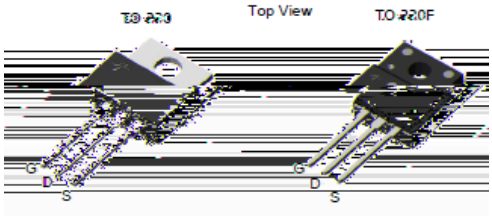
TMP3N50Z(G)/TMPF3N50Z(G)

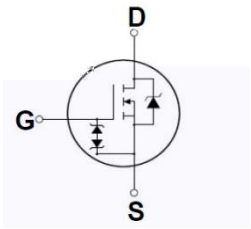
N-channel MOSFET

BV_{DSS}	I_D	$R_{DS(on)}$
500V	2.5A	< 2.8Ω

Features

- Low gate charge
- 100% avalanche tested
- Improved dv/dt capability
- RoHS compliant
- Halogen free package
- JEDEC Qualification
- Improved ESD performance





Device	Package	Marking	Remark
TMP3N50Z / TMPF3N50Z	TO-220 / TO-220F	TMP3N50Z / TMPF3N50Z	RoHS
TMP3N50ZG / TMPF3N50ZG	TO-220 / TO-220F	TMP3N50ZG / TMPF3N50ZG	Halogen Free

Absolute Maximum Ratings

Parameter		Symbol	TMP3N50Z(G)	TMPF3N50Z(G)	Unit
Drain-Source Voltage		V_{DSS}	500		V
Gate-Source Voltage		V_{GS}	30		V
Continuous Drain Current	T_C = 25	I_D	2.5	2.5 *	A
	T_C = 100		1.8	1.8 *	A
Pulsed Drain Current (Note 1)		I_{DM}	10	10 *	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	107		mJ
Repetitive Avalanche Current (Note 1)		I_{AR}	2.5		A
Repetitive Avalanche Energy (Note 1)		E_{AR}	5.21		mJ
Power Dissipation	T_C = 25	P_D	52.1	17.3	W
	Derate above 25		0.41	0.13	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,		T_L	300		

* Limited only by maximum junction temperature

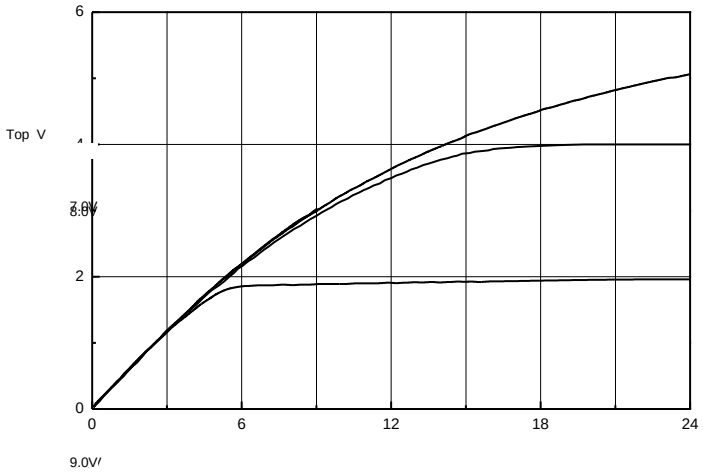
Thermal Characteristics

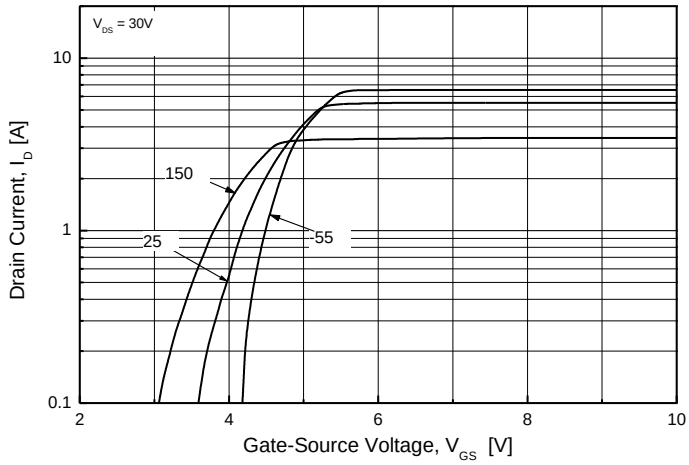
Parameter	Symbol	TMP3N50Z(G)	TMPF3N50Z(G)	Unit
Maximum Thermal resistance, Junction-to-Case	$R_{\theta JC}$	2.4	7.2	/W
Maximum Thermal resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	62.5	/W

