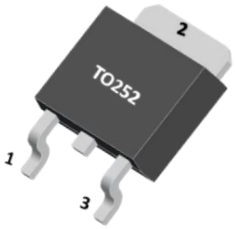
2.4A, 800V N-CHANNEL POWER MOSFET

■ DESCRIPTION

The HY2N80A is an N-channel mode power MOSFET using our advanced technology to provide costumers planar stripe and DMOS technology. This technology is specialized in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The HY2N80A is universally applied in high efficiency switch mode power supply.



■ FEATURES

*$R_{DS(on)}$ ≤ 6.3 Ω @ V_{GS}=10V, I_D=1.2A

* High switching speed

■ MARKING

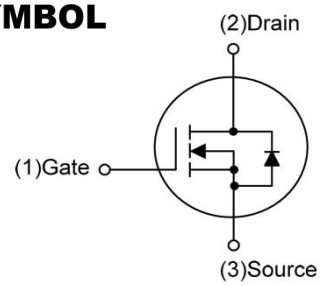
: HY LOGO

HY2N80A=Device Code

XXXX=Date Code

Solid Dot=Green molding compound

SYMBOL



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

SYMBOL	PARAMETER		VALUE	UNIT
V_{DS}	Drain-Source Voltage		800	V
V_{GS}	Gate Source Voltage		±30	V
I_{AR}	Avalanche Current (Note 2)		2.4	A
I_D	Continuous Drain Current		2.4	A
I_{DM}	Pulsed Drain Current (Note 2)		4.0	A
E_{AS}	Avalanche Energy	Single Pulsed (Note 3)	195	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 4)		3.47	V/ns
P_D	Power Dissipation	TO-220F	24	W
		TO-252	44	W
T_J	Junction Temperature		150	°C
T_{STG}	Storage Temperature		-55 to 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. Repetitive Rating: Pulse width limited by maximum junction temperature .

3.L = 30mH, I_{AS} = 3.4A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C .

4.I_{SD} ≤ 2.0A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F	θJA	62.5	°C/W
	TO-252		110	
Junction to Case	TO-220F	θJC	5.2	°C/W
	TO-252		2.84	

■ 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
		V_{DS}=640V, T_C = 125°C			100	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30V, V_{DS}=0V			±100	nA
Breakdown Voltage Temperature Coefficient	$\triangle V_{(BR)\ DSS}/\triangle T_J$	I_D=250μA, Referenced to 25°C		0.9		V/°C
ON CHARACTERISTICS						
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=1.2A		4.8	6.3	Ω
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS}=V_{DS},I_D=250μA	3.0		5.0	V
Forward Transconductance (Note 1)	g_{FS}	V_{DS}=50V, I_D=1.2A		2.65		S
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{GS}=0V,V_{DS}=25V f=1.0MHz		520	650	pF
Output Capacitance	C_{OSS}			51	60	
Reverse Transfer Capacitance	C_{RSS}			7	9	
SWITCHING CHARACTERISTICS						
Total gate charge	Qg	V_{DS}=640V,V_{GS}=10V,I_D=2A I_G=1mA (Note 1, 2)		20		nC
Gate-source charge	Qgs			7.8		
Gate-drain charge	Qgd			4.6		
Turn-On Delay Time	td(on)	V_{DD}=100V,I_D=2A,V_{GS}=10V R_G=25Ω (Note 1, 2)		8.8		nS
Turn-On Rise time	tr			1.7		
Turn-Off Delay Time	td(off)			42		
Turn-Off Fall time	tf			32		

