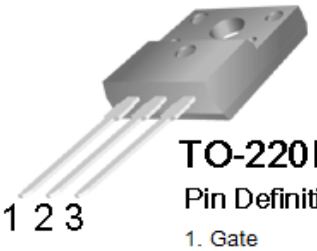
800V N-Channel Power MOSFET

Features

- High Voltage: BV_{DSS}=800V(Min.)
- I_D : 7A
- Robust high voltage termination
- Avalanche energy specified
- Improved dv/dt capability
- Low gate charge



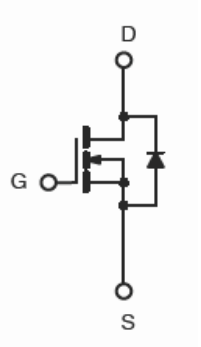
TO-220F

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
WMF7N80	7N80F	TO-220F

Absolute Maximum Ratings (Tc=25°C)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	800	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current	T_C = 25 ℃	I_D	7	A
	T_C = 100 ℃		4	A
Pulsed Drain Current (Note 1)		I_{DM}	28	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	227	mJ
Repetitive Avalanche Current (Note 1)		I_{AR}	7	A
Repetitive Avalanche Energy (Note 1)		E_{AR}	15.6	mJ
Power Dissipation	T_C = 25 ℃	P_D	50	W
	Derate above 25 ℃		0.4	W/℃
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.5	V/ns
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55~150	℃
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		T_L	300	℃

* Limited by maximum junction temperature

Parameter	Symbol	Rating	Unit
Maximum Thermal resistance, Junction-to-Case	$R_{\theta JC}$	2.5	℃/W
Maximum Thermal resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	℃/W

* Note: Surface mounted on FR4 board t ≦ 10sec

Electrical Characteristics

(Tc=25°C)

Parameter	Symbol	Test condition	Min	Typ	Max	Units
OFF						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250 µA	800	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 800 V, V_{GS} = 0 V	--	--	10	µA
		V_{DS} = 640 V, T_C = 125°C	--	--	100	µA
Forward Gate-Source Leakage Current	I_{GSSF}	V_{GS} = 30 V, V_{DS} = 0 V	--	--	100	nA
Reverse Gate-Source Leakage Current	I_{GSSR}	V_{GS} = -30 V, V_{DS} = 0 V	--	--	-100	nA
ON						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	2	--	4	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 3.5 A	--	1.59	1.9	Ω
Forward Transconductance (Note 4)	g_{FS}	V_{DS} = 30 V, I_D = 3.5 A	--	8	--	S
DYNAMIC						
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	1410	--	pF
Output Capacitance	C_{oss}		--	120	--	pF
Reverse Transfer Capacitance	C_{rss}		--	20	--	pF
SWITCHING						
Turn-On Delay Time (Note 4,5)	$t_{d(on)}$	V_{DD} = 400 V, I_D = 7 A, R_G = 25 Ω	--	26	--	ns
Turn-On Rise Time (Note 4,5)	t_r		--	49	--	ns
Turn-Off Delay Time (Note 4,5)	$t_{d(off)}$		--	135	--	ns
Turn-Off Fall Time (Note 4,5)	t_f		--	60	--	ns
Total Gate Charge (Note 4,5)	Q_g	V_{DS} = 640V, I_D = 7 A, V_{GS} = 10 V	--	38	--	nC
Gate-Source Charge (Note 4,5)	Q_{gs}		--	5.6	--	nC
Gate-Drain Charge (Note 4,5)	Q_{gd}		--	17	--	nC
SOURCE DRAIN DIODE						
Maximum Continuous Drain-Source Diode Forward Current	I_S	---	--	--	7	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}	---	--	--	28	A
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 7 A	--	--	1.5	V
Reverse Recovery Time (Note 4)	t_{rr}	V_{GS} = 0 V, I_S = 7 A, dI_F / dt = 100 A/µs	--	540	--	ns
Reverse Recovery Charge (Note 4)	Q_{rr}		--	4.1	--	µC