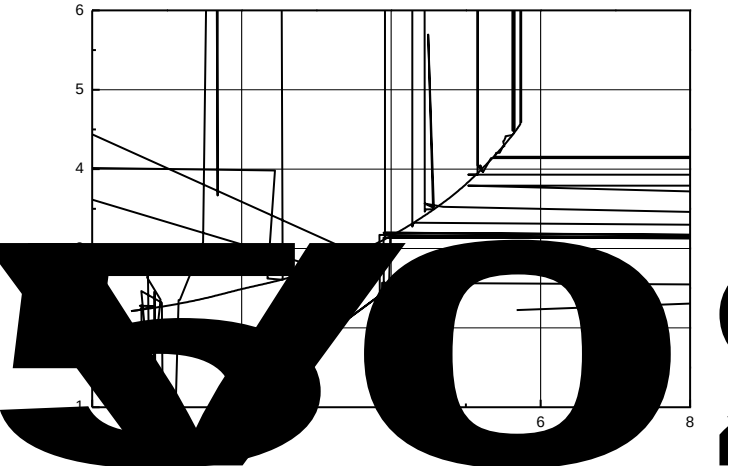
Electrical Characteristics : T_C=25 , unless otherwise noted

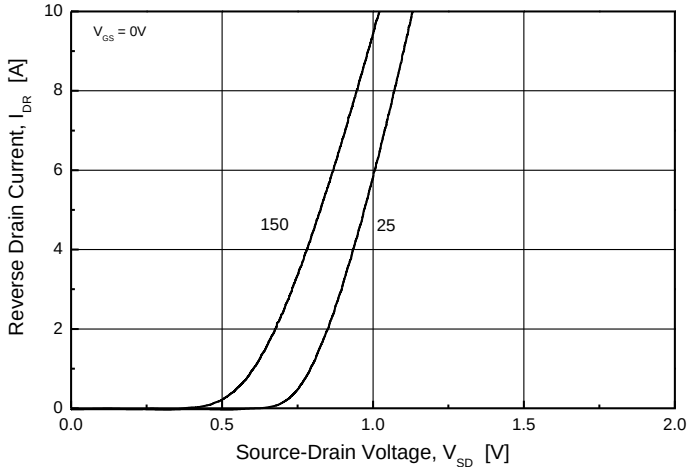
Parameter	Symbol	Test condition	Min	Typ	Max	Units
OFF						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250 µA	500	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 500 V, V_{GS} = 0 V	--	--	1	µA
		V_{DS} = 400 V, T_C = 125°C	--	--	10	µA
Forward Gate-Source Leakage Current	I_{GSSF}	V_{GS} = 30 V, V_{DS} = 0 V	--	--	100	µA
Reverse Gate-Source Leakage Current	I_{GSSR}	V_{GS} = -30 V, V_{DS} = 0 V	--	--	-100	µA
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 = 1.25 A	--	2.3	2.8	Ω
Forward Transconductance (Note 4)	g_{FS}	V_{DS} = 30 V, I_D = 1.25 A	--	5	--	S
DYNAMIC						
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	395	--	pF
Output Capacitance	C_{oss}		--	44	--	pF
Reverse Transfer Capacitance	C_{rss}		--	8	--	pF
SWITCHING						
Turn-On Delay Time (Note 4,5)	$t_{d(on)}$	V_{DD} = 300 V, I_D = 2.5 A, R_G = 25 , V_{GS} = 10 V	--	16	--	ns
Turn-On Rise Time (Note 4,5)	t_r		--	19	--	ns
Turn-Off Delay Time (Note 4,5)	$t_{d(off)}$		--	62	--	ns
Turn-Off Fall Time (Note 4,5)	t_f		--	18	--	ns
Total Gate Charge (Note 4,5)	Q_g	V_{DS} = 400 V, I_D = 2.5 A, V_{GS} = 10 V	--	9	--	nC
Gate-Source Charge (Note 4,5)	Q_{gs}		--	2	--	nC
Gate-Drain Charge (Note 4,5)	Q_{gd}		--	4	--	nC
SOURCE DRAIN DIODE						
Maximum Continuous Drain-Source Diode Forward Current	I_S	----	--	--	2.5	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}	----	--	--	10	A
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 2.5 A	--	--	1.5	V
Reverse Recovery Time (Note 4)	t_{rr}	V_{GS} = 0 V, I_S = 2.5 A, dI_F / dt = 100 A/µs	--	230	--	ns
Reverse Recovery Charge (Note 4)	Q_{rr}		--	0.9	--	µC