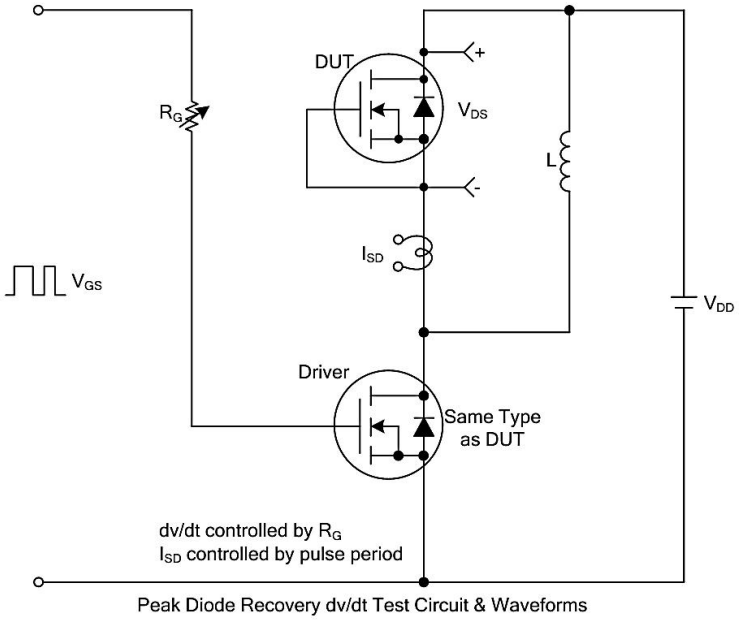
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 2.4A			1.4	V
Maximum Continuous Drain-Source Diode Forward Current	I_S				2.4	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				4	A
Reverse Recovery Time (Note 1)	trr	I_S = 2.0A,V_{GS} = 0V		367		ns
Reverse Recovery Charge (Note 1)	Qrr	dI_F/dt = 100A/μs (Note 1)		5		μC

