

# TN80H10NTF

## N-Channel Enhancement Mode Power MOSFET

### Product Summary

- $V_{DS}=800V, I_D=10A$
- $R_{DS(on)} < 1.1\Omega @ V_{GS}=10V$

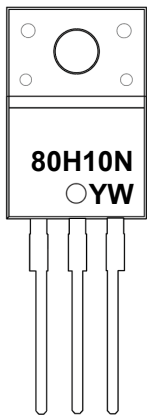
### Features

- Advanced Planar Technology
- 100% Avalanche Tested
- RoHS Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 3

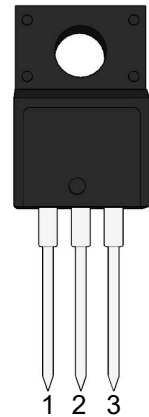
### Application

- Uninterruptible Power Supply
- High Frequency Switching Mode Power Supply
- Electronic Ballast

### Marking Code



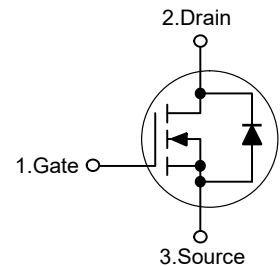
### TO-220F



### (Top View)

Pin	Description
1	Gate
2	Drain
3	Source

### Schematic Diagram



### Absolute Maximum Ratings

Ratings at 25°C case temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	800	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Drain Current-Continuous	$I_D$	10	A
Drain Current-Pulsed <sup>Note1</sup>	$I_{DM}$	40	A
Maximum Power Dissipation	$P_D$	240	W
Single Pulse Avalanche Energy <sup>Note2</sup>	$E_{AS}$	920	mJ
Junction Temperature	$T_J$	150	°C
Storage Temperature Range	$T_{STG}$	-55 to +150	°C

### Thermal Characteristics

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.52	°C/W
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## Electrical Characteristics

(T<sub>J</sub>=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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## On Characteristics

V <sub>GS</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	3.0	--	5.0	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 5.0A	--	0.93	1.10	Ω

## Off Characteristics

BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	800	--	--	V
ΔBVDSS / ΔT <sub>J</sub>	Breakdown Voltage Temperature Coefficient	I <sub>D</sub> = 250 μA, Referenced to 25°C	--	0.99	--	V/°C
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 800 V, V <sub>GS</sub> = 0 V	--	--	1	μA
		V <sub>DS</sub> = 640 V, T <sub>C</sub> = 125°C	--	--	10	μA
I <sub>GSSF</sub>	Gate-Body Leakage Current, Forward	V <sub>GS</sub> = 30 V, V <sub>DS</sub> = 0 V	--	--	100	nA
I <sub>GSSR</sub>	Gate-Body Leakage Current, Reverse	V <sub>GS</sub> = -30 V, V <sub>DS</sub> = 0 V	--	--	-100	nA

## Dynamic Characteristics

C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V, f = 1.0 MHz	--	3500	--	pF
C <sub>oss</sub>	Output Capacitance		--	180	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	15	--	pF

## Switching Characteristics

t <sub>d(on)</sub>	Turn-On Time	V <sub>DS</sub> = 400 V, I <sub>D</sub> = 10.0A, R <sub>G</sub> = 25 Ω (Note 4,5)	--	50	--	ns
t <sub>r</sub>	Turn-On Rise Time		--	130	--	ns
t <sub>d(off)</sub>	Turn-Off Delay Time		--	100	--	ns
t <sub>f</sub>	Turn-Off Fall Time		--	80	--	ns
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> = 640 V, I <sub>D</sub> = 10.0A, V <sub>GS</sub> = 10 V (Note 4,5)	--	45	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	14	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	18	--	nC

## Source-Drain Diode Maximum Ratings and Characteristics

I <sub>S</sub>	Continuous Source-Drain Diode Forward Current		--	--	10.0	A
I <sub>SM</sub>	Pulsed Source-Drain Diode Forward Current		--	--	40.0	
V <sub>SD</sub>	Source-Drain Diode Forward Voltage	I <sub>S</sub> = 10.0A, V <sub>GS</sub> = 0 V	--	--	1.5	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> =10.0A, V <sub>GS</sub> = 0 V di <sub>F</sub> /dt = 100 A/μs (Note 4)	--	730	--	ns
Q <sub>rr</sub>	Reverse Recovery Charge		--	11	--	uC