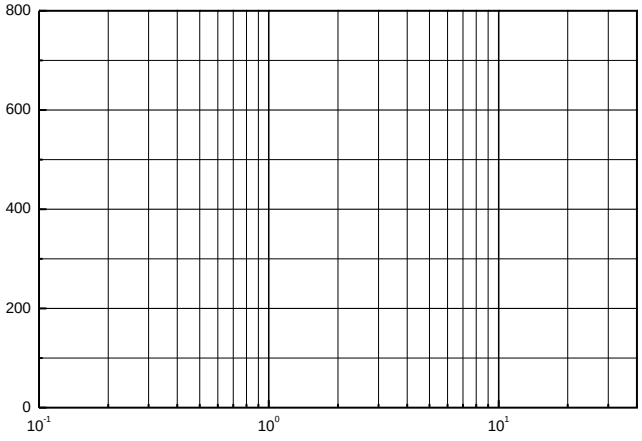
Note :
1. Repeated rating : Pulse width limited by safe operating area
2. L=30.9mH, I_{AS} = 2.5A, V_{DD} = 50V, R_G = 25 , Starting T_J= 25
3 I_{SD} 2.5A, di/dt µs , V_{DD} $_{DS}$, Starting T_J= 25
µ
5. Essentially Independent of Operating Temperature Typical Characteristics

