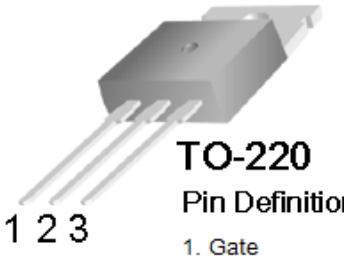
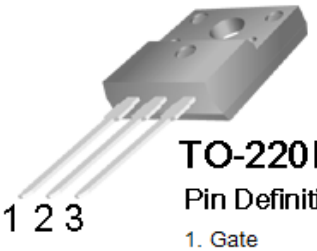
# WMF7N65AZ / WMX7N65AZ
# POWER MOSFET

Winsem Technology Corp.

## 650V N-Channel Power MOSFET




Pin Definition
1. Gate
2. Drain
3. Source



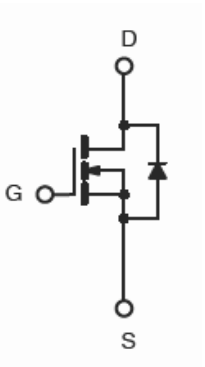

Pin Definition
1. Gate
2. Drain
3. Source

## Features

- High Voltage: $BV_{DSS}$=650V(Min.)
- $I_D$ : 6.5A
- Robust high voltage termination
- Avalanche energy specified
- Improved ESD performance

## Application

- Ballast Bridge
- Switch Mode Power Supplier
- Power Factor Correction
- Lighting




## Ordering Information

| Type NO | Marking | Package Code |
|---|---|---|
| WMF7N65AZ | 7N65AZ | TO-220F |
| WMX7N65AZ | 7N65AZ | TO-220 |

## Absolute maximum ratings ($T_C$=25°C unless otherwise noted)

| Characteristic | Symbol | 7N65X | 7N65F | Unit |
|---|---|---|---|---|
| Drain-source voltage | $V_{DSS}$ | 650 | | V |
| Gate-source voltage | $V_{GSS}$ | ±30 | | V |
| Continuous Drain Current | $I_D$ | 6.5 | 6.5 | A |
| Drain current (Pulsed) | $I_{DM}$ | 26 | 26 | A |
| Avalanche Current, Repetitive or Not-Repetitive (Pulse width limited by Tj max) | $I_{AR}$ | 6.5 | 6.5 | A |
| Single pulsed avalanche energy | $E_{AS}$ | 390 | 390 | mJ |
| Total Power Dissipation @Tc=25°C | $P_{DTOT}$ | 120 | 39 | W |
| Operating Junction and Storage temperature range | Tstg | -55~150 | | °C |

* Limited by maximum junction temperature

| Characteristic | | Symbol | WMF7N65AZ. | WMX7N65AZ | Unit |
|---|---|---|---|---|---|
| Thermal resistance | Junction-case | $R_{th}$ (J-C) | 3.2 | 1.04 | °C/W |
| | Junction-ambient | $R_{th}$ (J-A) | 62.5 | 62.5 | |



Version : A10

## Electrical Characteristics ($T_C$=25°C unless otherwise noted)

| Characteristic | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Drain-source breakdown voltage | $BV_{DSS}$ | $I_D$=250uA, $V_{GS}$=0 | 650 | - | - | V |
| Gate threshold voltage | $V_{GS(th)}$ | $I_D$=250uA, $V_{DS}$=$V_{GS}$ | 3.0 | - | 5.0 | V |
| Drain-source cut-off current | $I_{DSS}$ | $V_{DS}$=650V, $V_{GS}$=0V | - | - | 1 | uA |
| Gate leakage current | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$=±30V | - | - | ±100 | uA |
| Drain-source on-resistance ③ | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=3.25A | - | 1.2 | 1.4 | Ω |
| Forward transfer conductance ③ | $g_{fs}$ | $V_{DS}$=30V, $I_D$=3.25A | - | 10 | - | S |
| Input capacitance | Ciss | $V_{GS}$=0V, $V_{DS}$=25V, f=1MHz | - | 1072 | - | pF |
| Output capacitance | Coss | | - | 103 | - | |
| Reverse transfer capacitance | Crss | | - | 12 | - | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=325V, $I_D$=6.5A $R_G$=25Ω ②③ | - | 35 | - | ns |
| Rise time | $t_r$ | | - | 46 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 82 | - | |
| Fall time | $t_f$ | | - | 27 | - | |
| Total gate charge | $Q_g$ | $V_{DS}$=520V, $V_{GS}$=10V $I_D$=6.5A ②③ | - | 22 | - | nC |
| Gate-source charge | $Q_{gs}$ | | - | 5 | - | |
| Gate-drain charge | $Q_{gd}$ | | - | 10 | - | |