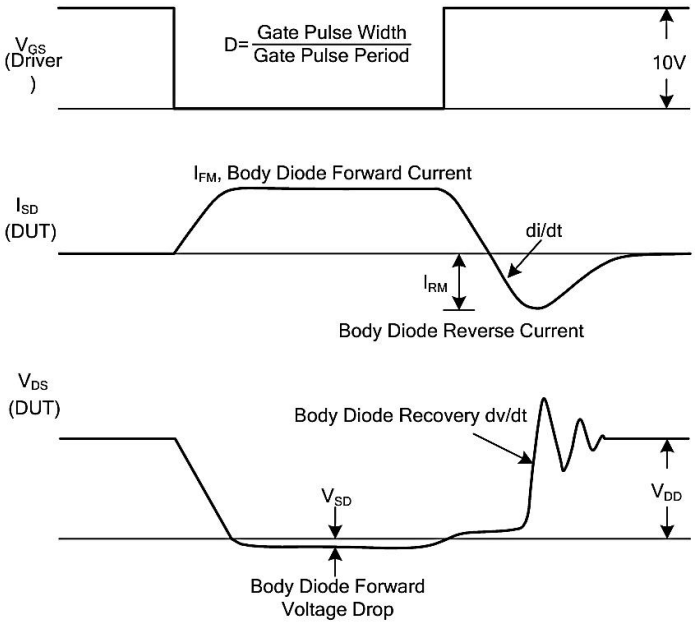
Notes：

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

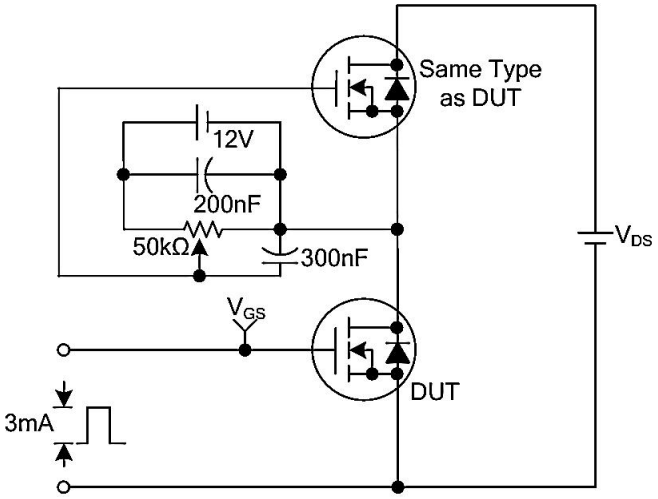
■ TEST CIRCUITS AND WAVEFORMS



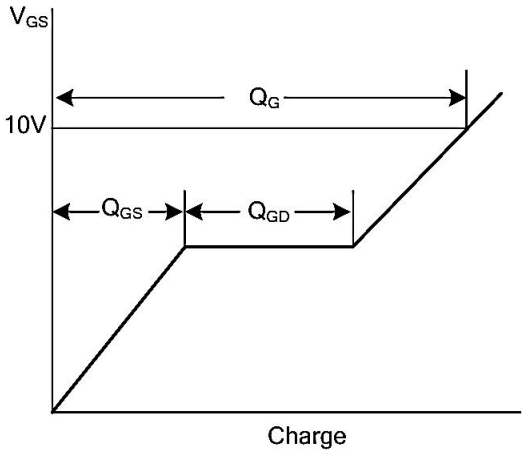
Peak Diode Recovery dv/dt Test Circuit & Waveforms



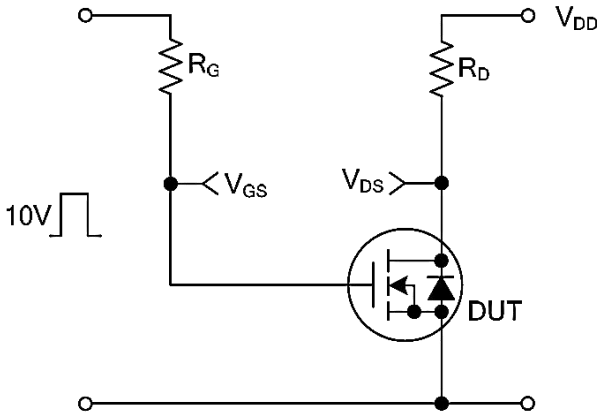
■ TEST CIRCUITS AND WAVEFORMS(Con.t)



