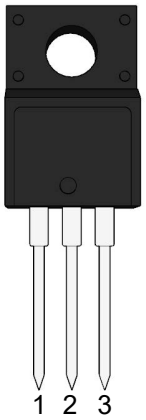
TN65H04NTF

N-Channel Enhancement Mode Power MOSFET

Product Summary

- V_{DS}= 650V,I_D= 04A
- $R_{DS(on)}$< 2.2Ω @V_{GS}= 10V

TO-220F



(Top View)

Pin	Description
1	Gate
2	Drain
3	Source

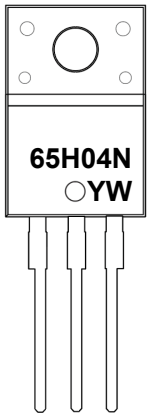
Features

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

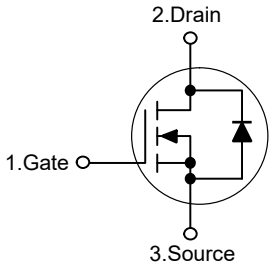
Application

- Electronic Ballast
- Electronic Transformer
- Switch Mode Power Supply

Marking Code



Schematic Diagram



Absolute Maximum Ratings

Ratings at 25℃ case temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±30	V
Drain Current-Continuous	I_D	04	A
Drain Current-Pulsed Note1	I_{DM}	16	A
Maximum Power Dissipation	P_D	50	W
Single Pulse Avalanche Energy Note2	E_{AS}	173	mJ
Junction Temperature	T_J	150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C

Thermal Characteristics

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	4	°C/W

Electrical Characteristics

(T_J=25℃ unless o therwise s pecified)

Parameter		Symbols	Test Conditions	Min	Typ	Max	Units
Off Characteristics							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V,I_D=250uA	650			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=650V,V_{GS}=0V			1.0	uA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=30V,V_{DS}=0V			100	nA
	Reverse		V_{GS}=-30V,V_{DS}=0V			-100	
On Characteristics							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250uA	2.0		4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V,I_D=2.0A		2.0	2.2	Ω
Transconductance		g_{fs}	V_{DS}=15V,I_D=2A		2.7		S
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=25V,		581		pF
Output Capacitance		C_{OSS}	V_{GS}=0V,		63		pF
Reverse Transfer Capacitance		C_{RSS}	f=1.0MHz		11		pF
Gate resistance		R_G			1.9		Ω
Switching Characteristics							
Total Gate Charge (Note 1)		Q_G	V_{DS}=480V,V_{GS}=10V,		25		nC
Gate-Source Charge		Q_{GS}	I_D=4A		17		nC
Gate-Drain Charge		Q_{GD}	(NOTE1,2)		20		nC
Turn-On Delay Time (Note 1)		$t_{D(ON)}$	V_{DS}=325V,I_D=4A		45		ns
Turn-On Rise Time		t_R	R_G=2.5Ω		100		ns
Turn-Off Delay Time		$t_{D(OFF)}$	(NOTE1,2)		200		ns
Turn-Off Fall Time		t_F			130		ns
Drain-Source Diode Characteristics And Maximum Ratings							
Maximum Body-Diode Continuous Current		I_S				4	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_{SD}=4A,V_{GS}=0V			1.3	V
Reverse Recovery Time (Note 1)		trr	I_F=4A		48		ns
Reverse Recovery Charge		Qrr	di/dt=100A/us		370		nC

