Features

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

V_{DSS} = 990 V @T_{jmax}
I_D = 7A
$R_{DS(ON)}$ = 1.9 (max) @ V_{GS}= 10 V

Absolute Maximum Ratings

Parameter		Symbol	TMP7N90	TMPF7N90G	Unit
Drain-Source Voltage		V_{DSS}	900		V
Gate-Source Voltage		V_{GS}	30		V
Continuous Drain Current	T_C = 25	I_D	7	7 *	A
	T_C = 100		4.31	4.31 *	A
Pulsed Drain Current (Note 1)		I_{DM}	28	28*	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	106		mJ
Repetitive Avalanche Current (Note 1)		I_{AR}	7		A
Repetitive Avalanche Energy (Note 1)		E_{AR}	25		mJ
Power Dissipation	T_C = 25	P_D	250	40.3	W
	Derate above 25		2	0.32	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		

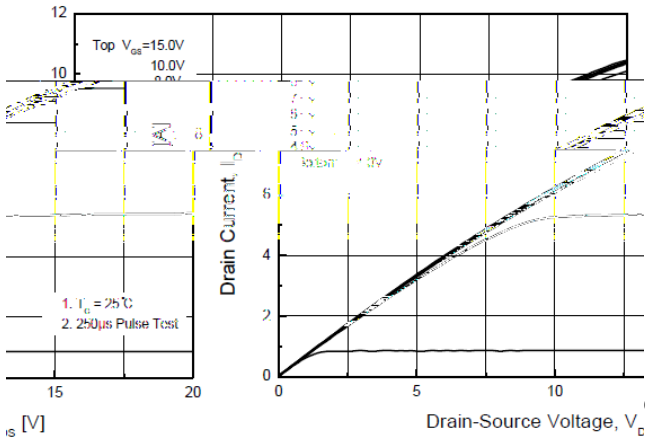
Thermal Characteristics

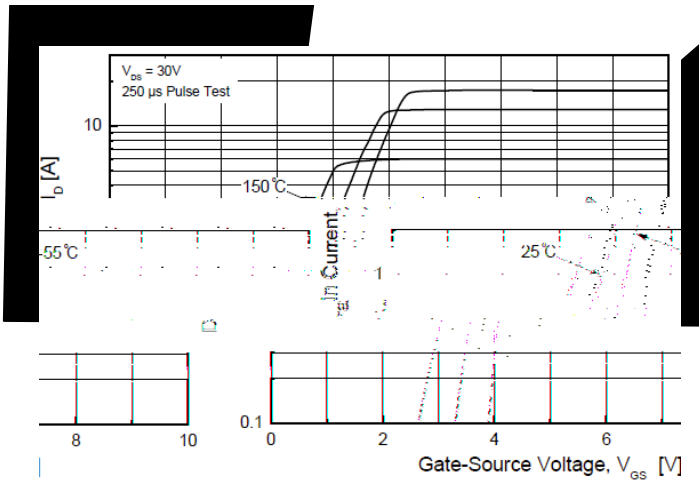
Parameter	Symbol	TMP7N90	TMPF7N90G	Unit
Maximum Thermal resistance, Junction-to-Case	R_{JC}	0.5	3.1	/W
Maximum Thermal resistance, Junction-to-Ambient	R_{JA}	62.5		

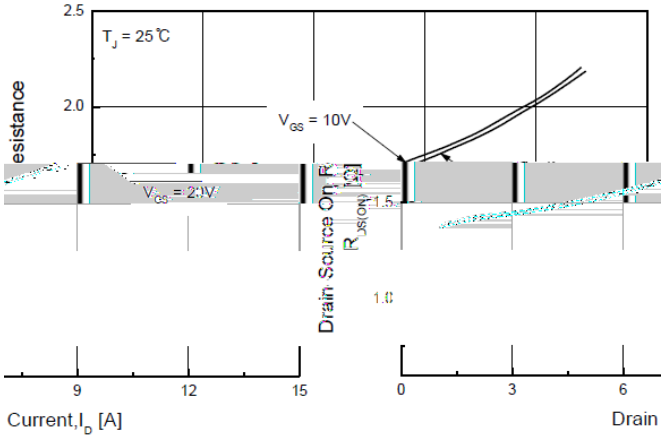
Electrical Characteristics : T_C=25 , unless otherwise noted