## Source-Drain Diode Ratings and Characteristics ($T_C$=25°C unless otherwise noted)

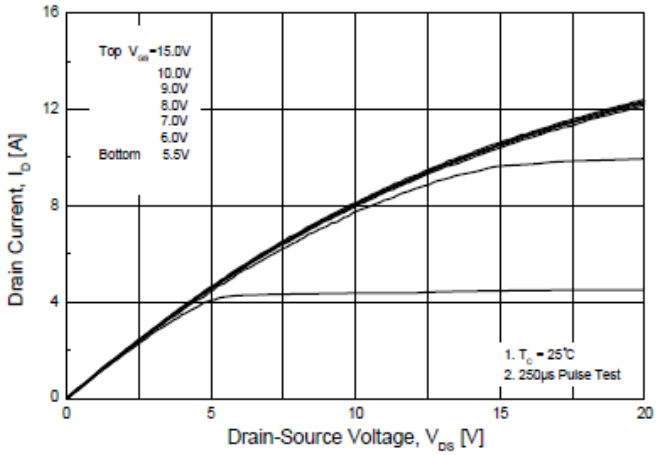
| Characteristic | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Source current (DC) | $I_S$ | - | - | - | 6.5 | A |
| Source current (Pulsed) ① | $I_{SM}$ | | - | - | 26 | |
| Forward voltage ③ | $V_{SD}$ | $V_{GS}$=0V, $I_S$=6.5A | - | - | 1.5 | V |
| Reverse recovery time | $t_{rr}$ | $I_S$=6.5A, $V_{GS}$=0V $dI_F/dt$=100A/us | - | 345 | - | ns |
| Reverse recovery charge | $Q_{rr}$ | | - | 2.6 | - | uC |

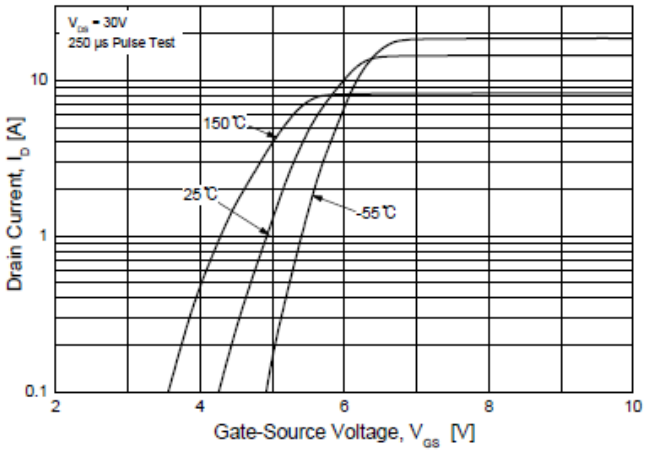
Note ;