Notes:
1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

Typical Characteristic Curves

Fig.1 Output characteristics

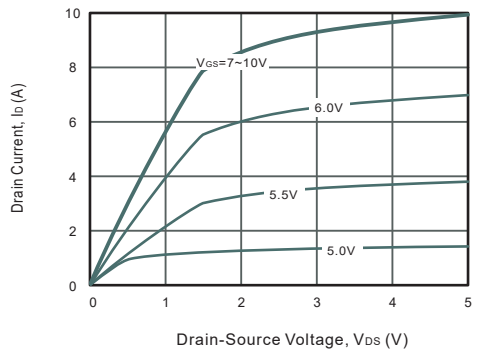


Fig.2 Power Dissipation

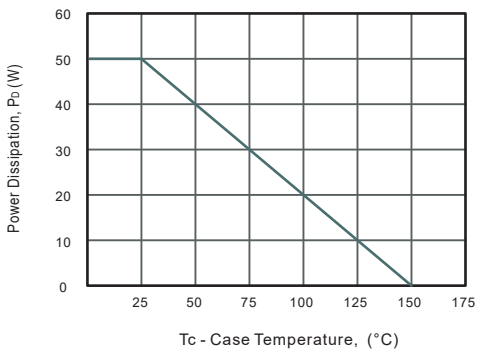


Fig.3 Drain Current Derating

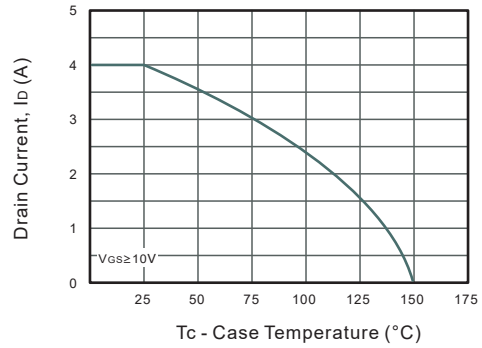


Fig.4 Drain-Source On-Resistance vs. Drain Current

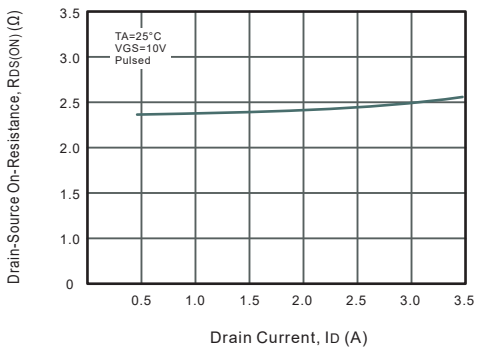


Fig.5 Gate Threshold Voltage vs. Junction Temperature

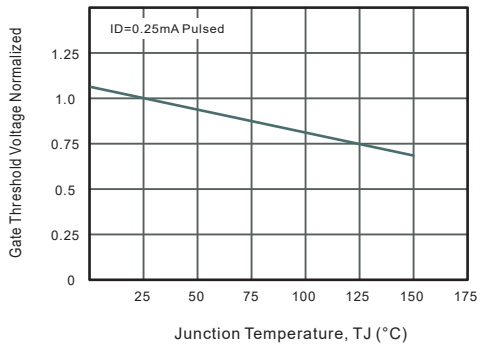


Fig.6 Body-diode Forward Characteristics