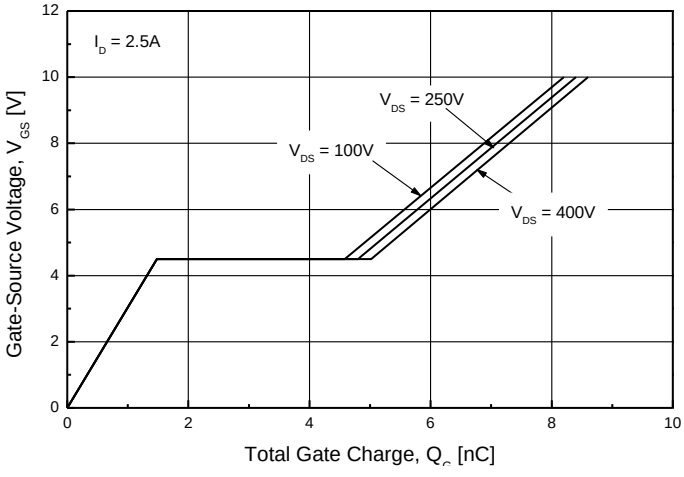

Top V
7.0V
8.0V
9.0V
6
4
2
0
0
6
12
18
24

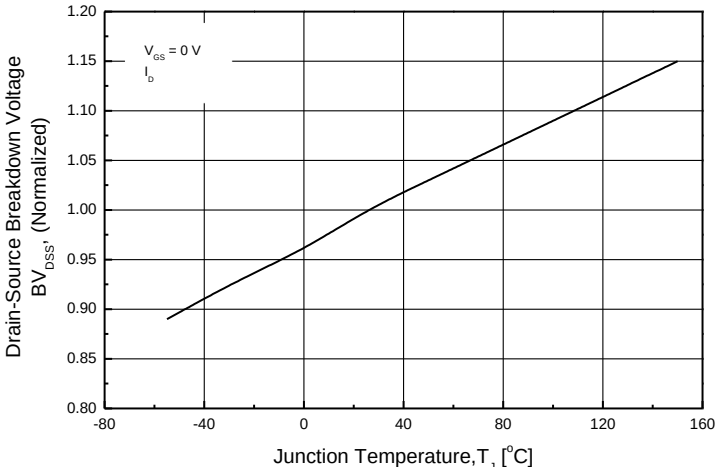

V_{DS} = 30V
10
1
0.1
150
25
55
Drain Current, I_D [A]
2
4
6
8
10
Gate-Source Voltage, V_{GS} [V]

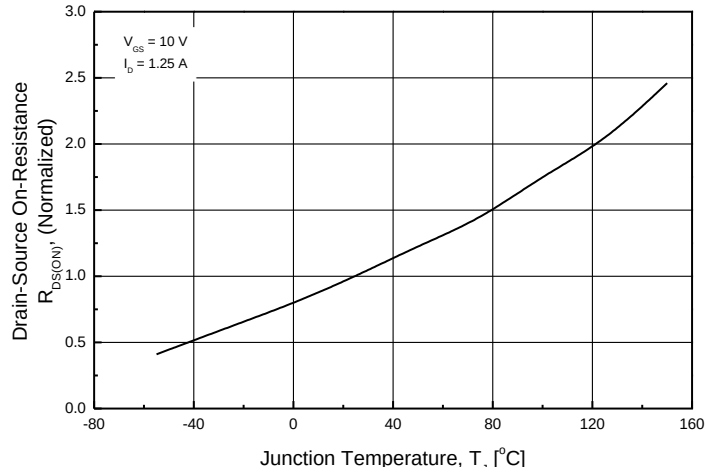

6
5
4
1
6
8

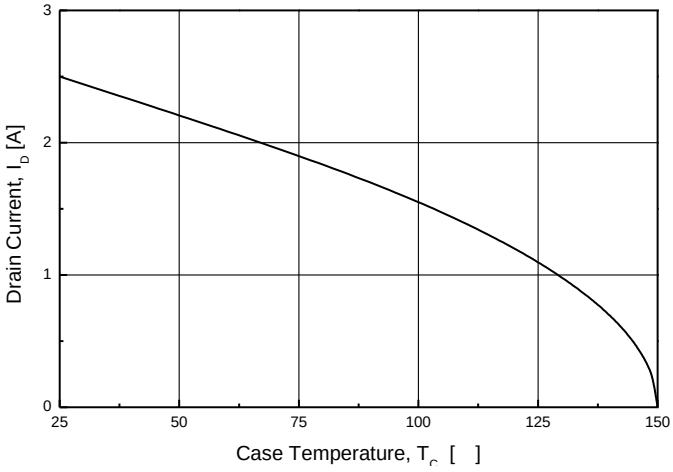

V_{GS} = 0V
10
8
6
4
2
0
150
25
Reverse Drain Current, I_{DR} [A]
0.0
0.5
1.0
1.5
2.0
Source-Drain Voltage, V_{SD} [V]

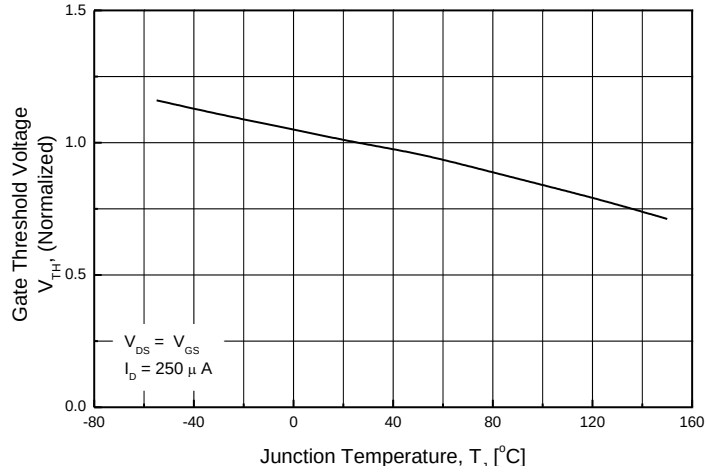

800
600
400
200
0
10^{-1}
10^{0}
10^{1}


I_D = 2.5A
V_{DS} = 250V
V_{DS} = 100V
V_{DS} = 400V
12
10
8
6
4
2
0
Gate-Source Voltage, V_{GS} [V]
0
2
4
6
8
10
Total Gate Charge, Q_g [nC]