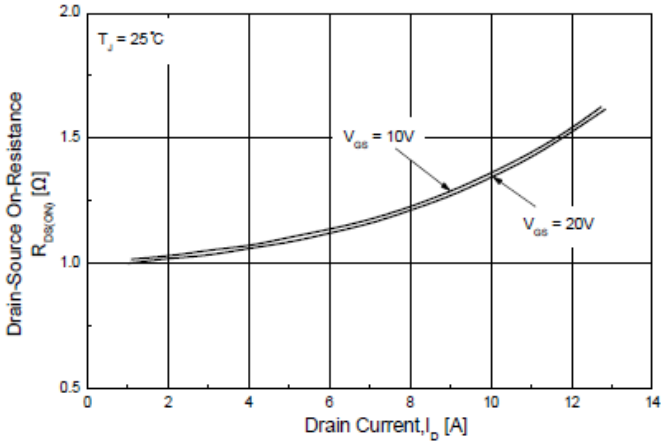
① Repetitive rating : Pulse width limited by maximum junction temperature

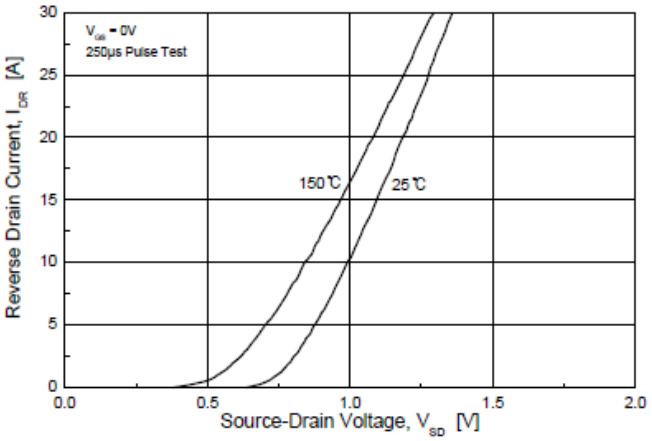
② Pulse Test : Pulse width≤300us, Duty cycle≤2%

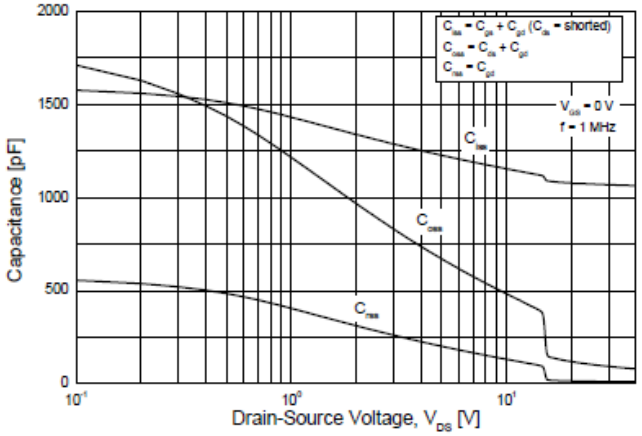
③ Essentially independent of operating temperature

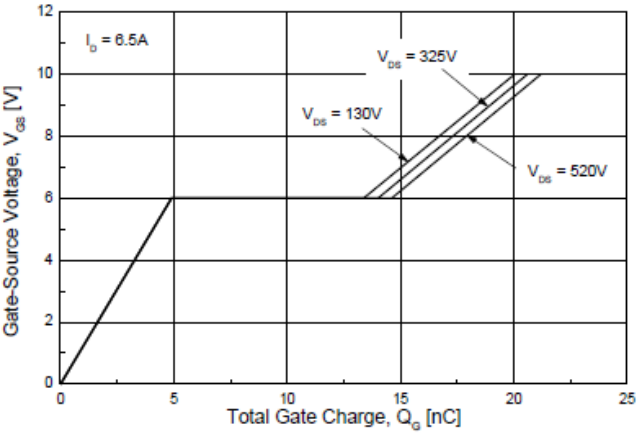

Top V_GS =15.0V
10.0V
9.0V
8.0V
7.0V
6.0V
Bottom 5.5V
1. T_C = 25℃
2. 250μs Pulse Test
Drain Current, I_D [A]
Drain-Source Voltage, V_DS [V]

