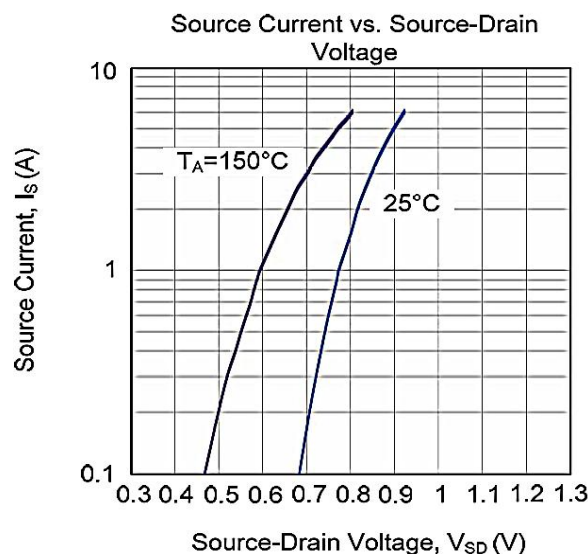
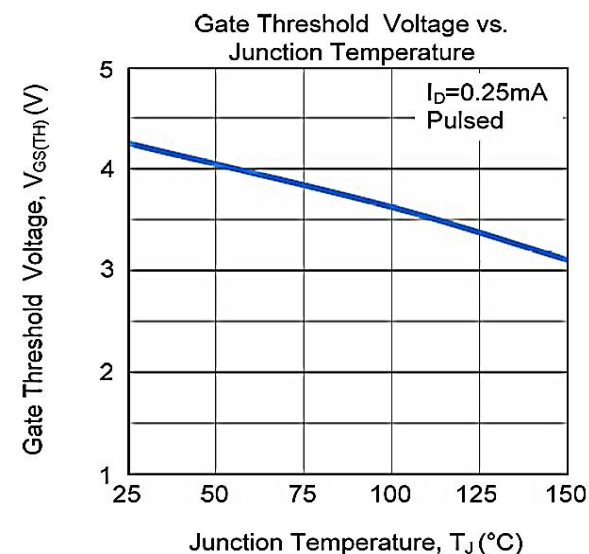




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■ TYPICAL CHARACTERISTICS(Con.t)

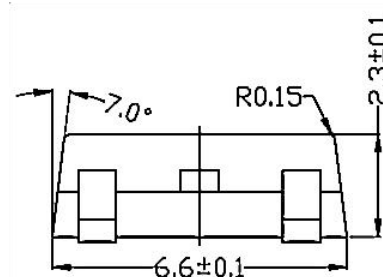
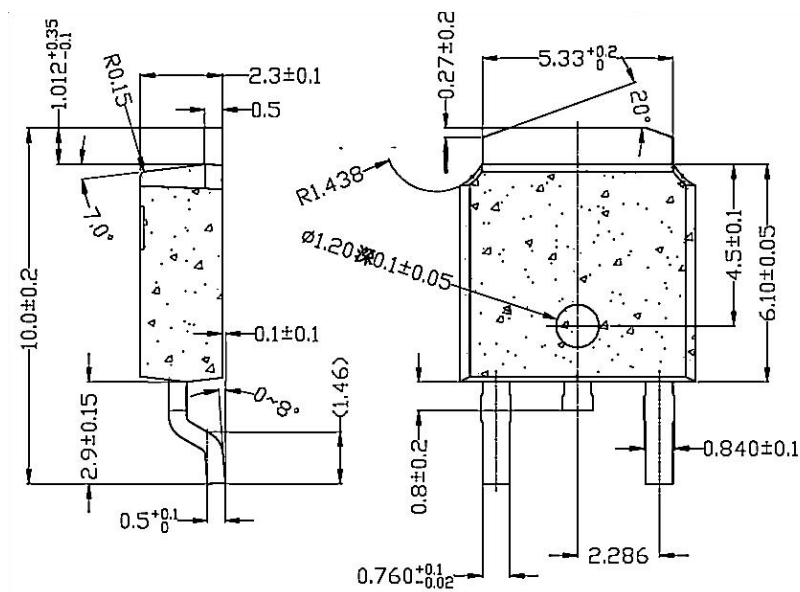