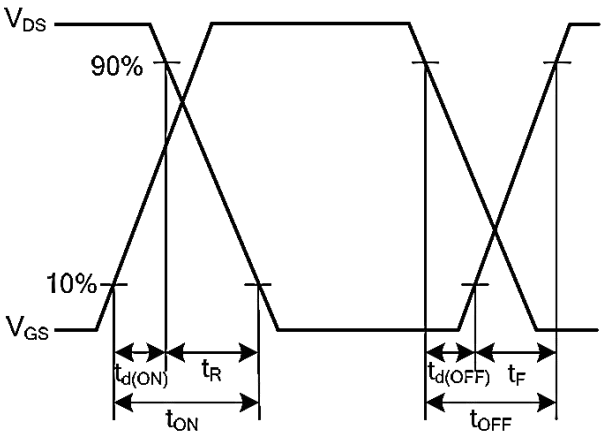
Gate Charge Test Circuit



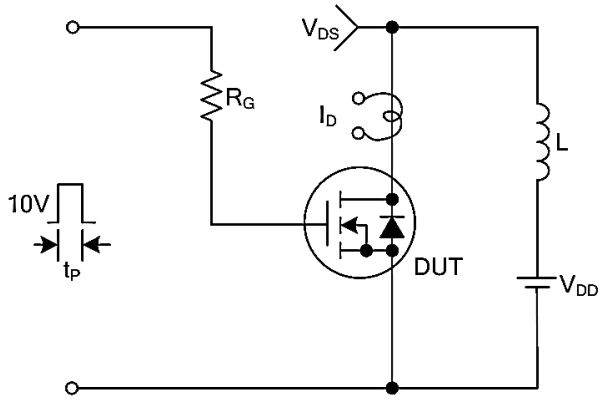
Gate Charge Waveforms



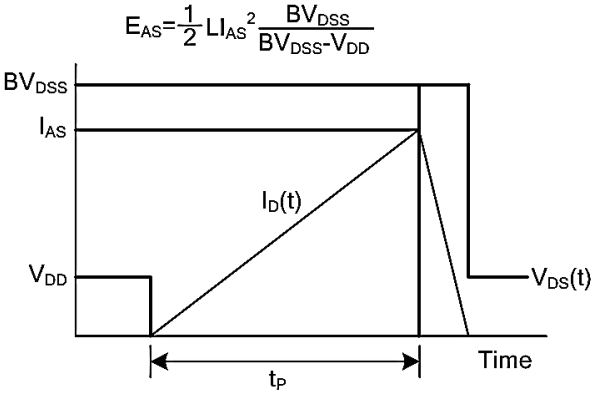
Resistive Switching Test Circuit



Resistive Switching Waveforms



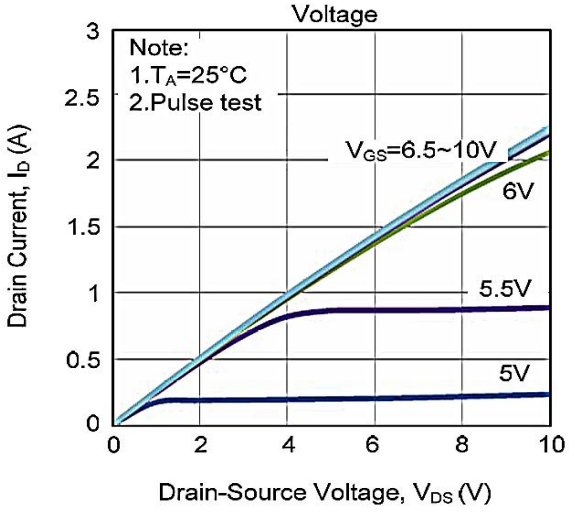
Unclamped Inductive Switching Test Circuit



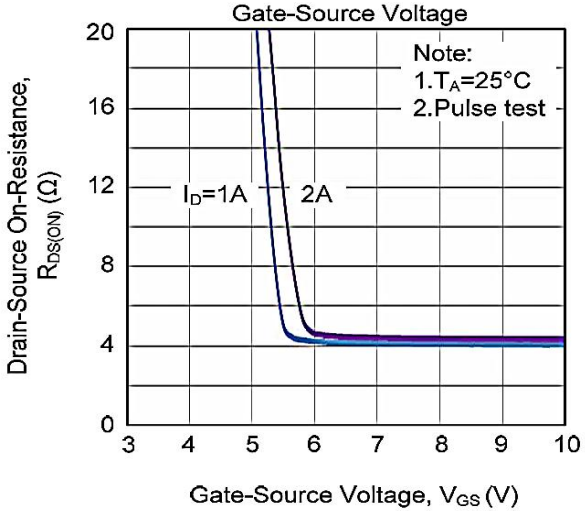
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