## NOTES:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L=17.5mH, I<sub>AS</sub>=10.0A, V<sub>DD</sub>=50V, R<sub>G</sub>=25 Ω, Starting T<sub>J</sub>=25 °C
3. I<sub>SD</sub>≤10.0A, di/dt ≤ 200A/μs, V<sub>DD</sub>≤ BV<sub>DSS</sub>, Starting T<sub>J</sub> = 25 °C
4. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%
5. Essentially Independent of Operating Temperature Typical Characteristics

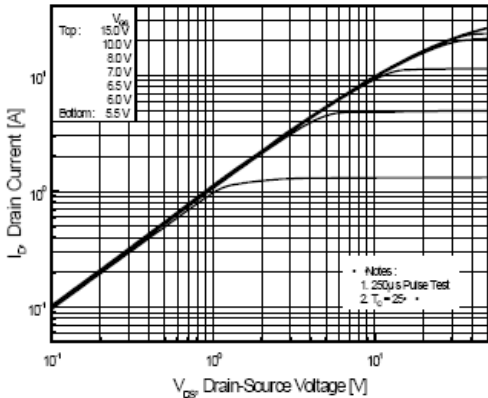


Figure 1. On-Region Characteristics

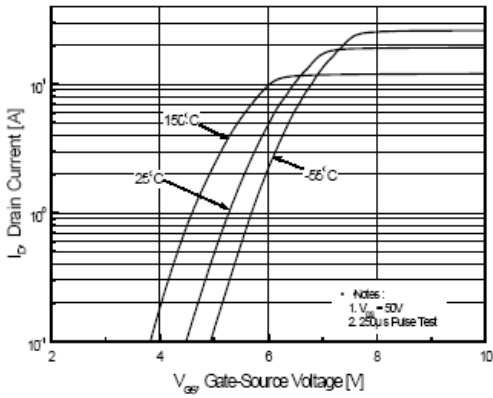


Figure 2. Transfer Characteristics

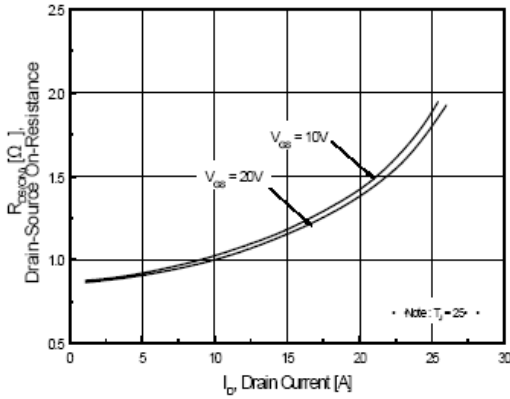


Figure 3. On-Resistance Variation

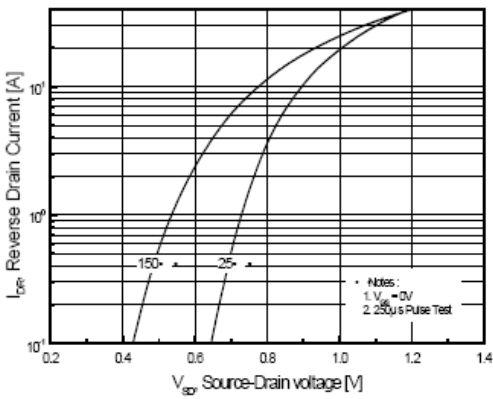