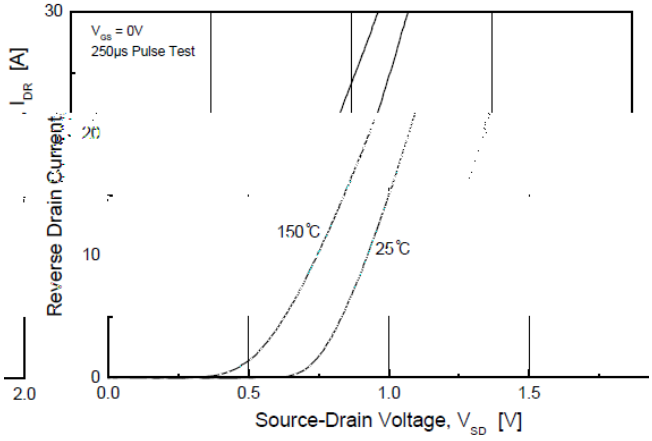
Parameter	Symbol	Test condition	Min	Typ	Max	Units
OFF						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250 µA	900	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 900 V, V_{GS} = 0 V	--	--	10	µA
		V_{DS} = 720 V, T_C = 125 C	--	--	100	µA
Forward Gate-Source Leakage Current	I_{GSSF}	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	--	1.52	1.9	
Forward Transconductance (Note 4)	g_{FS}	V_{DS} = 30 V, I_D = 3.5 A	--	7	--	S
DYNAMIC						
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	1969	--	pF
Output Capacitance	C_{oss}		--	133	--	pF
Reverse Transfer Capacitance	C_{rss}		--	11	--	pF
SWITCHING						
Turn-On Delay Time (Note 4,5)	$t_{d(on)}$	V_{DD} = 450 V, I_D = 7 A, R_G = 25	--	39	--	ns
Turn-On Rise Time (Note 4,5)	t_r		--	38	--	ns
Turn-Off Delay Time (Note 4,5)	$t_{d(off)}$		--	155	--	ns
Turn-Off Fall Time (Note 4,5)	t_f		--	45	--	ns
Total Gate Charge (Note 4,5)	Q_g	V_{DS} = 720V, I_D = 7 A, V_{GS} = 10 V	--	49	--	nC
Gate-Source Charge (Note 4,5)	Q_{gs}		--	7	--	nC
Gate-Drain Charge (Note 4,5)	Q_{gd}		--	20	--	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	--	464	--	ns
Reverse Recovery Charge (Note 4)	Q_{rr}	dI_F / dt = 100 A/µs	--	4.7	--	µC

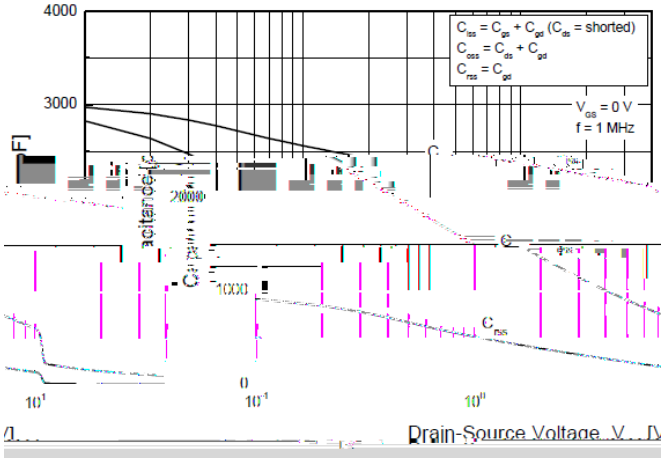
Note :
1. Repeated rating : Pulse width limited by safe operating area
2. L=4.1mH, I_{AS} = 7A, V_{DD} = 50V, R_G = 25 , Starting T_J= 25 , not subject to production test verified by design/characterization
3 I_{SD} 7A, di/dt µs , V_{DD} $_{DS}$, Starting T_J= 25
µ
5. Essentially Independent of Operating Temperature Typical Characteristics