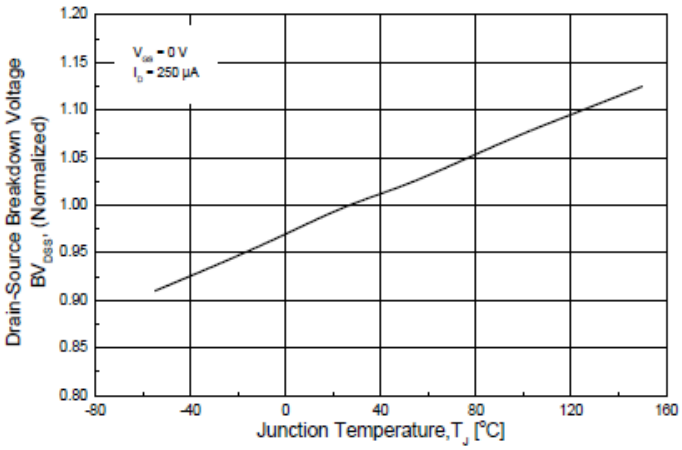

V_DS = 30V
250 μs Pulse Test
150℃
25℃
-55℃
Drain Current, I_D [A]
Gate-Source Voltage, V_GS [V]

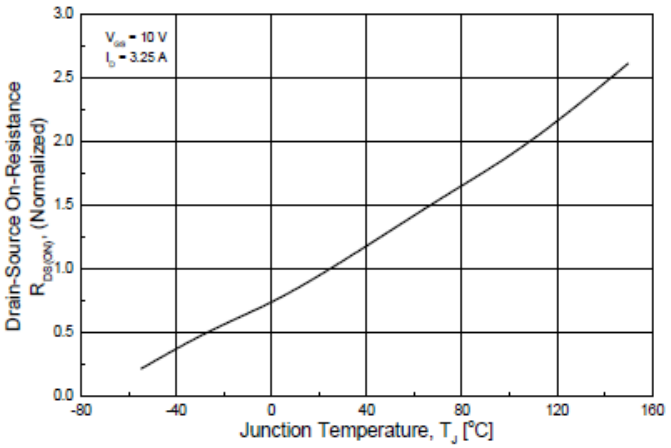

T_J = 25℃
V_GS = 10V
V_GS = 20V
Drain-Source On-Resistance R_DS(ON) [Ω]
Drain Current, I_D [A]

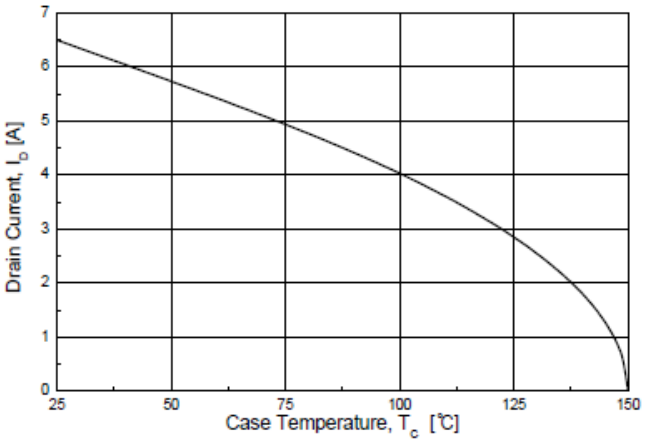

V_GS = 0V
250μs Pulse Test
150℃
25℃
Reverse Drain Current, I_DR [A]
Source-Drain Voltage, V_SD [V]