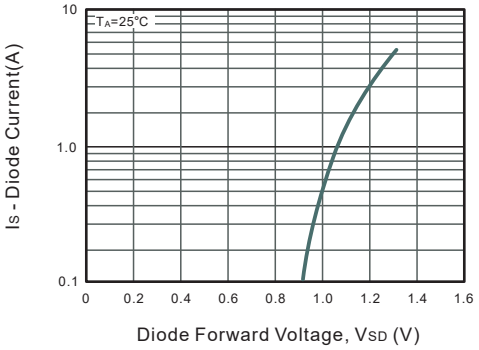


Fig.7 Drain-Source On-Resistance vs. Junction Temperature

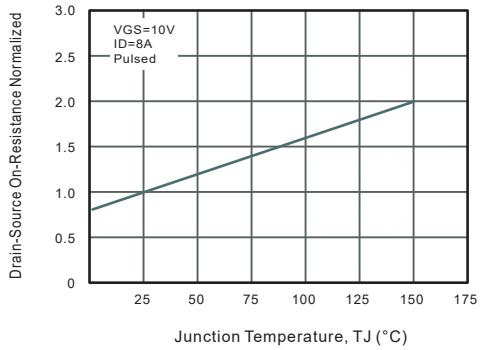


Fig.8 Breakdown Voltage vs. Junction Temperature

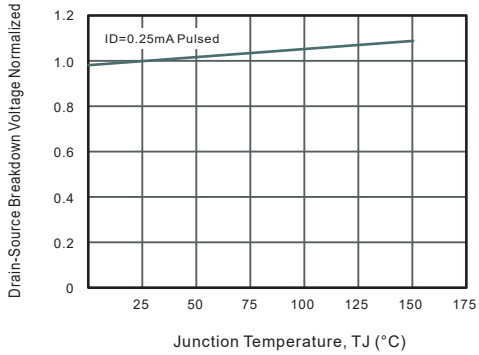


Fig.9 Capacitance Characteristics

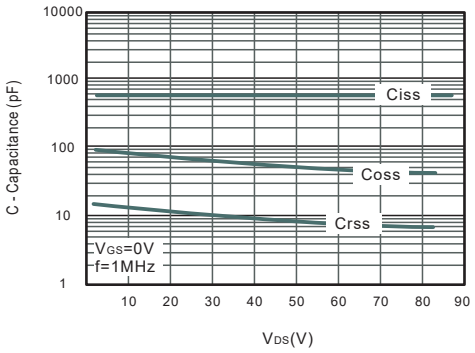


Fig.10 Gate Charge Characteristics

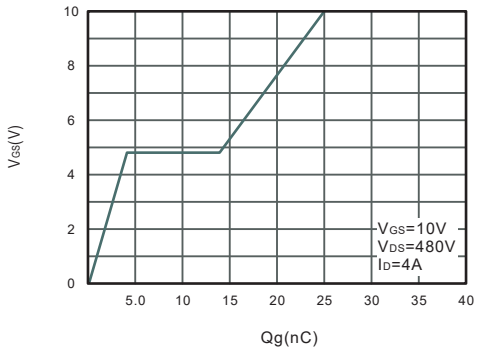


Fig.11 Safe Operating Area

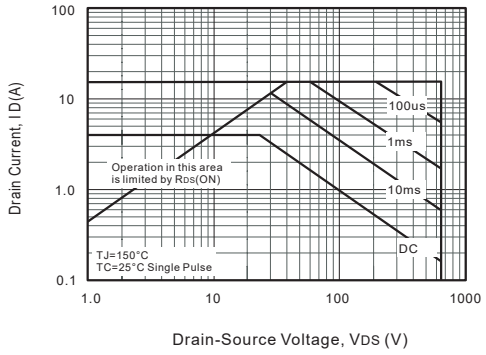
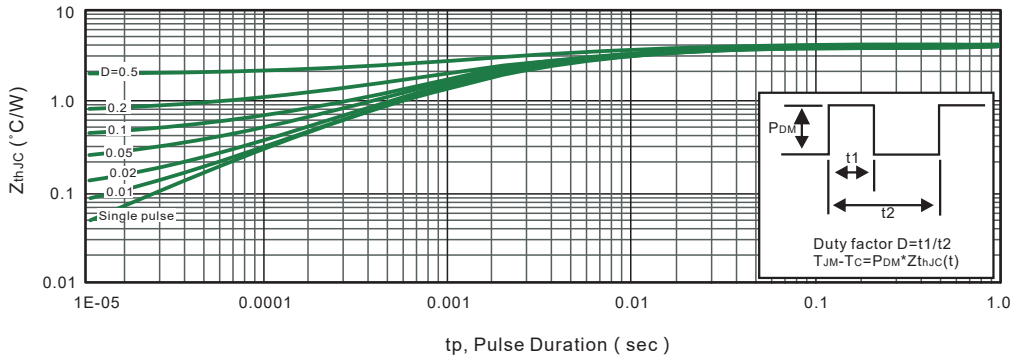