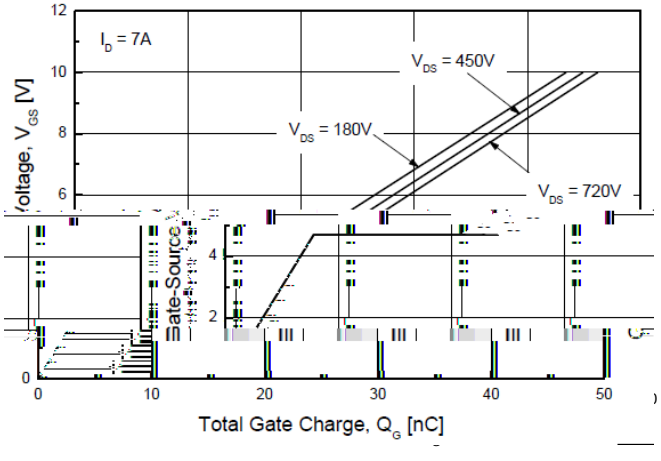

Top V_GS=15.0V
10.0V
1. T_c = 25℃
2. 250μs Pulse Test
Drain Current, I_D
Drain-Source Voltage, V_D

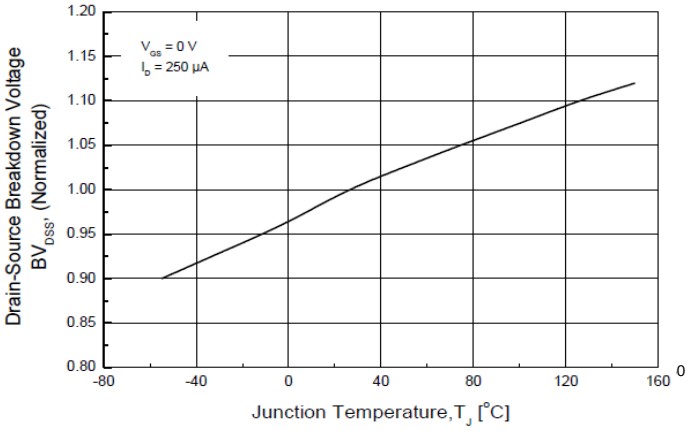

V_DS = 30V
250 μs Pulse Test
150℃
25℃
-55℃
I_D [A]
Gate-Source Voltage, V_GS [V]

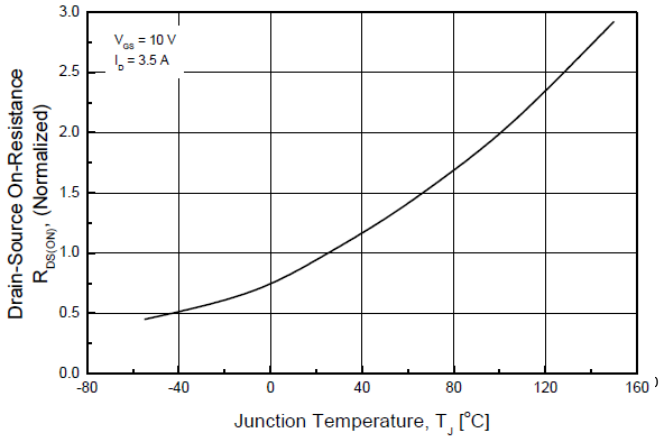

T_J = 25℃
V_GS = 10V
V_GS = 20V
Drain Source On Resistance
Current, I_D [A]
Drain

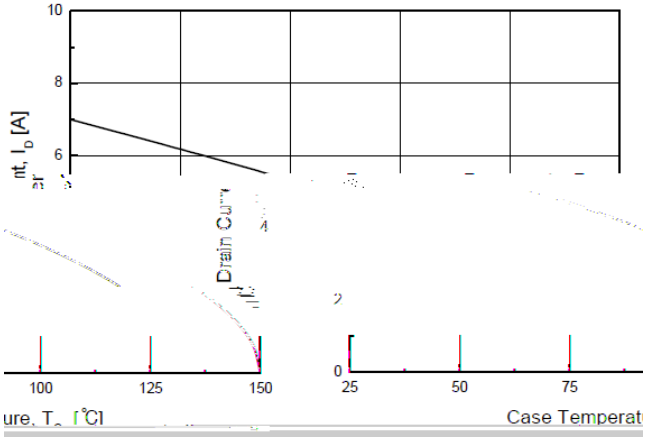

V_GS = 0V
250μs Pulse Test
150℃
25℃
I_DR [A]
Reverse Drain Current
Source-Drain Voltage, V_SD [V]

