WTC

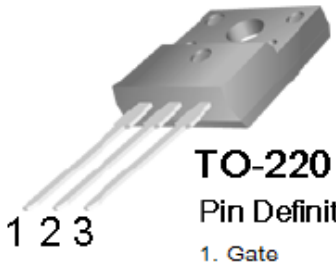
Winsem Technology Corp.

WMF4N65U
POWER MOSFET

650V N-Channel Power MOSFET

Features

- High Voltage: BV_{DSS}=650V(Min.)
- I_D : 4A
- Robust high voltage termination
- Avalanche energy specified
- Fast diode recovery time



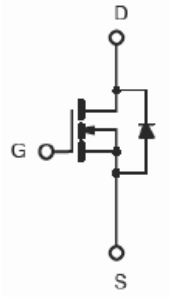
TO-220F

Pin Definition

1. Gate
2. Drain
3. Source

Application

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



Ordering Information

Type NO	Marking	Package Code
WMF4N65U	4N65FU	TO-220F

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

Characteristic	Symbol		Rating	Unit
Drain-source voltage	V_{DSS}		650	V
Gate-source voltage	V_{GSS}		±30	V
Drain current (DC) *	I_D	T_C=25℃	4.0	A
		T_C=100℃	2.53	A
Drain current (Pulsed) *	I_{DM}		16	A
Power dissipation	P_D		52	W
Single avalanche energy ②	E_{AS}		86.7	mJ
Repetitive avalanche current ①	I_{AR}		4.0	A
Repetitive avalanche energy ①	E_{AR}		5.2	mJ
Junction temperature	T_J		150	℃
Storage temperature range	T_{stg}		-55~150	℃

* Limited by maximum junction temperature

Characteristic		Symbol	Typ.	Max	Unit
Thermal resistance	Junction-case	$R_{th(J-C)}$	-	2.4	℃/W
	Junction-ambient	$R_{th(J-A)}$	-	83	

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=250 μA, V_{GS}=0V	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	I_D=250 μA, V_{GS}= V_{DS}	3.0	-	5.0	V
Drain-source cut-off current	I_{DSS}	V_{DS}=650V, V_{GS}=0V	-	-	1	μA
		V_{DS}=650V, T_c=150℃			100	μA
Gate leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±30V	-	-	±100	nA
Drain-source on-resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=2.0A	-	2.4	3.0	Ω
Forward transfer conductance ③	g_{fs}	V_{DS}=10V, I_D=2.0A	-	4.4	-	S
Input capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V f=1.0 MHz	-	725	-	pF
Output capacitance	C_{oss}		-	52	-	
Reverse transfer capacitance	C_{rss}		-	6	-	
Turn-on delay time ③④	$t_{d(on)}$	V_{DS}=325V, I_D=4.0A R_G=25Ω	-	48	-	ns
Rise time ③④	t_r		-	32	-	
Turn-off delay time ③④	$t_{d(off)}$		-	79	-	
Fall time ③④	t_f		-	25	-	
Total gate charge ③④	Q_g	V_{DS}=520V, V_{GS}=10V I_D=4.0A	-	12	16	nC
Gate-source charge ③④	Q_{gs}		-	5	-	
Gate-drain charge ③④	Q_{gd}		-	2.5	-	

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	Integral reverse diode in the MOSFET	-	-	4.0	A
Source current (Pulsed)	I_{SM}		-	-	16.0	
Forward voltage	V_{SD}	V_{GS}=0V, I_{SD}=4.0A	-	-	1.4	V
Reverse recovery time ③④	t_{rr}	I_{SD}=4.0A, V_{GS}=0V dI$_F$/dt=100A/μs	-	498	-	ns
Reverse recovery charge ③④	Q_{rr}		-	0.98	-	μC

Note ;

1. Repeated rating: Pulse width limited by safe operating area
2. L=10mH, I_{AS}=4A, V_{DD}=50V, R_G=25 , Starting T_J=25℃
3. Pulse test: Pulse width≤300us, Duty cycle≤2%
4. Essentially independent of operating temperature typical characteristics