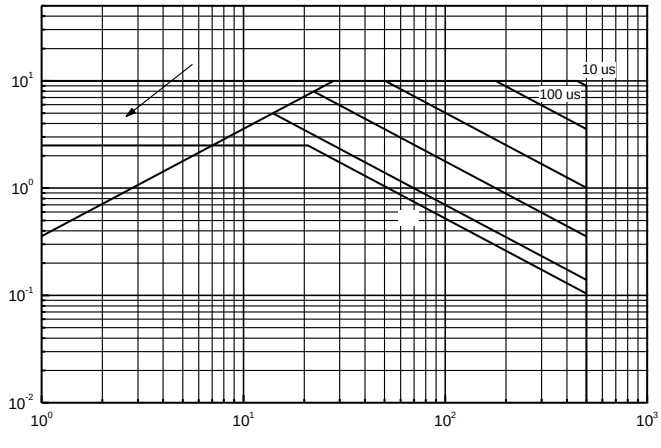




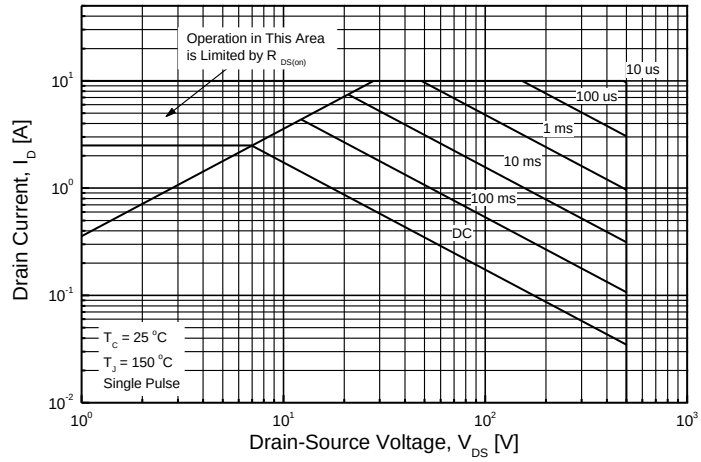




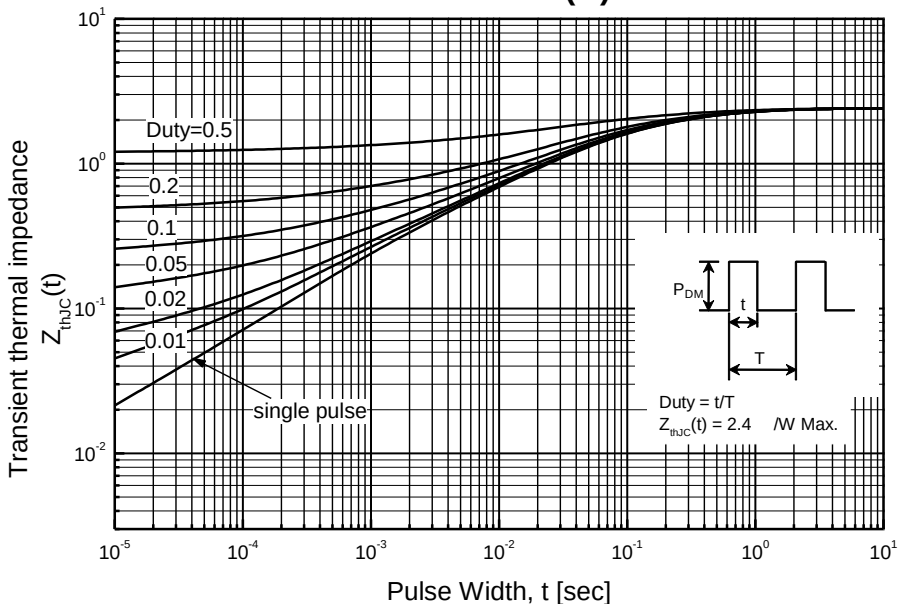