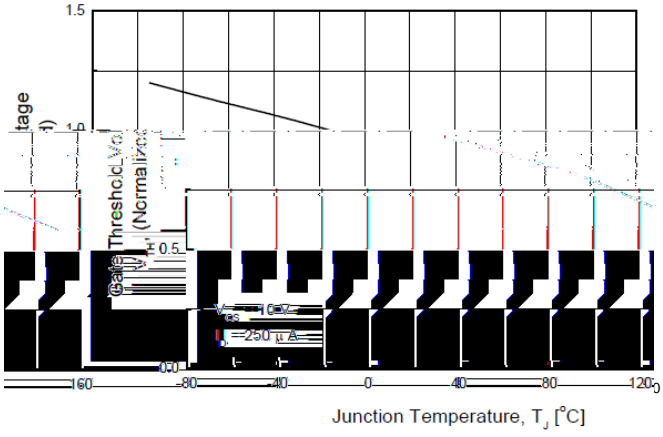

C_iss = C_gs + C_gd (C_ds = shorted)
C_oss = C_ds + C_gd
C_rss = C_gd
V_GS = 0 V
f = 1 MHz
Drain-Source Voltage, V_DS [V]


I_D = 7A
V_DS = 450V
V_DS = 180V
V_DS = 720V
Gate-Source Voltage, V_GS [V]
Total Gate Charge, Q_G [nC]









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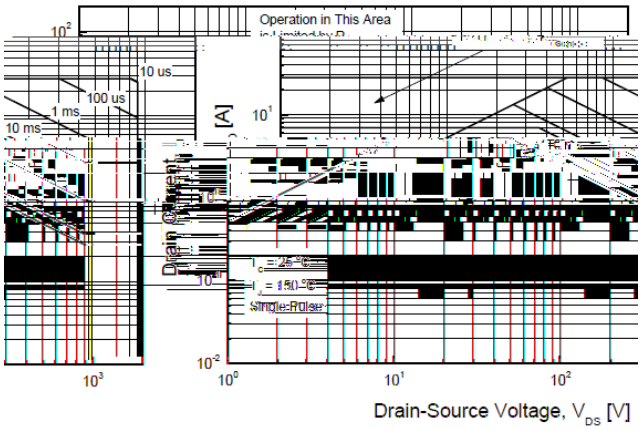

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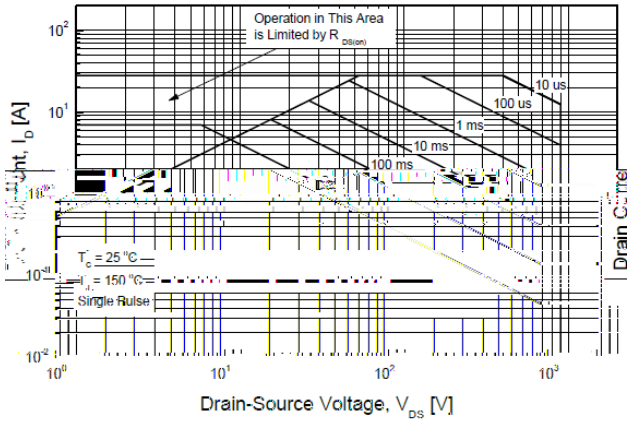