Electrical Characteristic Curves

Fig. 1 Typical Output Characteristics

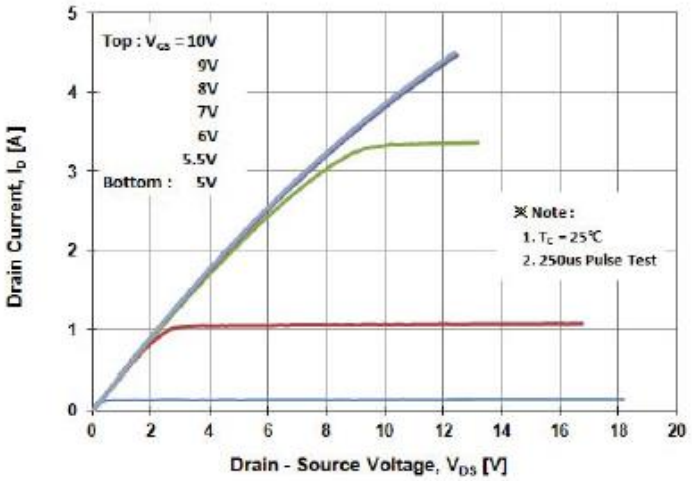


Fig. 2 Typical Output Characteristics

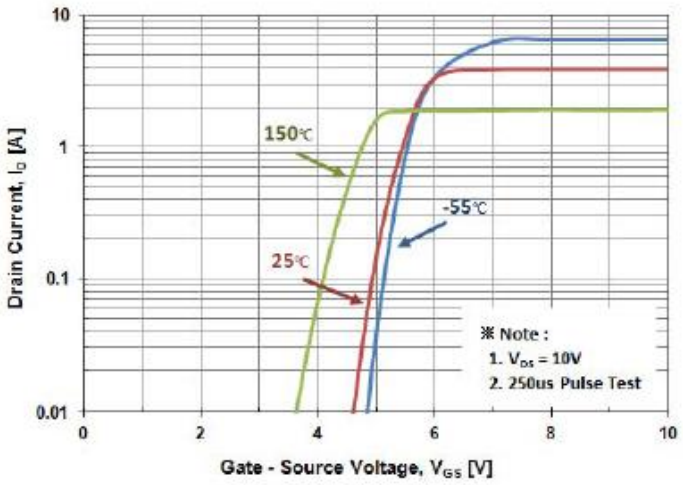


Fig. 3 On-Resistance Variation with Drain Current and Gate Voltage