Note :

1. Repeated rating : Pulse width limited by safe operating area
2. L= 8.7mH, I_{AS} = 7A, V_{DD} = 50V, R_G = 25Ω, Starting T_J= 25 ℃, not subject to production test-verified by design / chatacterization.
3. I_{SD} ≤ 8A, di/dt ≤ 200A/µs , V_{DD} ≤ BV_{DS}, Starting T_J= 25 ℃
4. Pulse Test :Pulse width ≤ 300µs, Duty Cycle ≤ 2%
5. Essentially Independent of Operating Temperature Typical Characteristics

Electrical Characteristic Curves

Fig. 1 Output Characteristics

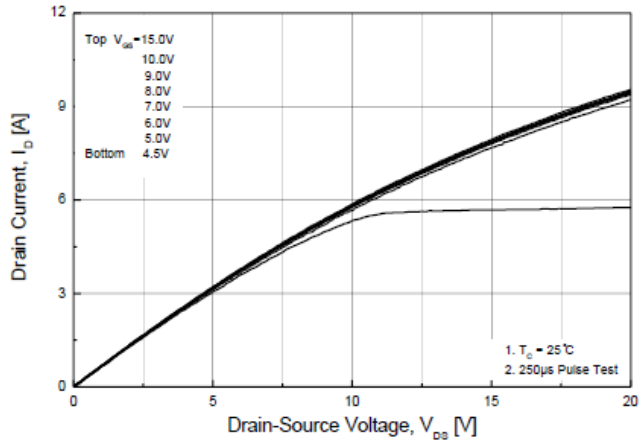


Fig. 2 Transfer Characteristics

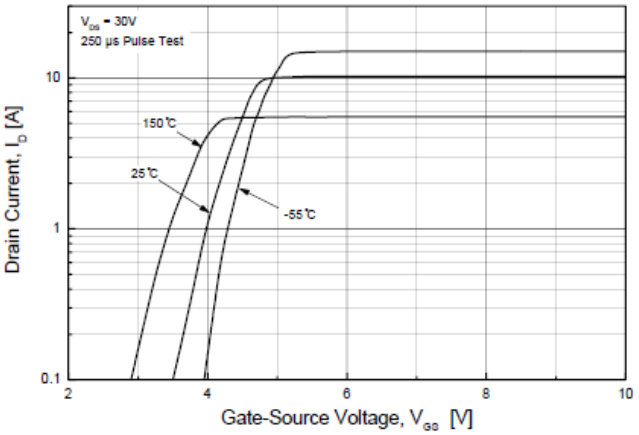


Fig. 3 On-Resistance vs.
Drain Current and Gate voltage

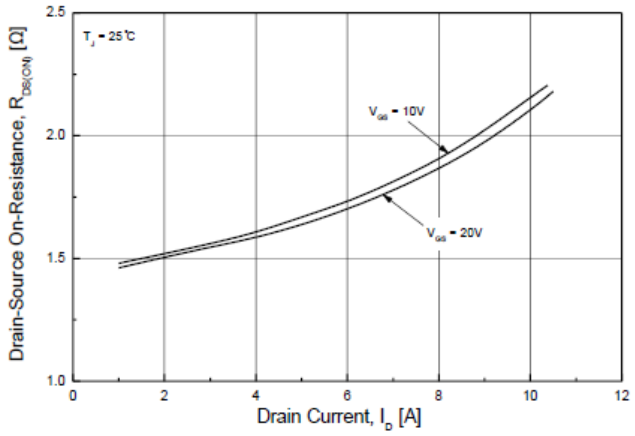


Fig. 4 Body Diode Forward Voltage vs.
Source Current and Temperature

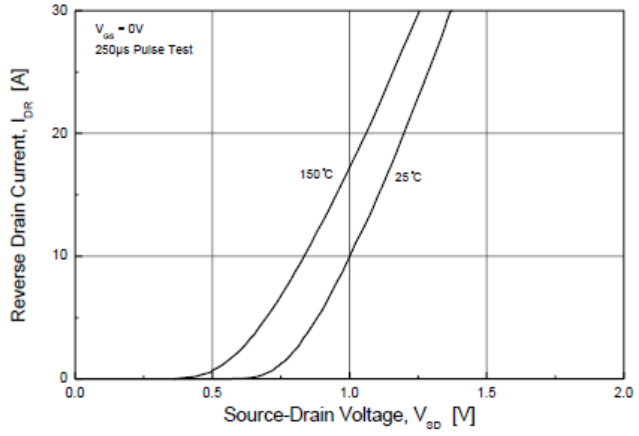


Fig. 5 Capacitance Characteristics

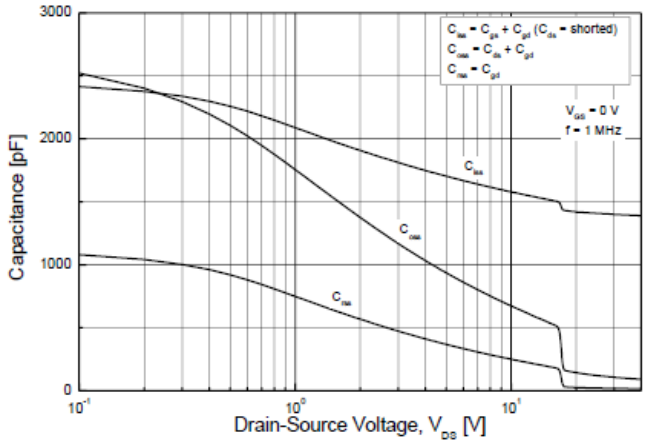


Fig. 6 Gate Charge Characteristics

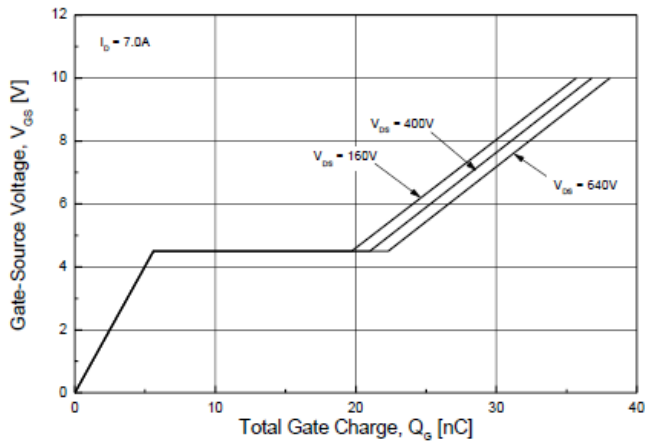


