

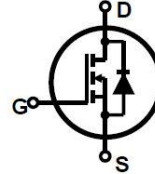
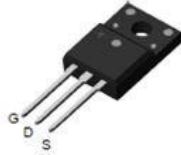
N-channel MOSFET

Features

- Low gate charge
- Improved dv/dt capability
- RoHS compliant
- JEDEC Qualification

BV_{DSS}	I_D	$R_{DS(on)}$
800V	7A	<1.9 Ω

Top view TO-220F



Ordering Part Number	Package	Marking	Remark
TMPF7N80A	TO-220F	TMPF7N80A	RoHS

Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V _{DSS}	800	V
Gate-Source Voltage		V _{GS}	±30	V
Continuous Drain Current	T _C = 25 °C	I _D	7	A
	T _C = 100 °C		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 °C	P _D	50	W
	Derate above 25 °C		0.4	W/°C
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	°C
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		T _L	300	°C

* Limited only by maximum junction temperature

Thermal Characteristics

Parameter	Symbol	Value	Unit
Maximum Thermal resistance, Junction-to-Case	$R_{\theta JC}$	2.5	$^{\circ}\text{C/W}$
Maximum Thermal resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	$^{\circ}\text{C/W}$

Electrical Characteristics : $T_C=25^{\circ}\text{C}$, unless otherwise noted

Parameter	Symbol	Test condition	Min	Typ	Max	Unit
OFF						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	800	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 800\text{ V}, V_{GS} = 0\text{ V}$	--	--	10	μA
		$V_{DS} = 640\text{ V}, T_C = 125^{\circ}\text{C}$	--	--	100	μA
Forward Gate-Source Leakage Current	I_{GSSF}	$V_{GS} = 30\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
Reverse Gate-Source Leakage Current	I_{GSSR}	$V_{GS} = -30\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

ON						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2	--	4	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 3.5\text{ A}$	--	1.59	1.9	Ω
Forward Transconductance (Note 4)	g_{FS}	$V_{DS} = 30\text{ V}, I_D = 3.5\text{ A}$	--	8	--	S

DYNAMIC						
Input Capacitance	C_{iss}	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	1410	--	pF
Output Capacitance	C_{oss}		--	120	--	pF
Reverse Transfer Capacitance	C_{rss}		--	20	--	pF

SWITCHING						
Turn-On Delay Time (Note 4,5)	$t_{d(on)}$	$V_{DD} = 400\text{ V}, I_D = 7\text{ A},$ $R_G = 25\text{ }\Omega$	--	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	$V_{DS} = 640\text{ V}, I_D = 7\text{ A},$ $V_{GS} = 10\text{ V}$	--	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}	$V_{GS} = 0\text{ V}, I_S = 7\text{ A}$	--	--	1.5	V
Reverse Recovery Time (Note 4)	t_{rr}	$V_{GS} = 0\text{ V}, I_S = 7\text{ A}$ $di_F / dt = 100\text{ A}/\mu\text{s}$	--	540	--	ns
Reverse Recovery Charge (Note 4)	Q_{rr}		--	4.1	--	μC

Note :

1. Repeated rating : Pulse width limited by safe operating area
2. $L=8.7\text{mH}, I_{AS} = 7\text{ A}, V_{DD} = 50\text{ V}, R_G = 25\text{ }\Omega$, Starting $T_j = 25^{\circ}\text{C}$, not subject to production test – verified by design/characterization
3. $I_{SD} \leq 7\text{ A}, di/dt \leq 200\text{ A}/\mu\text{s}, V_{DD} \leq BV_{DS}$, Starting $T_j = 25^{\circ}\text{C}$
4. Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
5. Essentially Independent of Operating Temperature Typical Characteristics