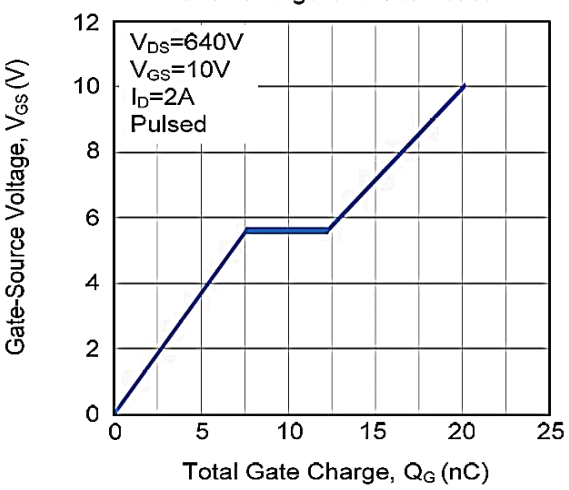
Drain Current vs. Drain-Source Voltage



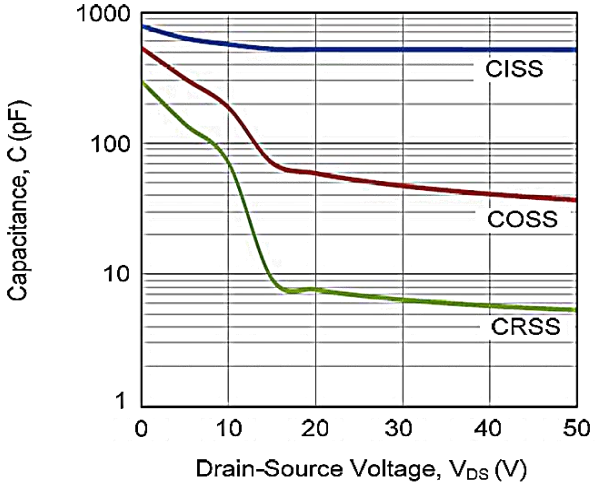
Drain-Source On-Resistance vs. Gate-Source Voltage



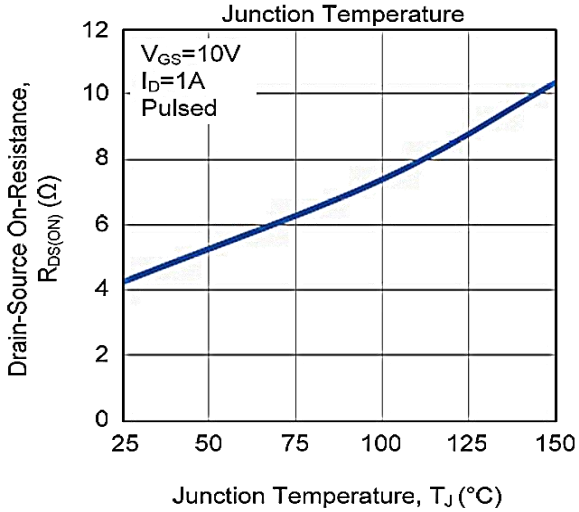
Gate Charge Characteristics



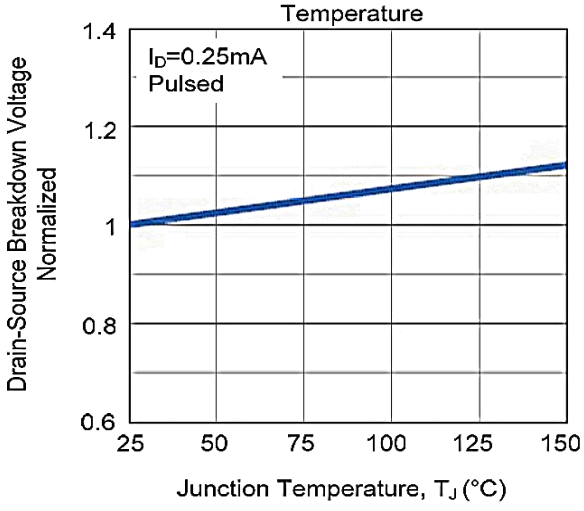
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