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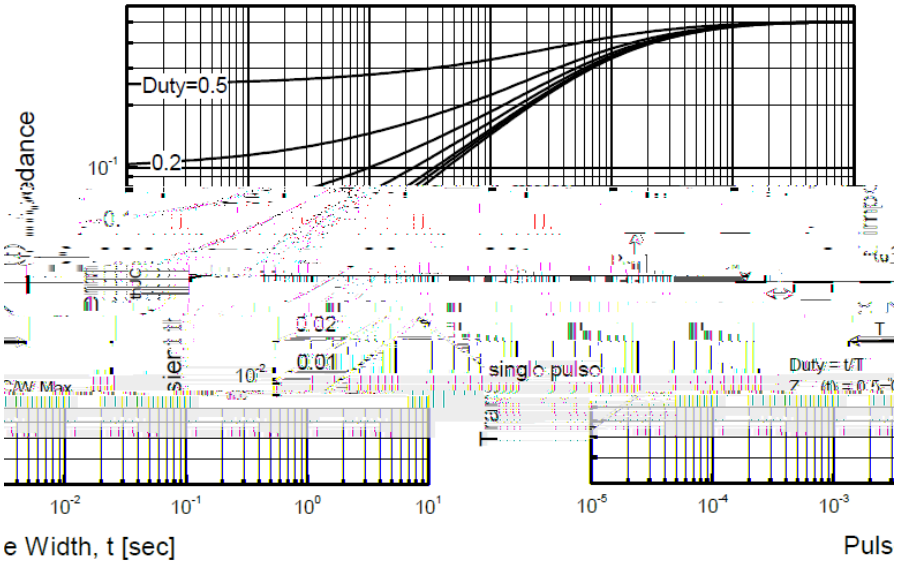