Fig. 7 Breakdown Voltage vs. Temperature

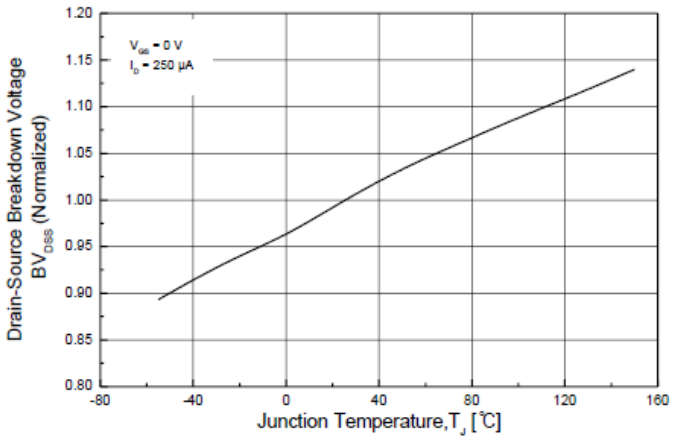


Fig. 8 On-Resistance vs. Temperature

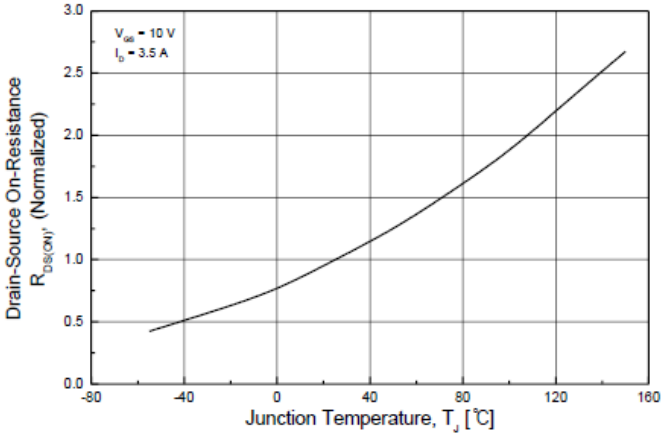


Fig. 9 Maximum Drain Current vs. Case Temperature

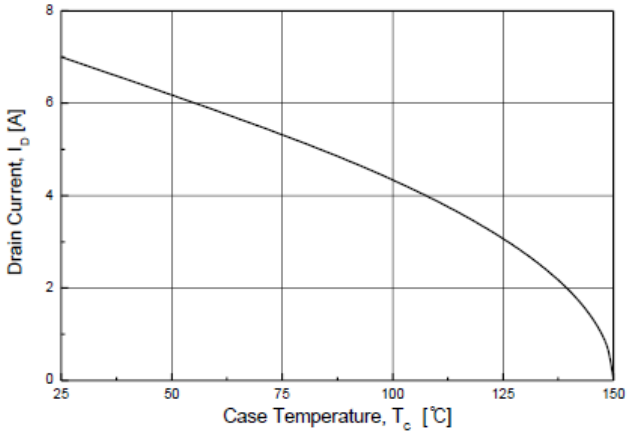


Fig. 10 Gate Threshold Voltage vs. Junction Temperature

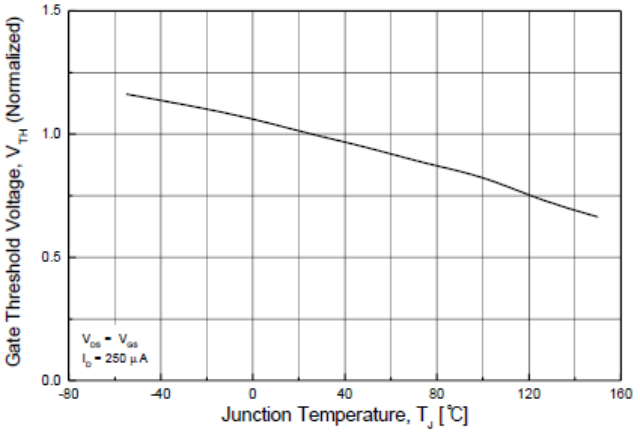


Fig. 11 Maximum Safe Operating Area

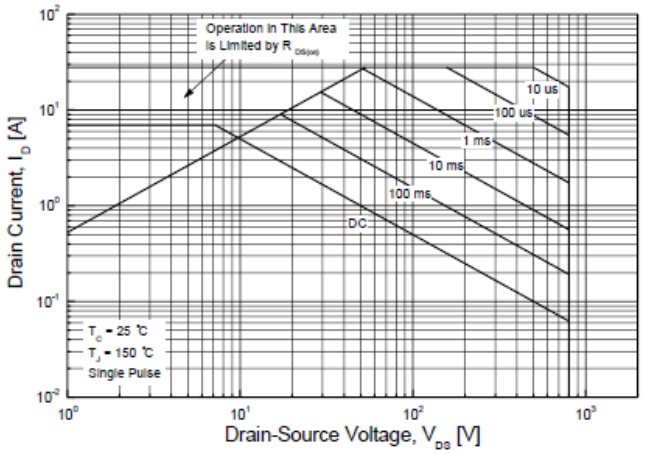
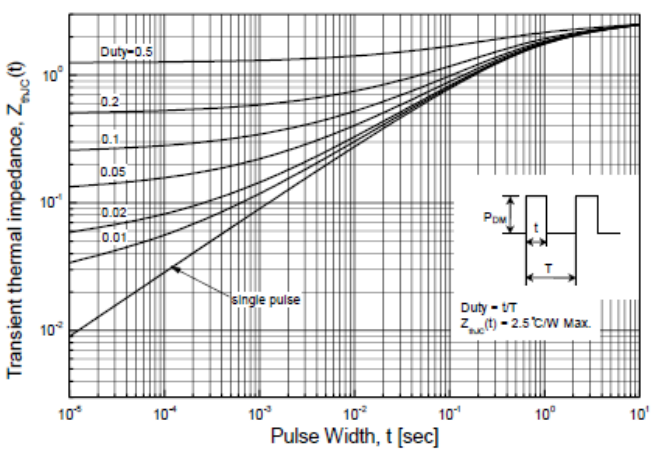