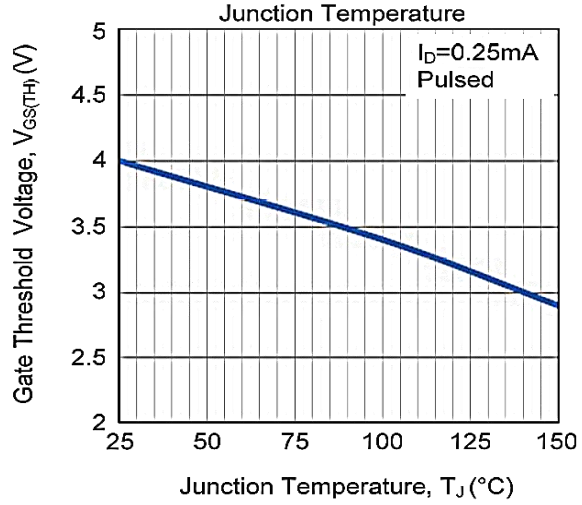


Breakdown Voltage vs. Junction Temperature

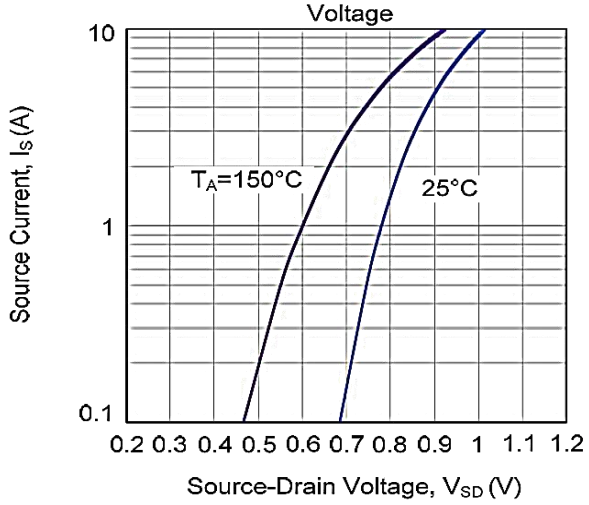


■ TYPICAL CHARACTERISTICS(Con.t)

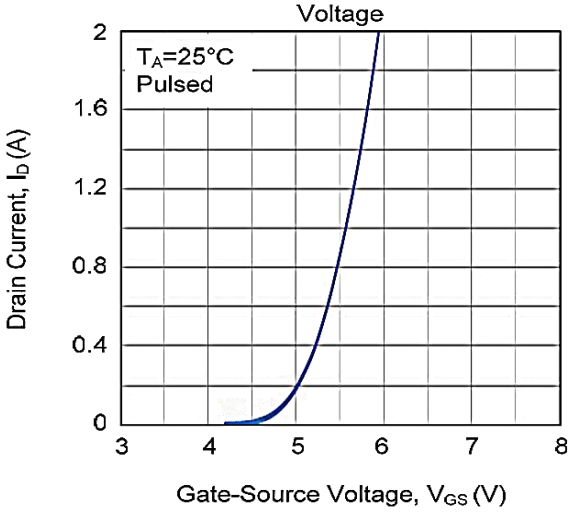
Gate Threshold Voltage vs. Junction Temperature