Figure 4. Body Diode Forward Voltage

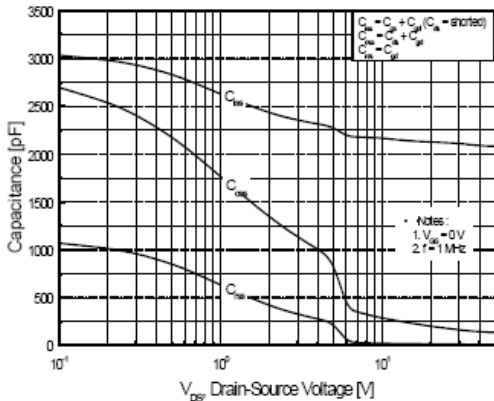


Figure 5. Capacitance Characteristics

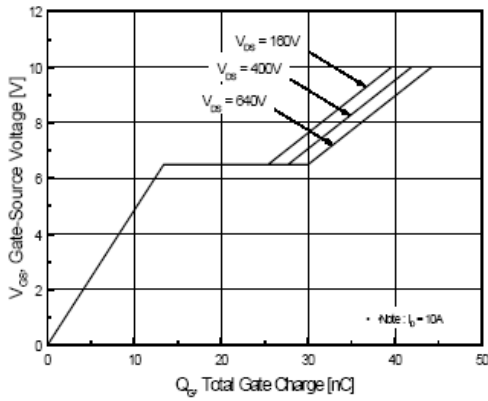


Figure 6. Gate Charge Characteristics

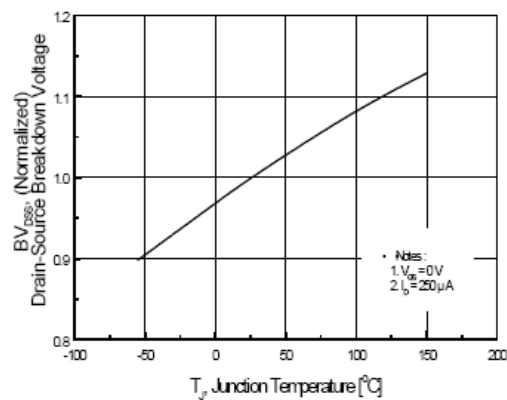


Figure 7. Breakdown Voltage Variation vs Temperature

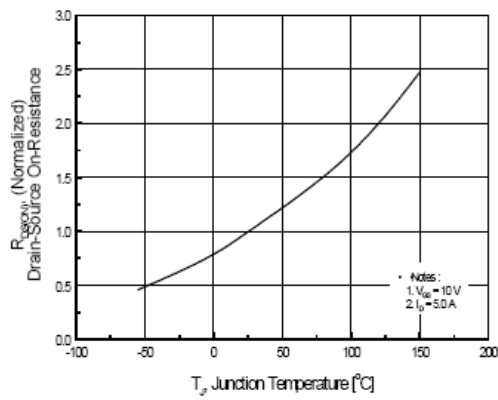


Figure 8. On-Resistance Variation vs Temperature

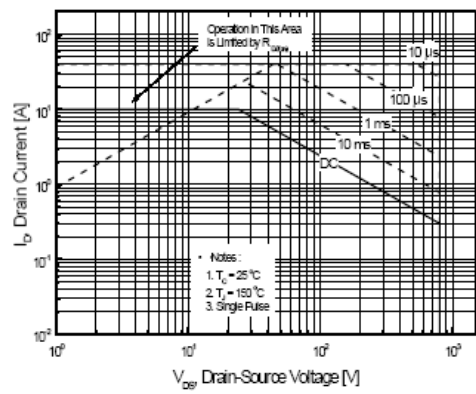


Figure 9. Maximum Safe Operating Area

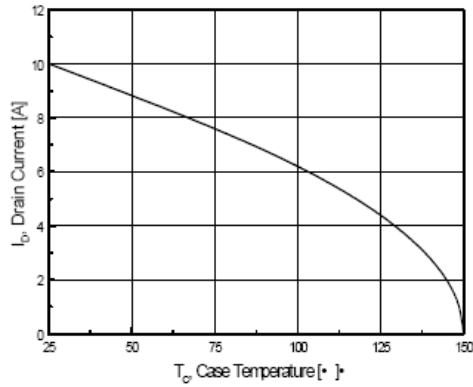


Figure 10. Maximum Drain Current vs Case Temperature

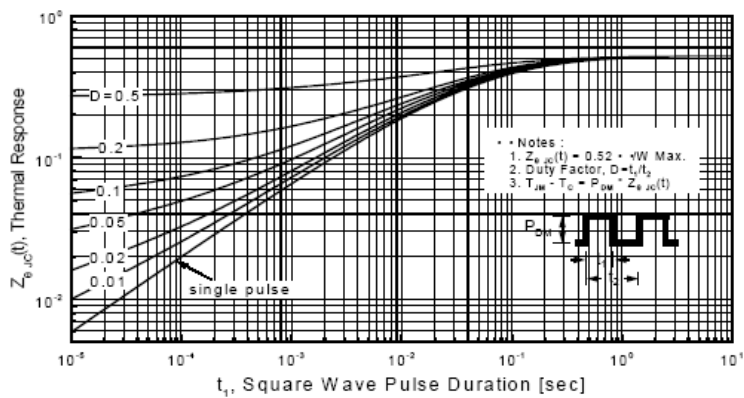
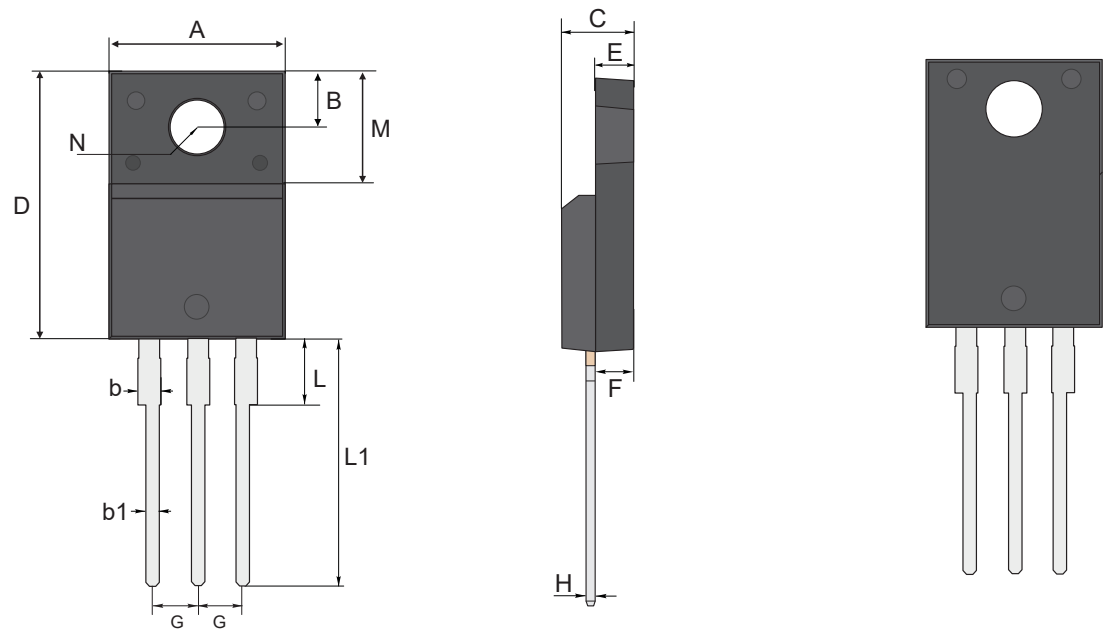