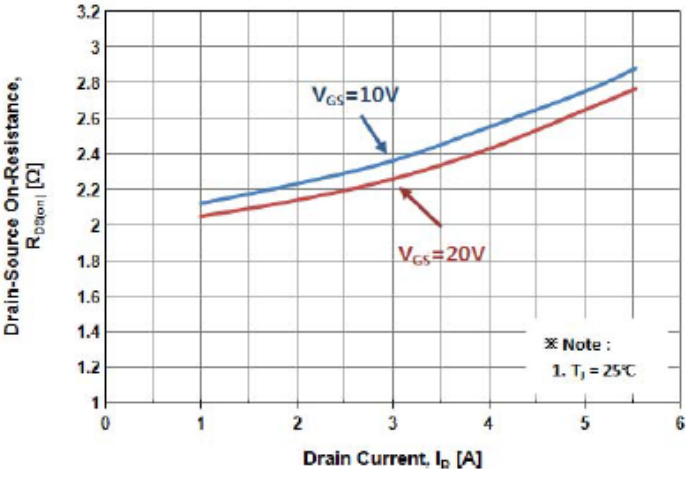


Fig. 4 Body Diode Forward Voltage Variation with Source Current

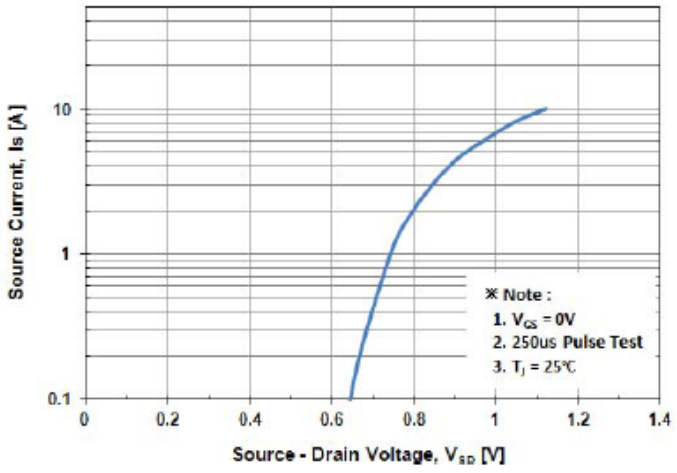


Fig. 5 Typical Capacitance Characteristics

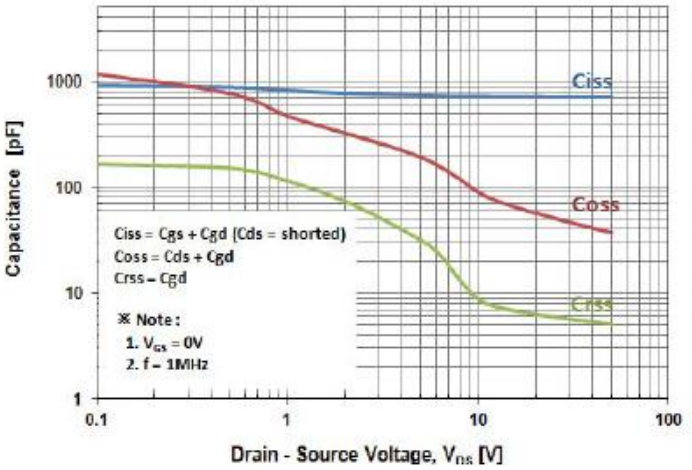
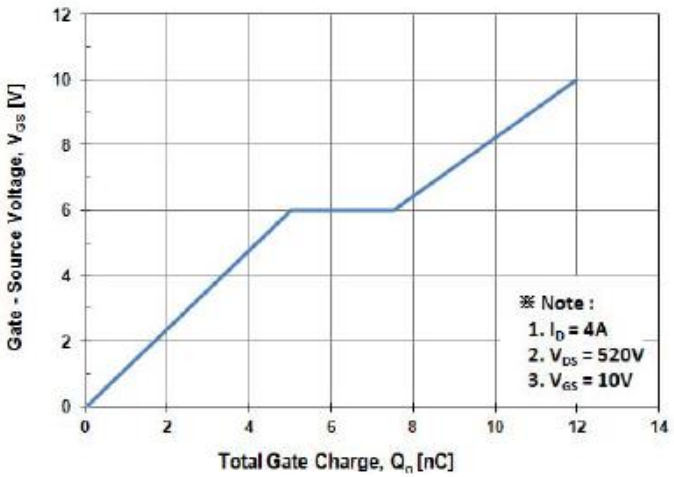