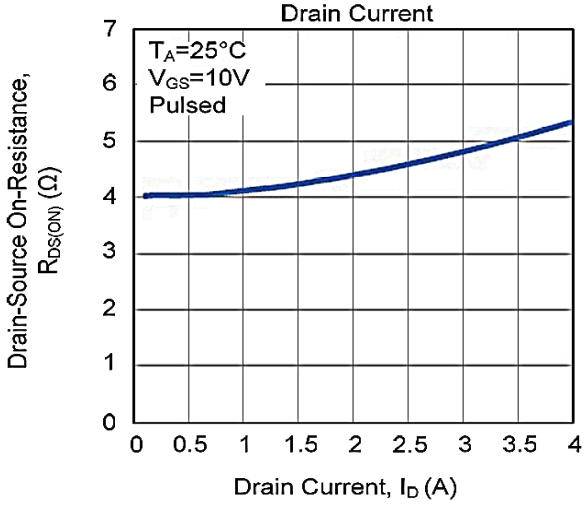
Source Current vs. Source-Drain Voltage



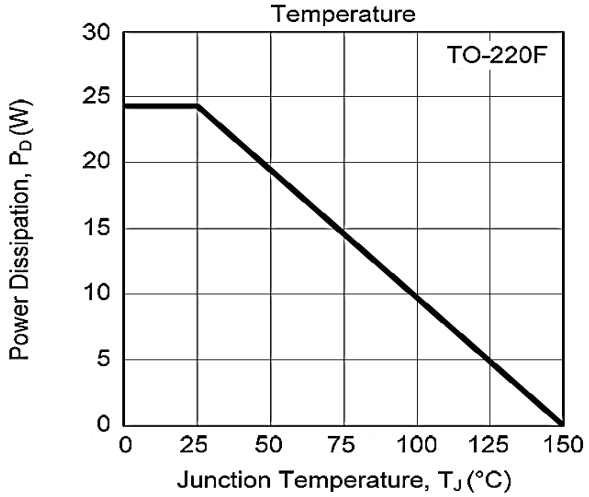
Drain Current vs. Gate-Source Voltage



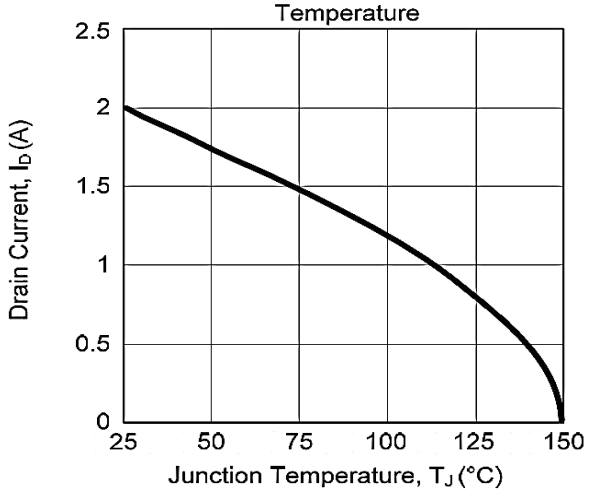
Drain-Source On-Resistance vs. Drain Current



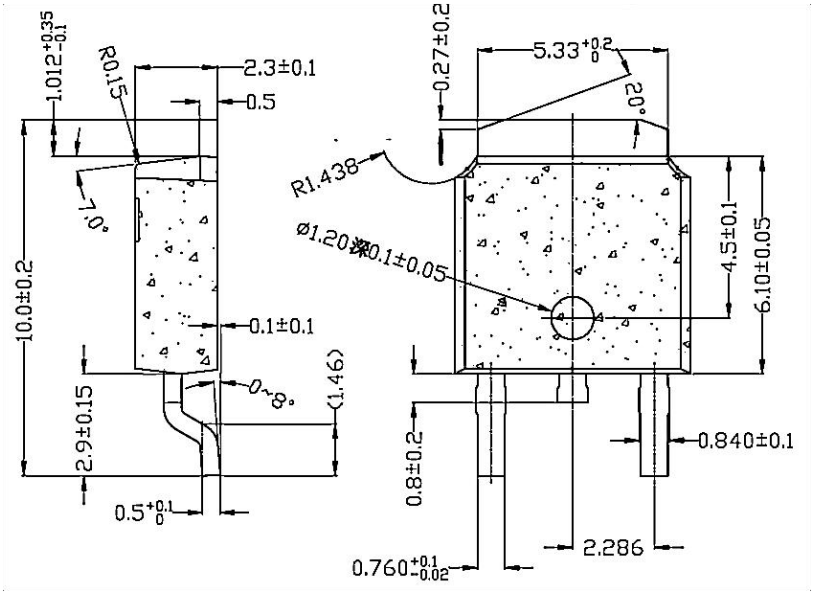
Power Dissipation vs. Junction Temperature