TMP3N50Z



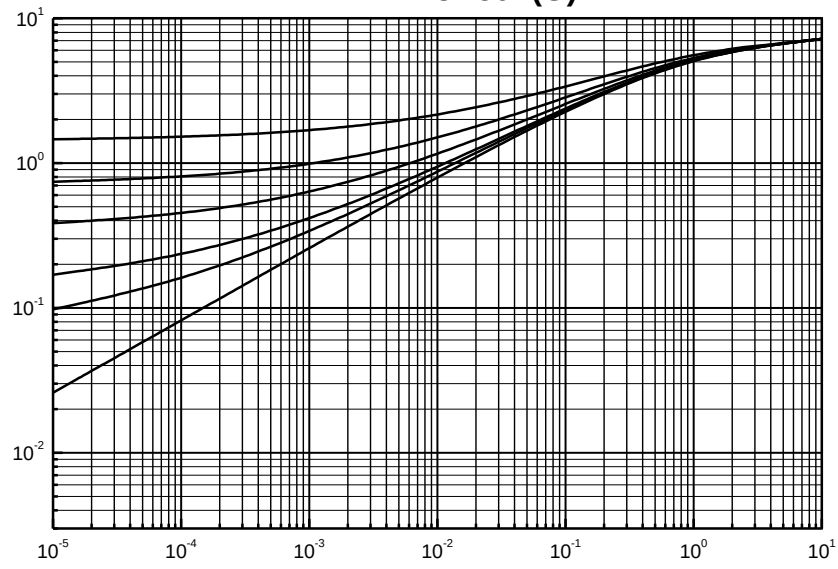
TMPF3N50Z



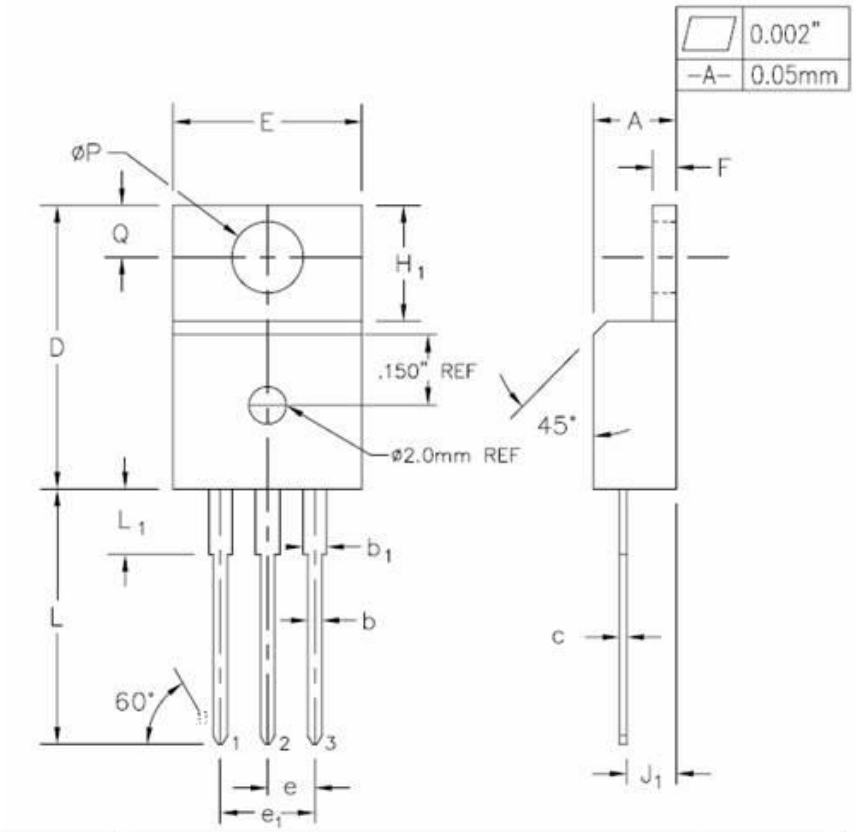
TMP3N50Z(G)