Fig. 6 Typical Total Gate Charge Characteristics



Electrical Characteristic Curves

Fig. 7 Breakdown Voltage Variation vs. Temperature

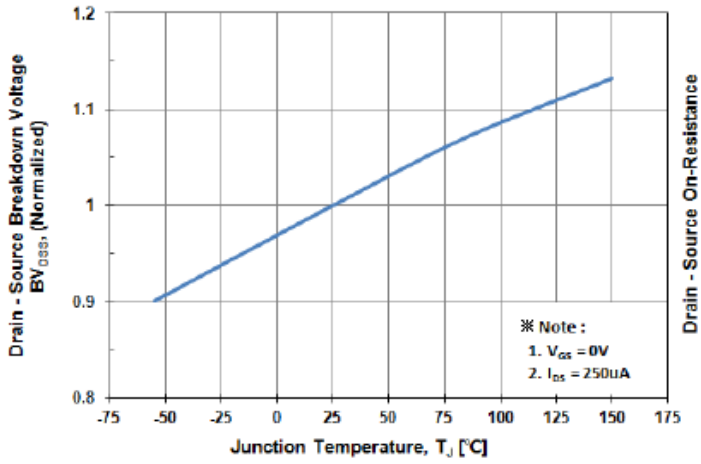


Fig. 8 On-Resistance Variation vs. Temperature

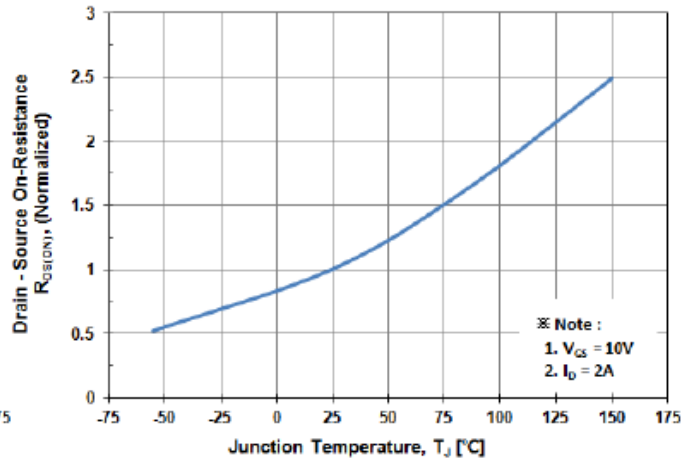


Fig. 9 Maximum Drain Current vs. Case Temperature

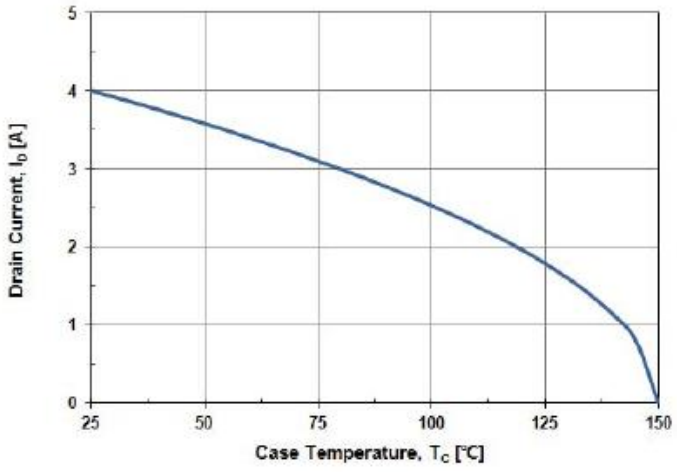


Fig. 10 Maximum Safe Operating Area

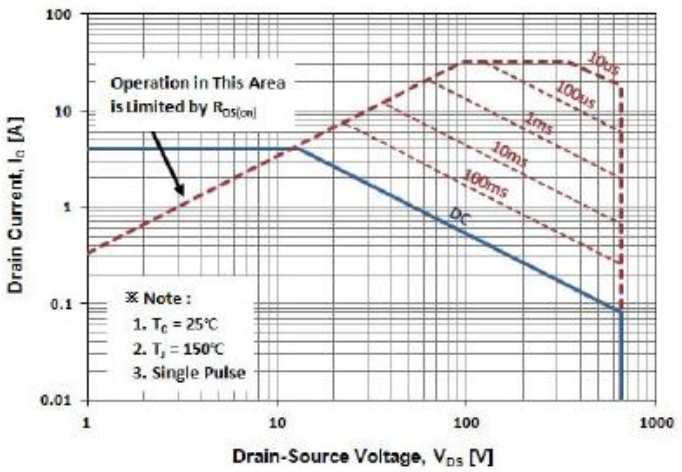
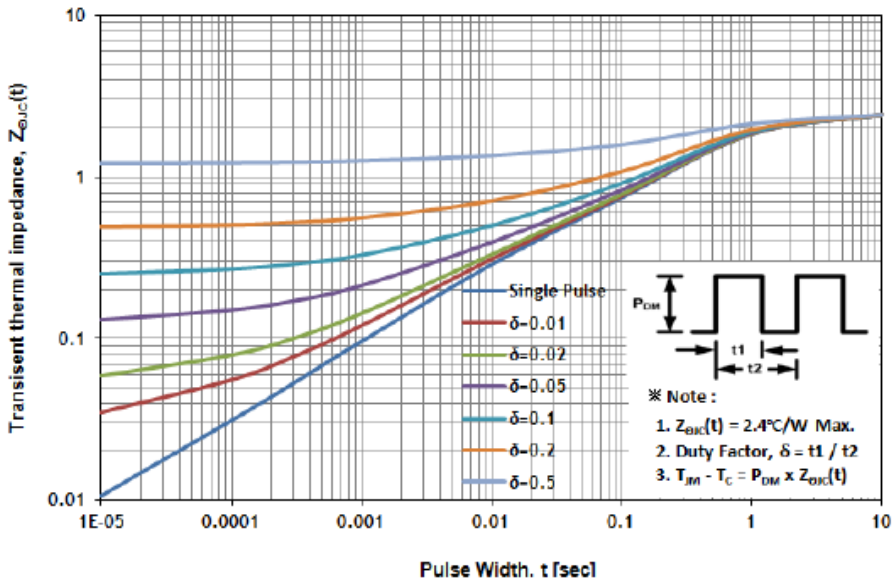