Figure 11. Transient Thermal Response Curve

Package Outline

TO-220F

Dimensions in mm



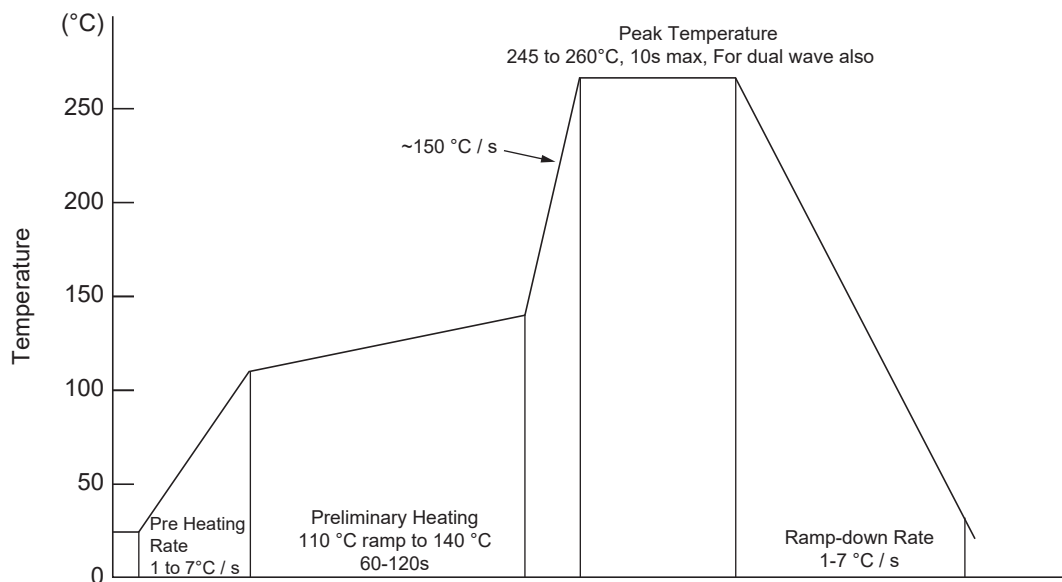
UNIT		A	B	b	b1	C	D	E	F	G	H	L	L1	M	N
mm	max	10.28	3.37	1.44	0.9	4.9	16.07	2.74	2.74	2.64	0.6	2.85	13.7	6.88	3.18 typ.
	typ	10.18	3.27	1.34	0.8	4.7	15.87	2.54	2.54	2.54	0.5	2.65	13.5	6.68	
	min	10.08	3.17	1.24	0.7	4.5	15.67	2.34	2.34	2.44	0.4	2.45	13.3	6.48	
mil	max	405	133	57	35	193	633	108	108	104	24	112	539	271	125 typ.
	typ	401	129	53	31	185	625	100	100	100	20	104	531	263	
	min	397	125	49	28	177	617	92	92	96	16	96	524	255	