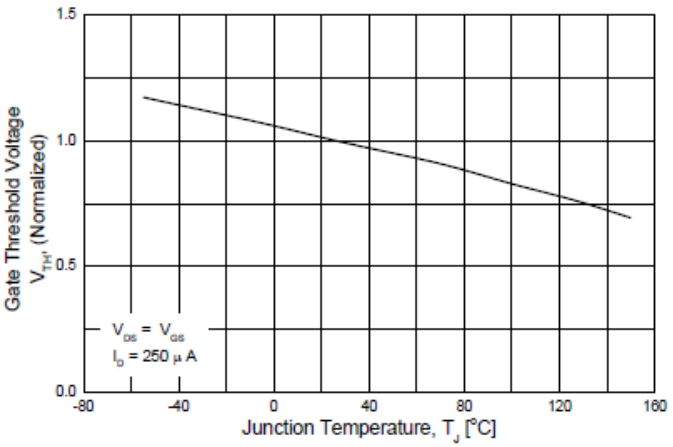

C_iss = C_gs + C_gd (C_ds = shorted)
C_oss = C_ds + C_gd
C_rss = C_gd
V_GS = 0 V
f = 1 MHz
C_iss
C_oss
C_rss
Capacitance [pF]
Drain-Source Voltage, V_DS [V]


I_D = 6.5A
V_DS = 325V
V_DS = 130V
V_DS = 520V
Gate-Source Voltage, V_GS [V]
Total Gate Charge, Q_G [nC]