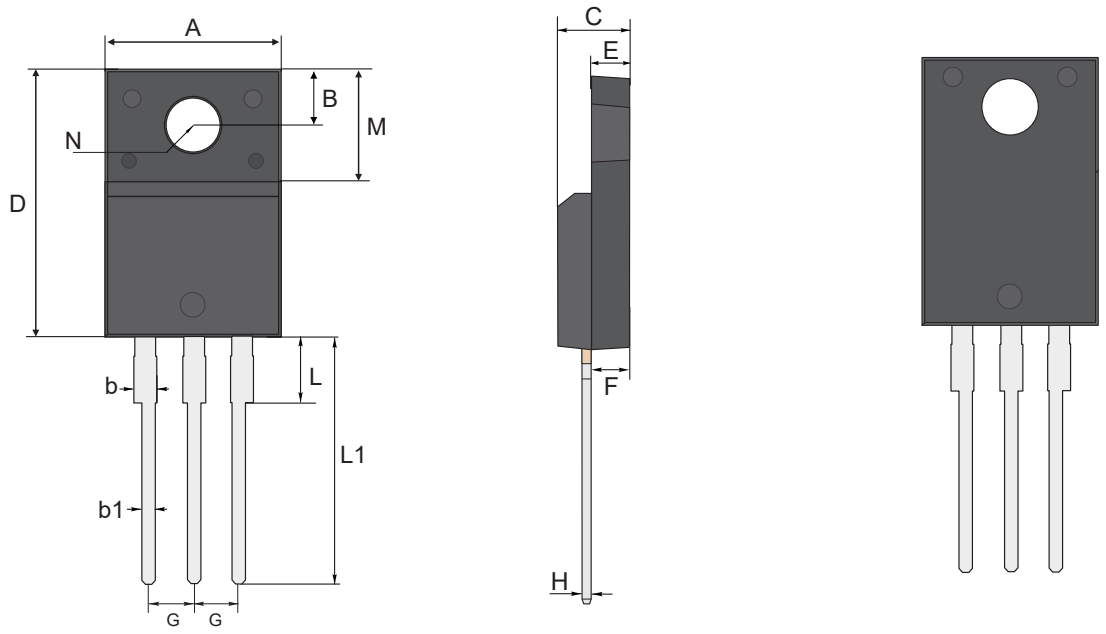
Fig.12 Max. Transient Thermal Impedance



Package Outline

TO-220F

Dimensions in mm



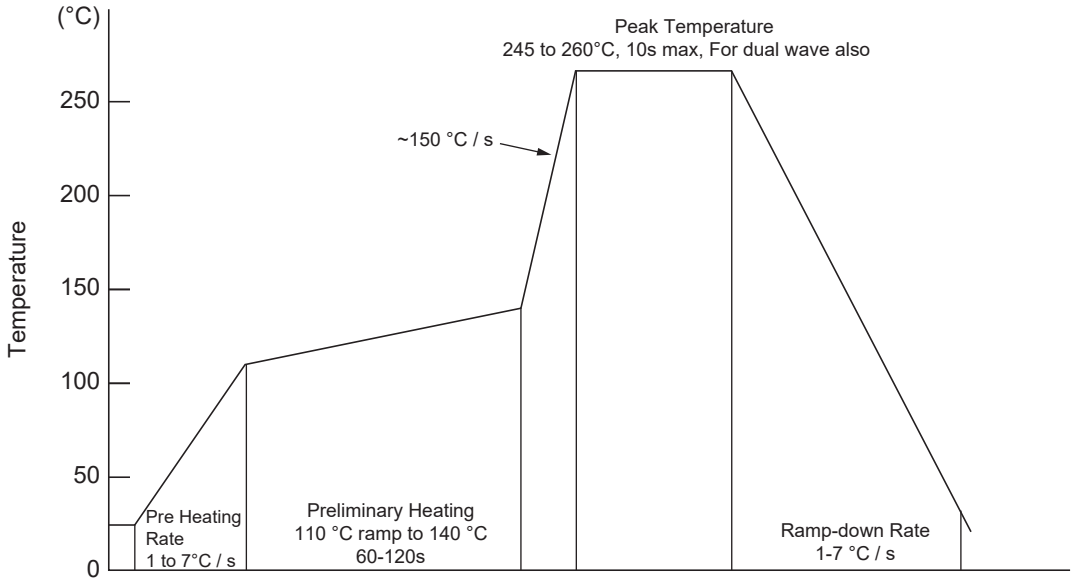
UNIT		A	B	b	b1	C	D	E	F	G	H	L	L1	M	N
mm	max	10.28	3.37	1.44	0.9	4.9	16.07	2.74	2.74	2.64	0.6	2.85	13.7	6.88	3.18 typ.
	typ	10.18	3.27	1.34	0.8	4.7	15.87	2.54	2.54	2.54	0.5	2.65	13.5	6.68	
	min	10.08	3.17	1.24	0.7	4.5	15.67	2.34	2.34	2.44	0.4	2.45	13.3	6.48	
mil	max	405	133	57	35	193	633	108	108	104	24	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
TN65H04NTF	TO-220F	50PCS/Tube