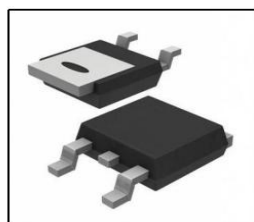
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N-CHANNEL POWER MOSFET

TO - 252 PACKAGE OUTLINE DIMENSIONS



TO - 252 PACKING INFORMATION



2500PC
S/reel



2 Reel/BOX



Outer box

5 Inner
Box



Inner box

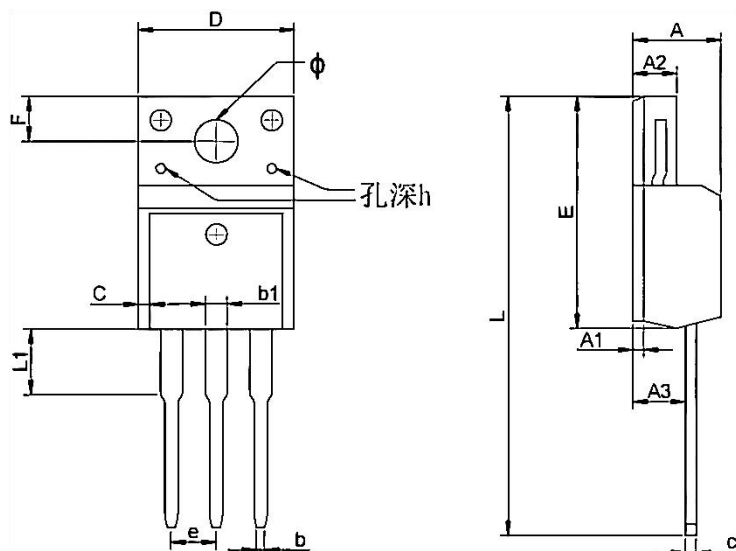
Package version	Reel dimensions $\Phi \times H$ (mm)	Per Reel (pcs)	Reels per box	Inner box dimensions $L \times W \times H$ (mm)	Outer box (pcs)	Outer box dimensions $L \times W \times H$ (mm)
TO-252	$\Phi 330 \times 20$	2500	2	360*340*50	25000	375*375*280



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TO-220F PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.300	4.750	0.169	0.185
A1	1.830 REF		0.072 REF	
A2	2.300	2.850	0.090	0.112
A3	2.500	2.900	0.098	0.114
b	0.400	0.420	0.016	0.016
b1	1.220	1.280	0.048	0.050
C	0.690	0.720	0.027	0.028
c	0.490	0.510	0.019	0.020
D	9.960	10.200	0.392	0.400
E	15.000	15.950	0.588	0.625
e	2.574 TYP		0.101TYP	
F	3.470 REF		0.136 REF	
y	3.200 REF		0.125 REF	
h	0.000	0.300	0.000	0.012
L	28.780	28.900	1.128	1.133
L1	2.990	3.100	0.117	0.122

TO - 220F PACKING INFORMATION



50PCS

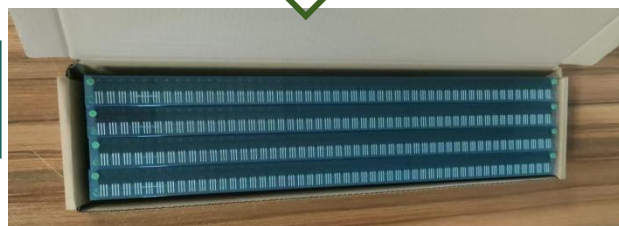


20 Tube



Outer Box

5 Inner
Box



Inner Box

Package version	Tube dimensions LxWxH (mm)	Per Tube (pcs)	Tube per box	Inner box dimensions LxWxH (mm)	PCS/ Inner box	Outer box dimensions LxWxH(mm)	PCS/ Outer box
TO-220F	530*32*7	50	20	580*155*50	1000	602*277*188	5000