Ordering Information

Device	Package	Shipping
TN80H10NTF	TO-220F	50PCS/Tube

## Conditions of Soldering and Storage

### ◆ Wave Soldering



### ◆ Conditions of hand soldering

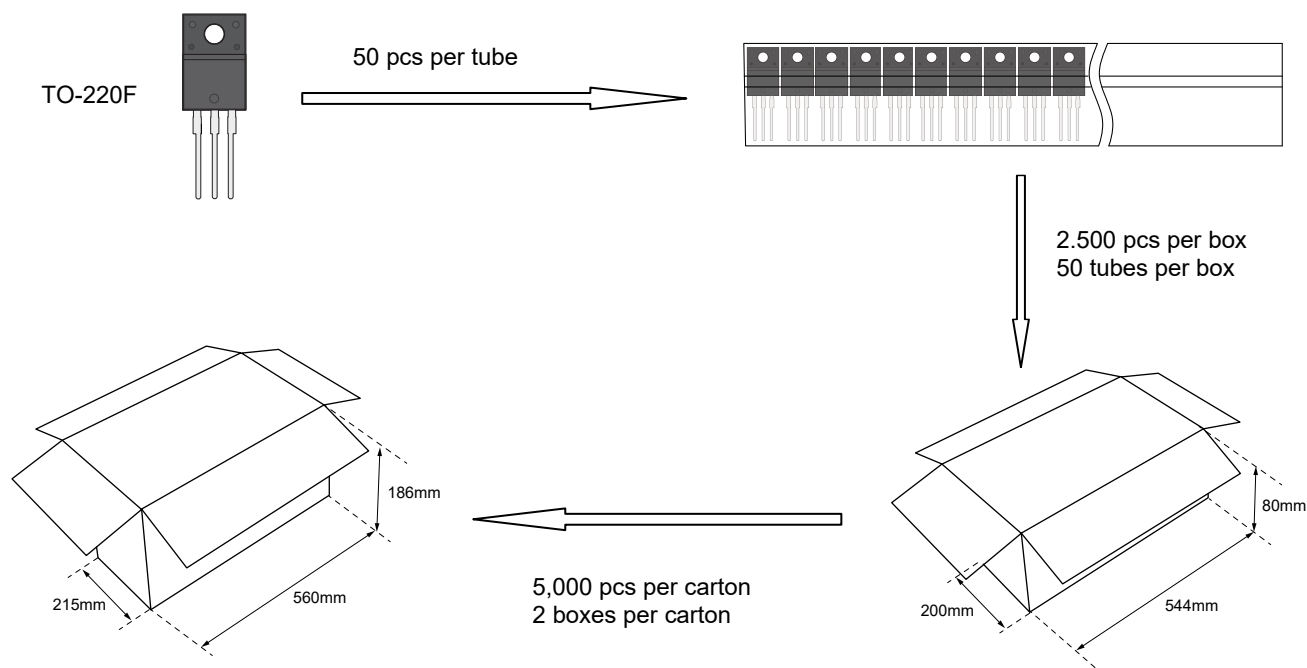
- Temperature: 360°C
- Time: 3s max.
- Times: one time

### ◆ Storage conditions

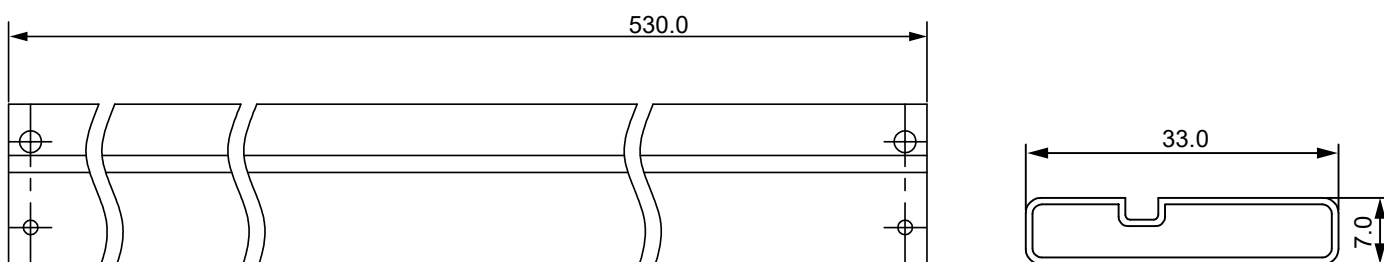
- **Temperature**  
5 to 40°C
- **Humidity**  
30 to 80% RH
- **Recommended period**  
One year after manufacturing

## Package Specifications

- The method of packaging



## ◆ Tube data



## Contact Information

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For additional information, please contact your local Sales Representative.



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