Conditions of Soldering and Storage

◆ Wave Soldering



◆ Conditions of hand soldering

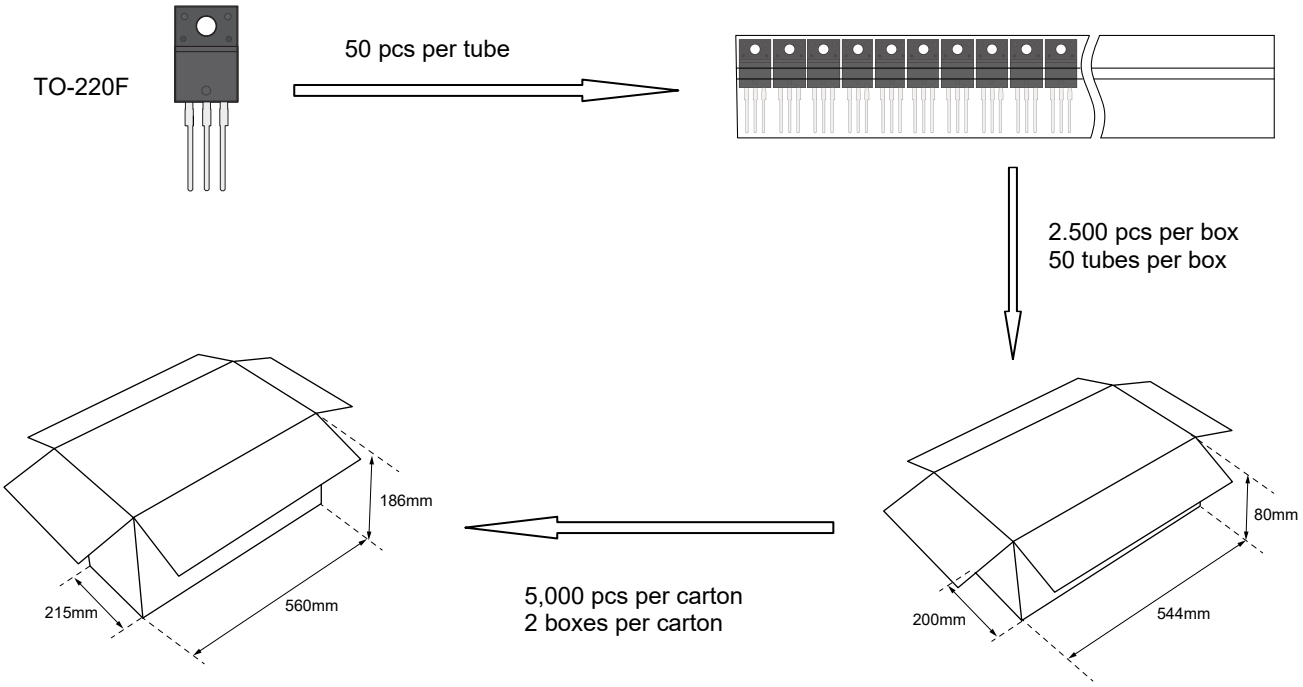
- Temperature: 360°C
- Time: 3s max.
- Times: one time

◆ Storage conditions

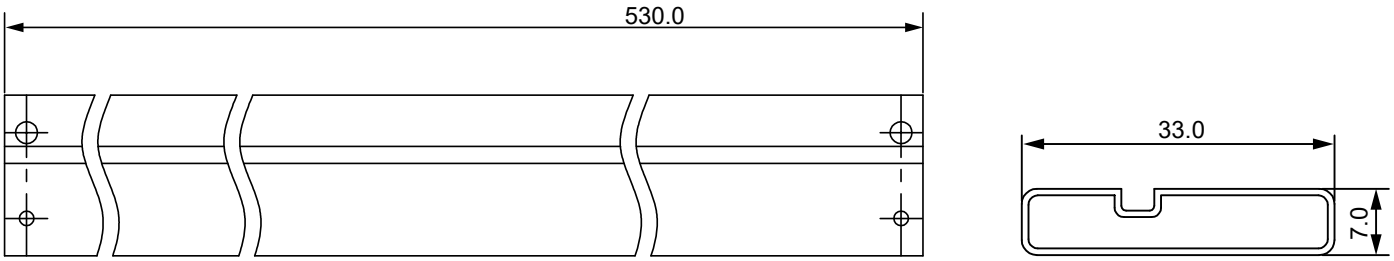
- **Temperature**
  5 to 40°C
- **Humidity**
  30 to 80% RH
- **Recommended period**
  One year after manufacturing

Package Specifications

- The method of packaging



- **Tube data**



Contact Information

TANI website: **http://www.tanisemi.com** Email:tani@tanisemi.com

For additional information, please contact your local Sales Representative.

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The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. TANI shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and TANI assumes no responsibility for the application of the product. TANI strives to provide accurate and up -to-date information to the best of our ability. However, due to technical, human, or other reasons, TANI cannot guarantee that the information provided in the product specification is entirely accurate and error-free. TANI shall not be held responsible for any losses or damages resulting from the use or reliance on any information in these product specifications.

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The design of the product is intended to meet civilian needs and is not guaranteed for use in harsh environments or precision equipment. It is not recommended for use in systems or equipment such as medical devices, aircraft, nuclear power, and similar systems, where failures in these systems or equipment could reasonably be expected to result in personal injury. TANI shall assume no responsibility for any consequences resulting from such usage.

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