Fig. 1 Output Characteristics

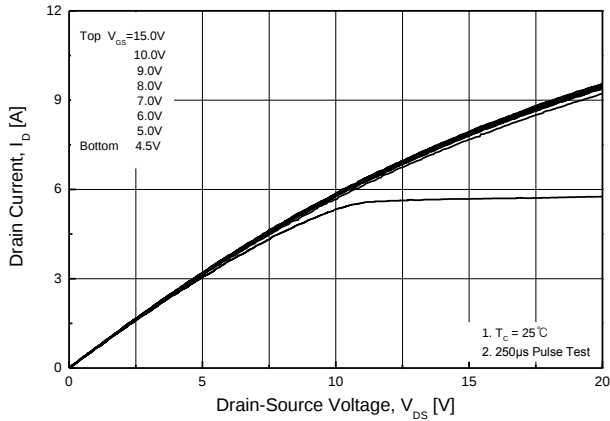


Fig. 2 Transfer Characteristics

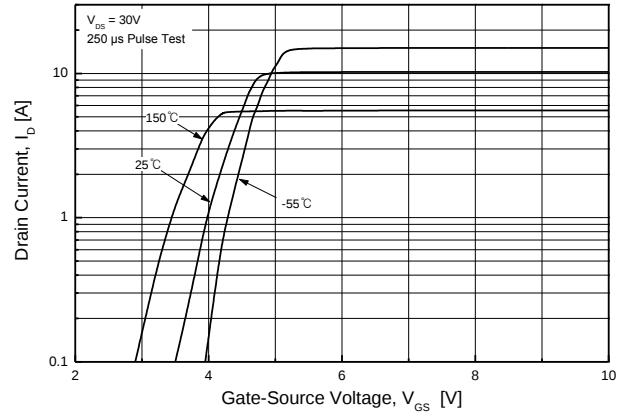


Fig. 3 On-Resistance vs. Drain Current and Gate voltage

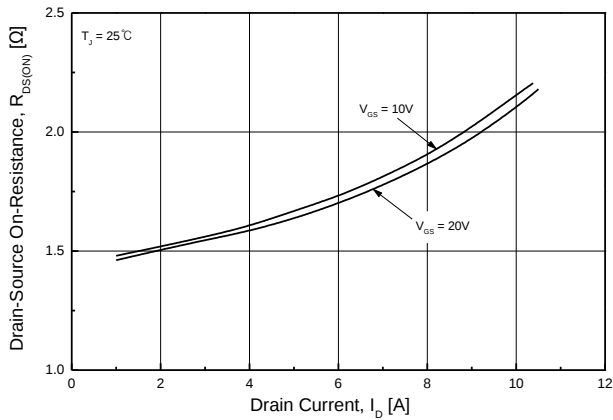


Fig. 4 Body Diode Forward Voltage vs. Source Current and Temperature

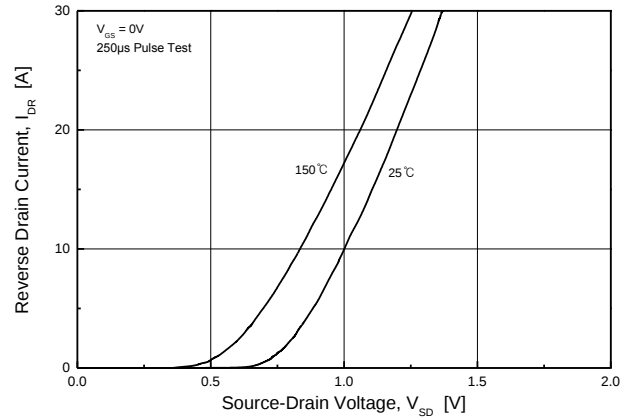


Fig. 5 Capacitance Characteristics

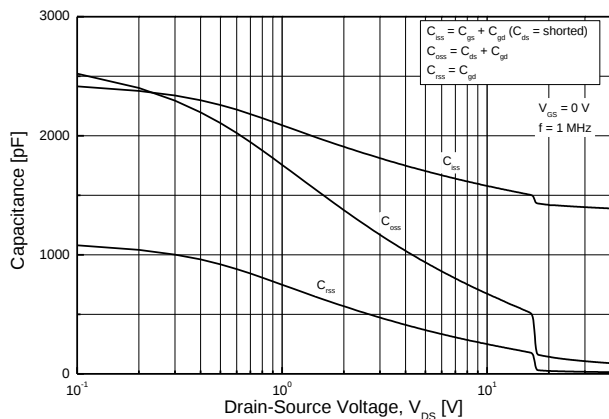


Fig. 6 Gate Charge Characteristics

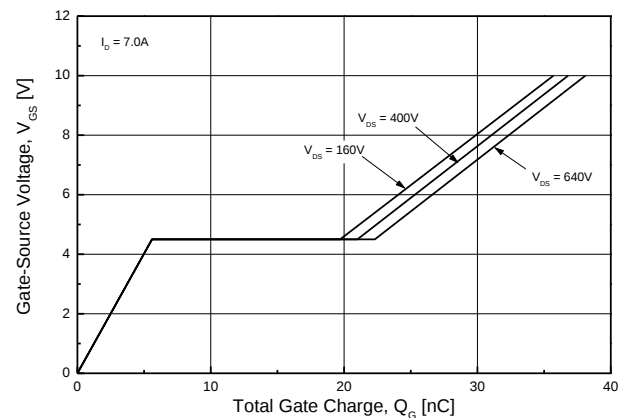


Fig. 7 Breakdown Voltage vs. Temperature

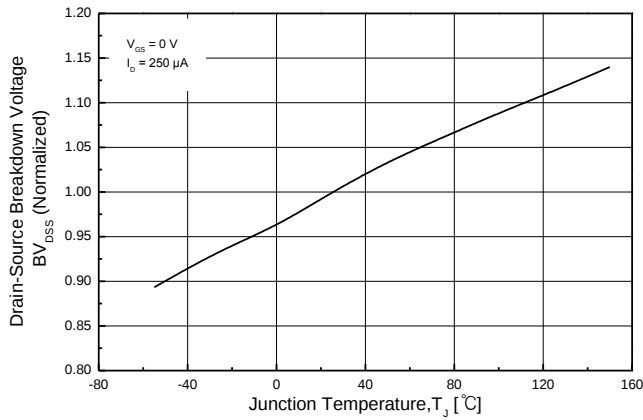


Fig. 8 On-Resistance vs. Temperature

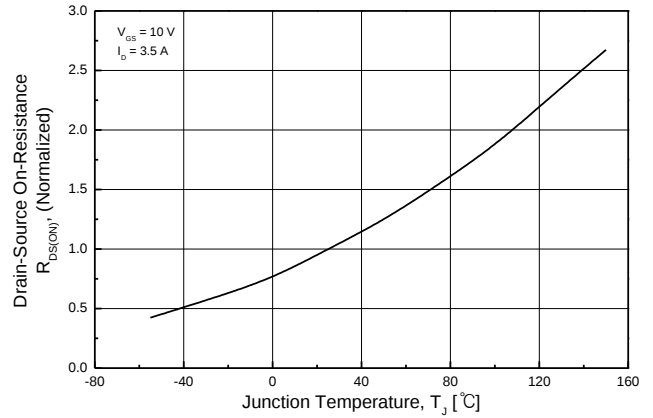