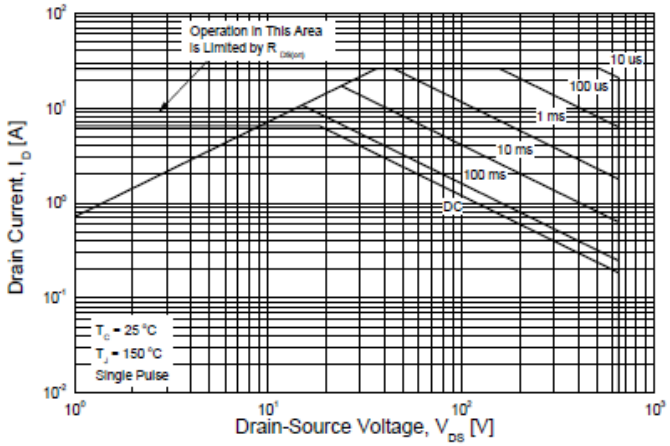


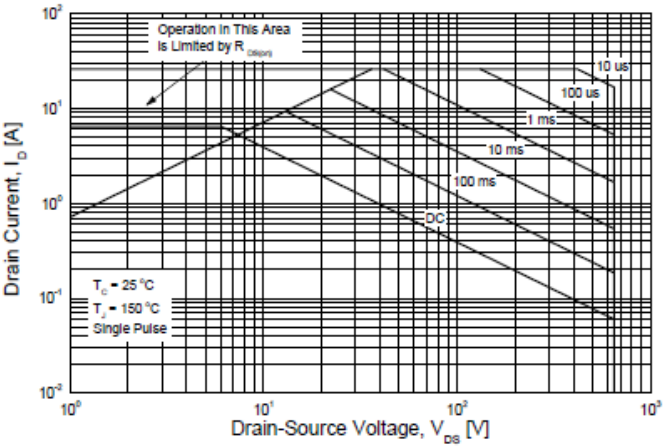



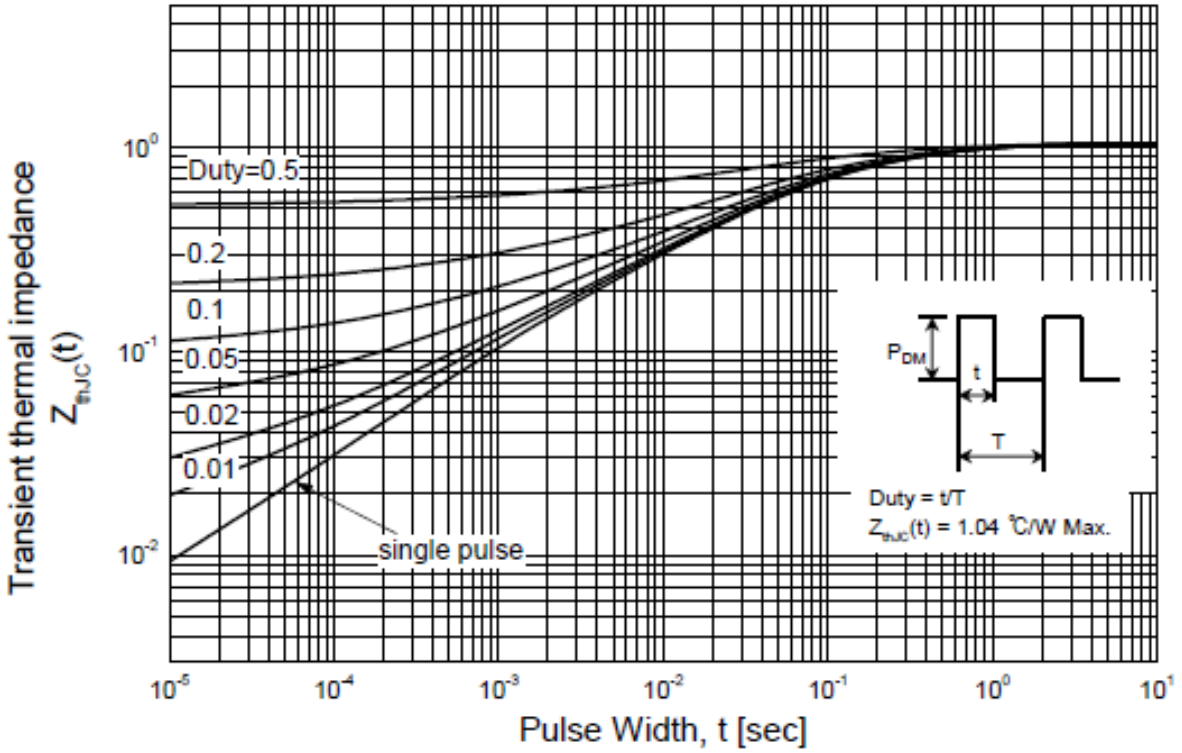

**WMX7N65AZ**



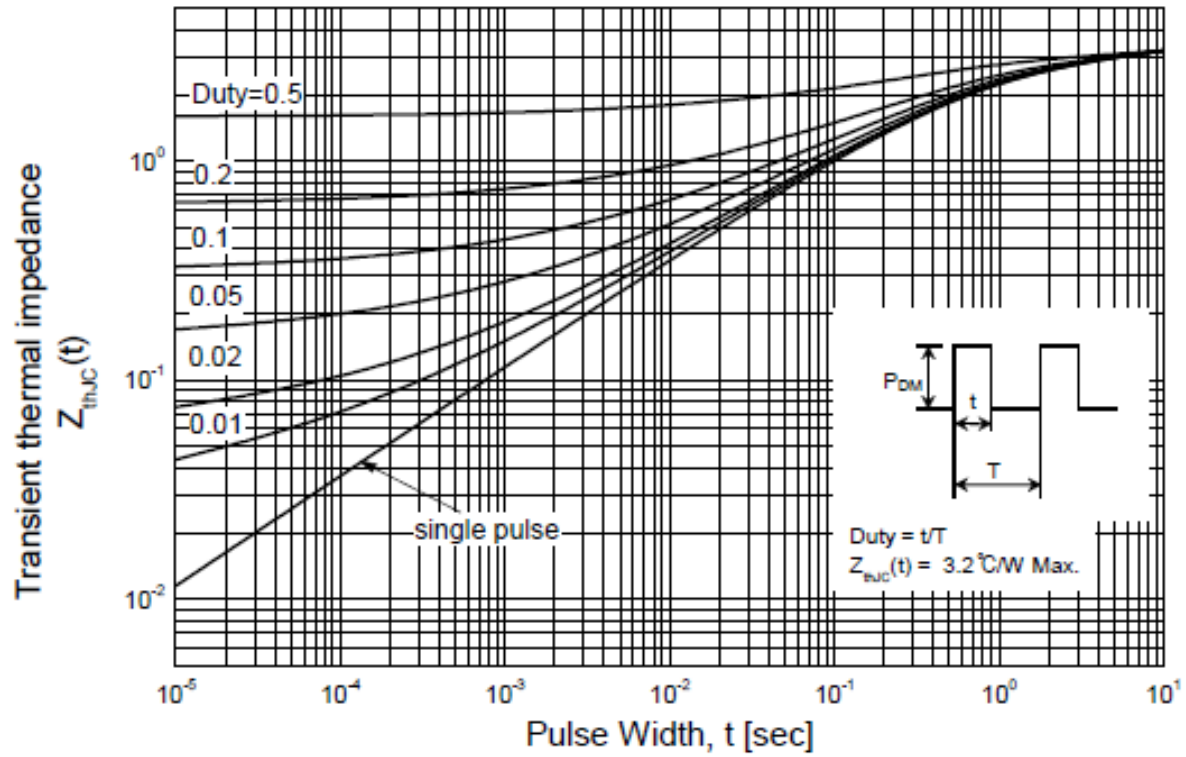

**WMF7N65AZ**



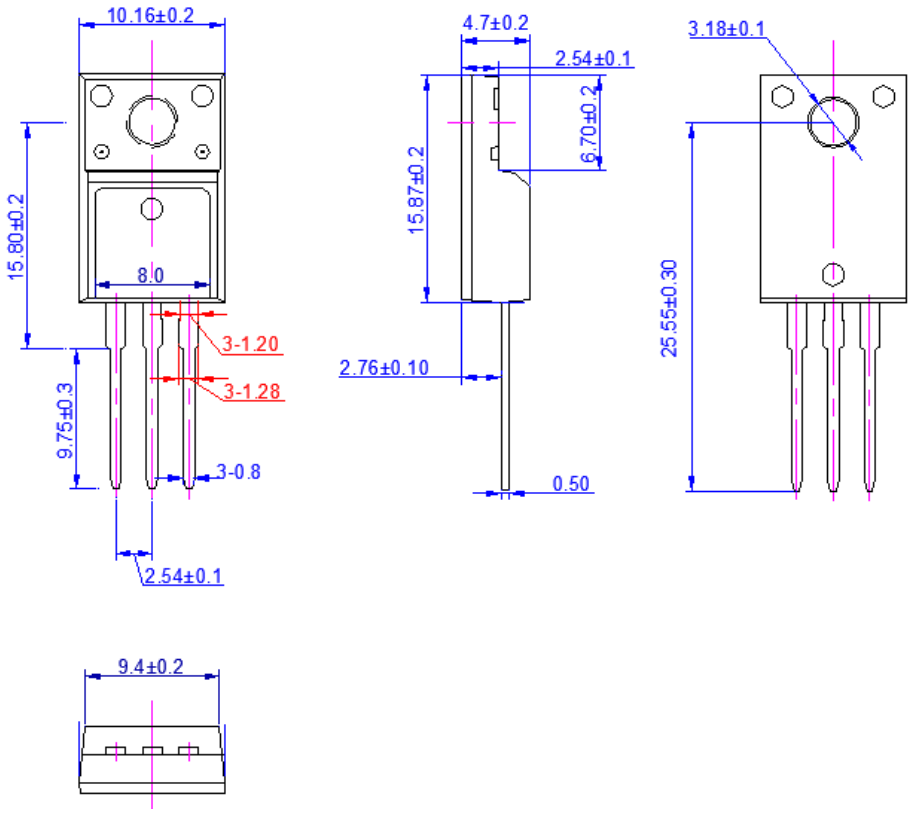
## WMX7N65AZ



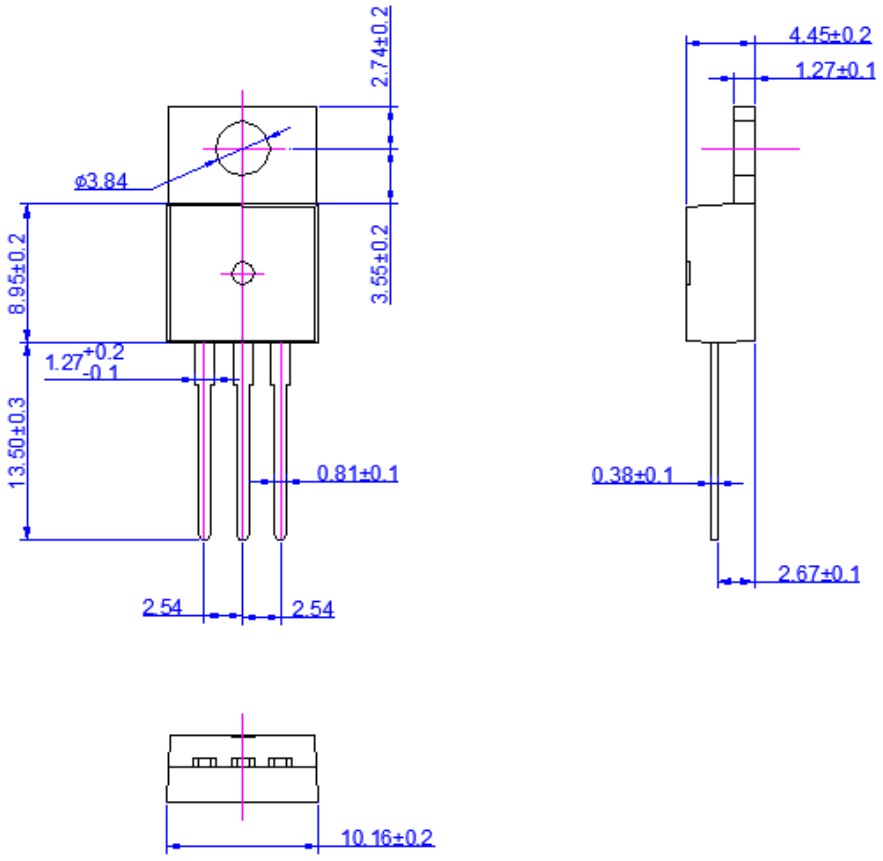