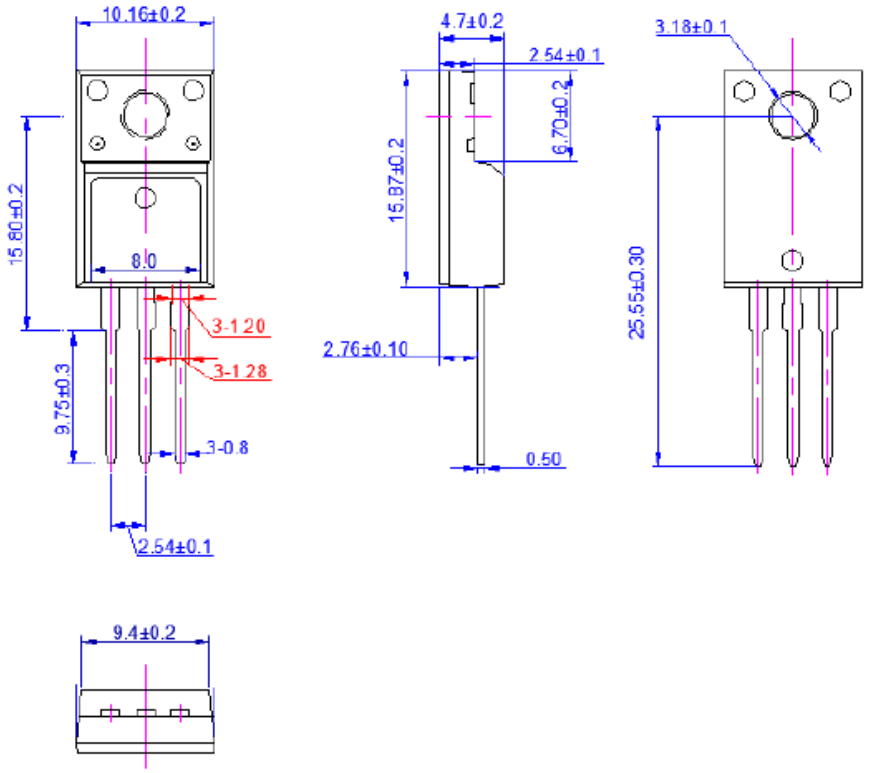


Fig. 11 Transient Thermal Impedance

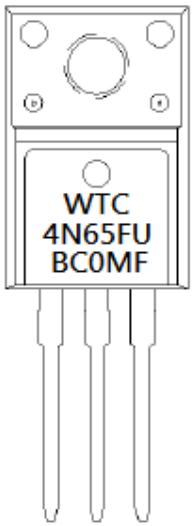


Outline Dimension : TO-220F



Unit : mm

Marking Diagram



First Line	WTC	Company Name	
Second Line	4N65FU	Product Code	
Third Line	BC0MF	1st (Year Code)	A-2010 B-2011 C-2012 …
		2nd (Month Code)	A-Jan B-Feb C-Mar D-Apr E-May F-Jun 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)	X-TO-220, F-TO-220F
		6th (Spec Code)	(Reserve)