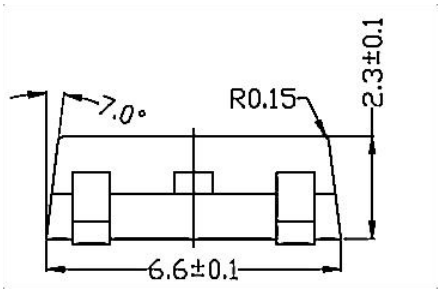


Drain Current vs. Junction Temperature

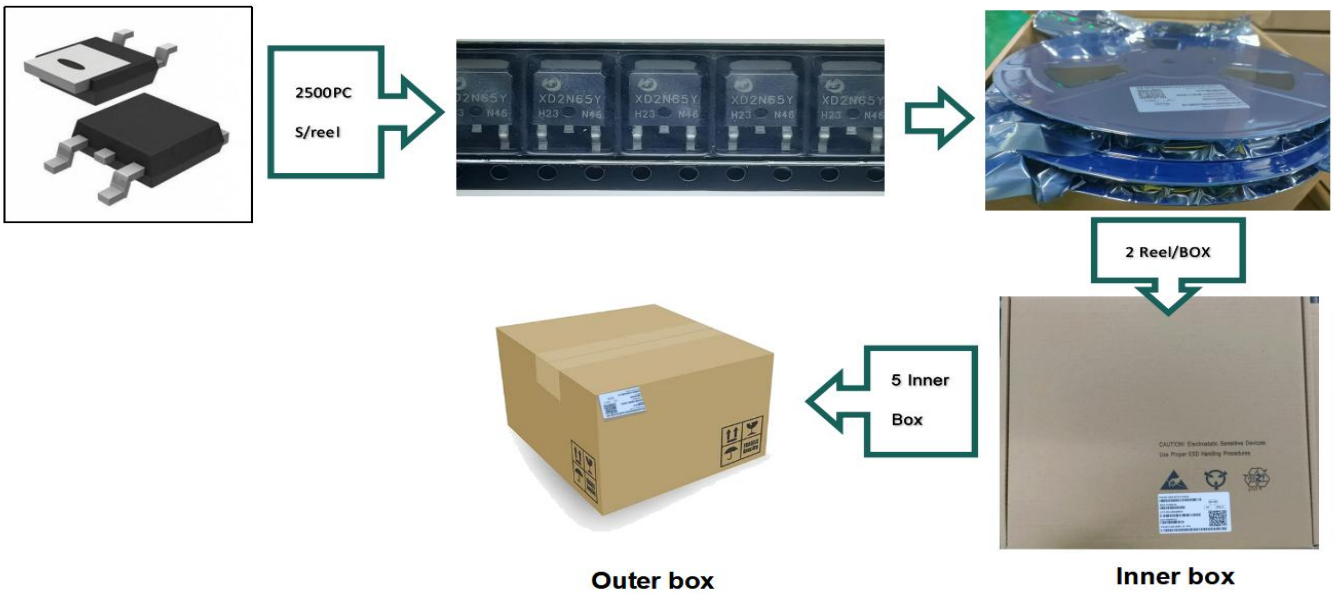


■ TO - 252 PACKAGE OUTLINE DIMENSIONS



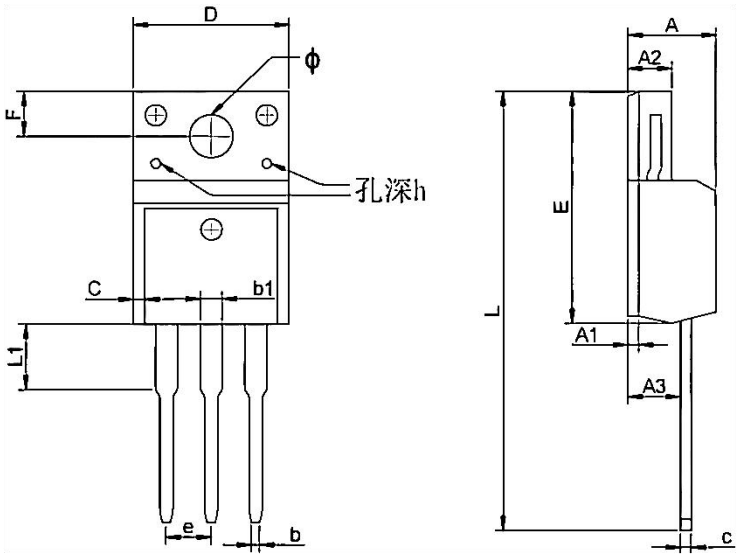


■ TO - 252 PACKING INFORMATION



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

■ 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

5 Inner Box

Outer Box

Inner Box

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