TMPF3N50Z(G)

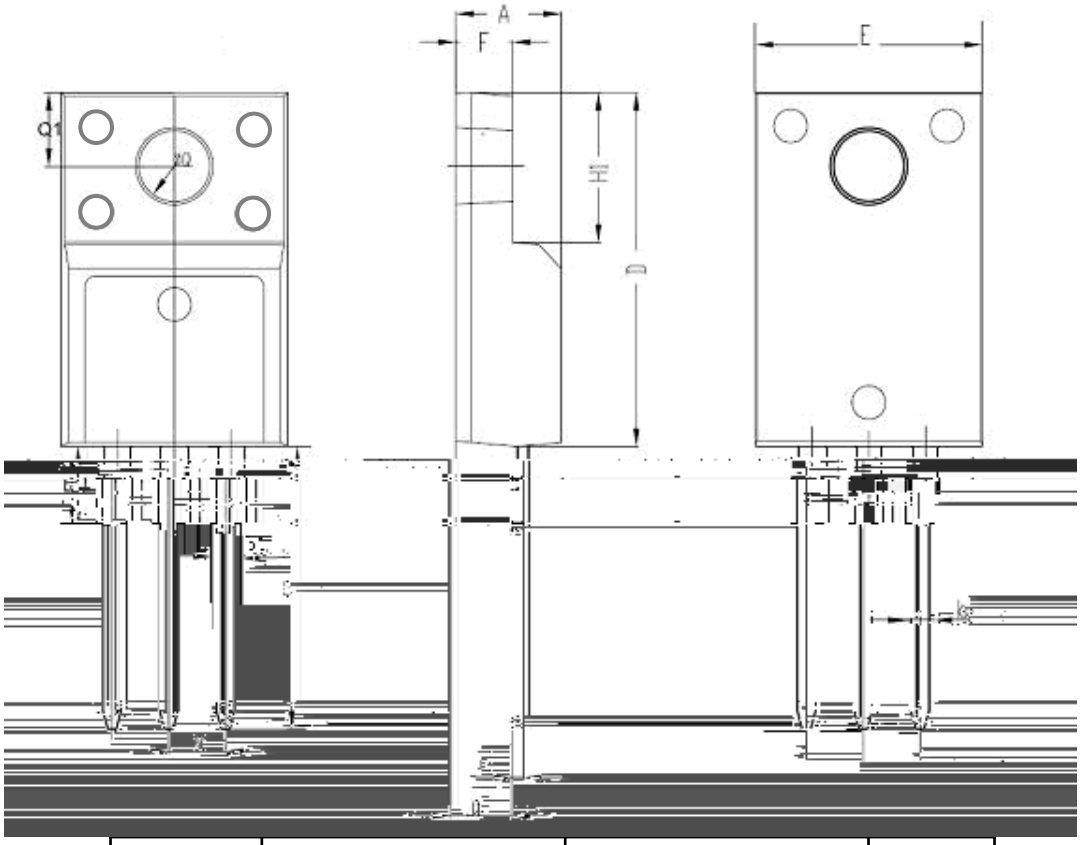


TO-220AB-3L MECHANICAL DATA



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	0.170	0.180	4.32	4.57	
b	0.028	0.036	0.71	0.91	
b_1	0.045	0.055	1.15	1.39	
c	0.014	0.021	0.36	0.53	
D	0.590	0.610	14.99	15.49	
E	0.395	0.410	10.04	10.41	
e	0.100 TYP.		2.54 TYP.		
e_1	0.200 BSC		5.08 BSC		
F	0.048	0.054	1.22	1.37	
H_1	0.235	0.255	5.97	6.47	
J_1	0.100	0.110	2.54	2.79	
L	0.530	0.550	13.47	13.97	
L_1	0.130	0.150	3.31	3.81	
øP	0.149	0.153	3.79	3.88	
Q	0.102	0.112	2.60	2.84	

TO-220F-3L MECHANICAL DATA



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