## WMF7N65AZ



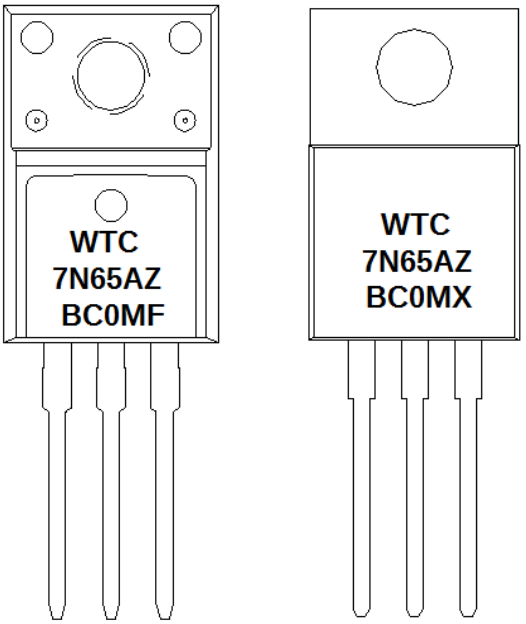
## Outline Dimension : TO-220F




## Outline Dimension : TO-220




**Unit : mm**




| | | | |
|---|---|---|---|
| First Line | WTC | Company Name | |
| Second Line | 7N65AZ<br>7N65AZ | Product Code | |
| Third Line | BC0MF<br>BC0MX | 1st ( Year Code ) | A-2010 B-2011 C-2012 … |
| | | 2nd ( Month Code ) | A-Jan B-Feb C-Mar D-Apr E-May F-Jun<br>G-Jul H-Aug I-Sep J-Oct K-Nov L-Dec |
| | | 3rd ( Lot Code ) | 0-1 , A-9 |
| | | 4th ( Product Code ) | M-MOS , T-Transsistor |
| | | 5th ( Package Code ) | D-TO-252 , I-TO-251 , F-TO220F |
| | | 6th ( Spec Code ) | ( Reserve ) |