Fig. 9 Maximum Drain Current vs. Case Temperature

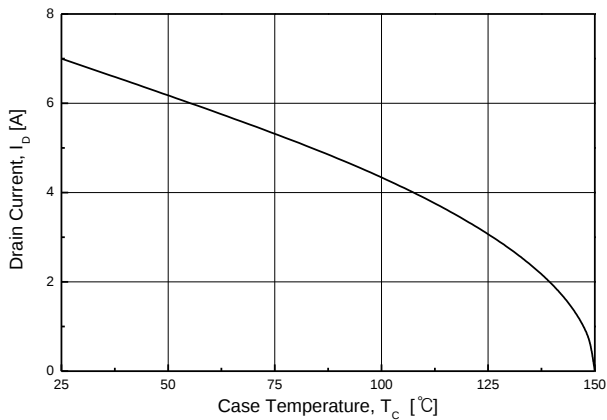


Fig. 10 Gate Threshold Voltage vs. Junction Temperature

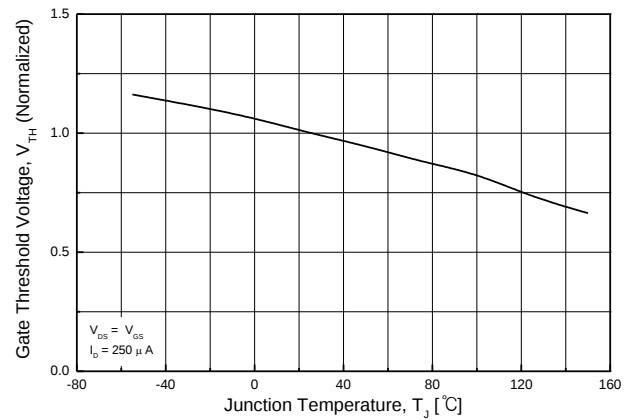


Fig. 11 Maximum Safe Operating Area

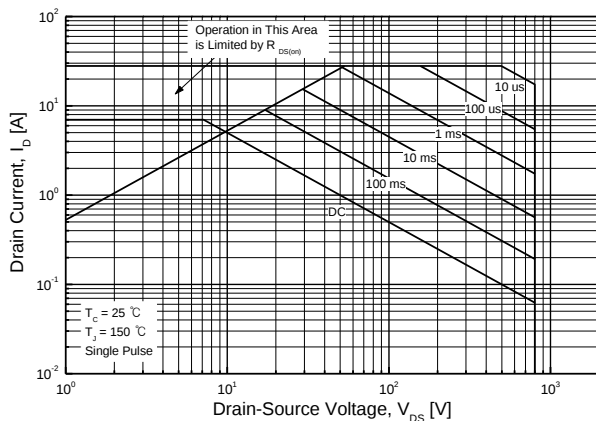
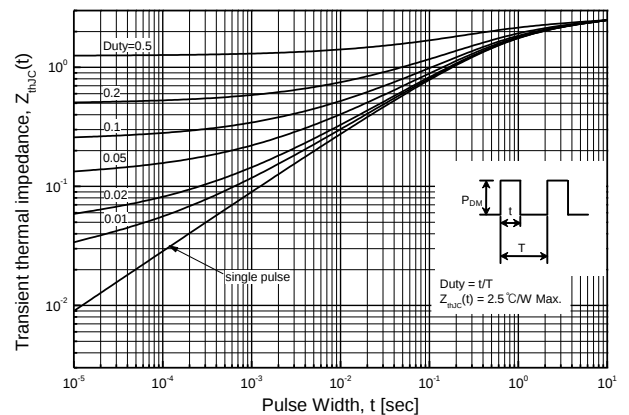
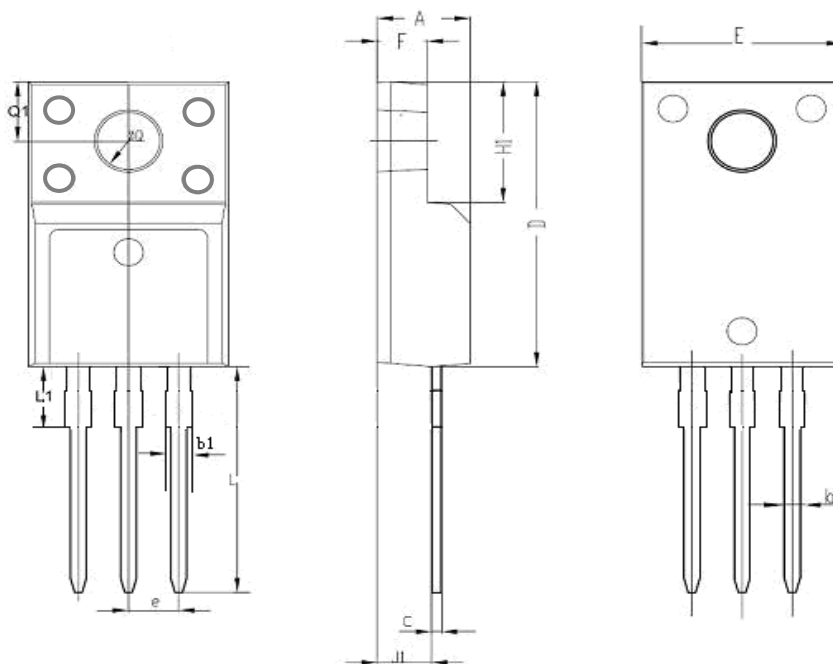


Fig. 12 Transient Thermal Response Curve



TO-220F-3L MECHANICAL DATA


SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.178	0.194	4.53	4.93	
b	0.028	0.036	0.71	0.91	
C	0.018	0.024	0.45	0.60	
D	0.617	0.633	15.67	16.07	
E	0.392	0.408	9.96	10.36	
e	0.100 TYP.		2.54TYP.		
H1	0.256	0.272	6.50	6.90	
J1	0.101	0.117	2.56	2.96	
L	0.503	0.519	12.78	13.18	
φQ	0.117	0.133	2.98	3.38	
b1	0.045	0.055	1.15	1.39	
L1	0.114	0.130	2.9	3.3	
Q1	0.122	0.138	3.10	3.50	
F	0.092	0.108	2.34	2.74	

Disclaimer :

TRinno technology reserves the right to make changes without notice to products herein to improve reliability, performance, or design. The information given in this document is believed to be accurate and reliable. However, it shall in no event be regarded as a guarantee of conditions and characteristics. With respect to any information regarding the application of the device, TRinno technology hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of patent rights of any third party.