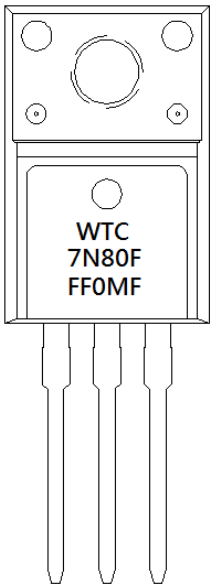
Fig. 12 Transient Thermal Response Curve



Ordering Information

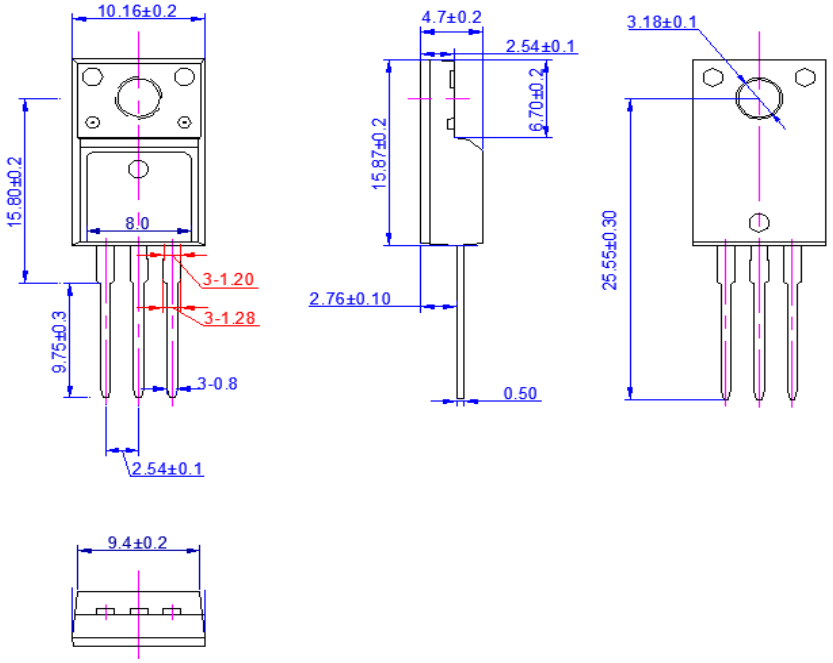
Type NO	Marking Package	Code
WMF7N80	7N80F	TO-220F

Marking Diagram



First Line	WTC	Company Name	
Second Line	7N80F	Product Code	
Third Line	F F 0 M F	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)	D-TO-252, I-TO-251, X-TO-220, F-TO-220F
		6th (Spec Code)	(Reserve)

TO-220F Package Dimension



Unit : mm