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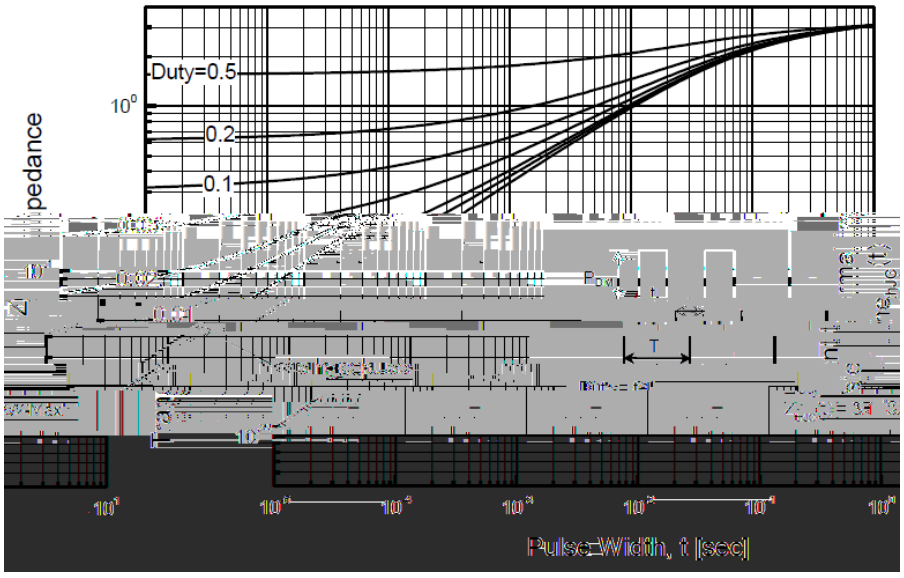
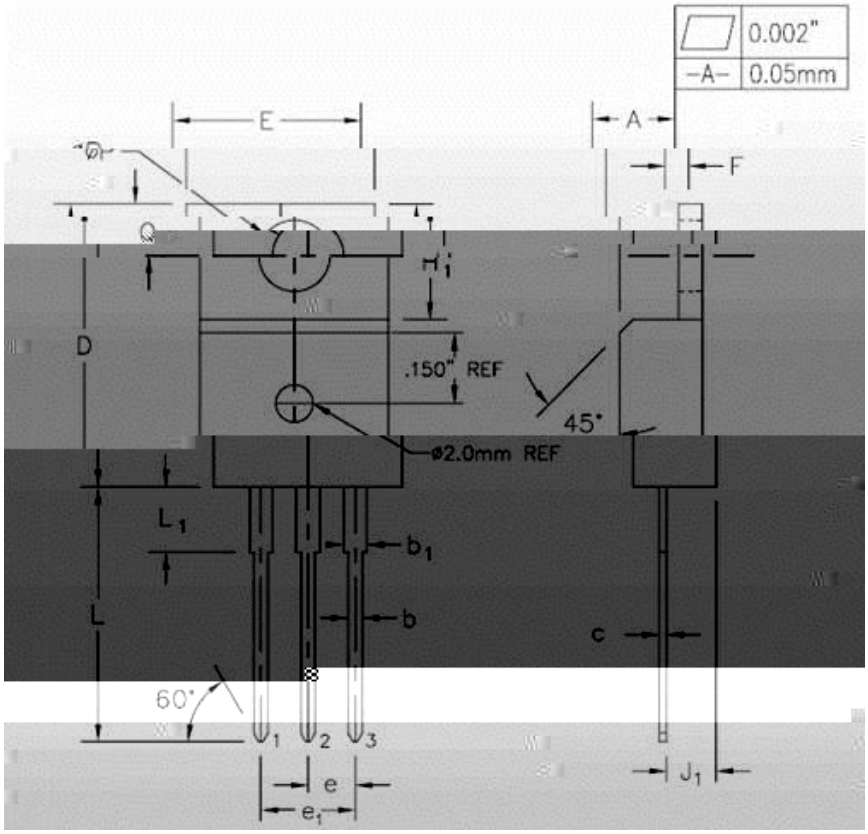
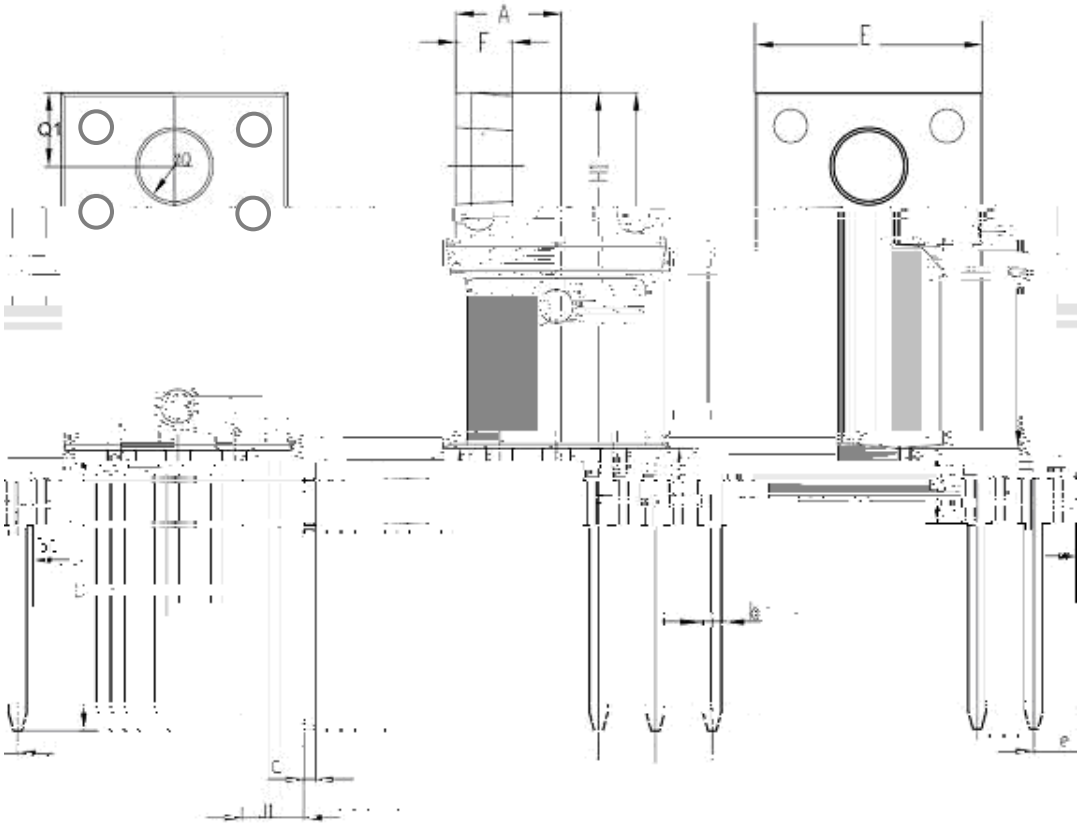


TO-220AB-3L MECHANICAL DATA



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	0.550	0.550	13.47	13.97	
L_1	0.130	0.150	3.31	3.81	2
ØP	0.149	0.153	3.79	3.88	
Q	0.102	0.112	2.60	2.84	

TO-220F-3L MECHANICAL DATA



Q MJ	LAFCQ		JJ CRCPQ		LMRCQ
	L		L		
	. 56	. 72	2 31	2 71	
	. . 06	. . 14	. 5	. 7	
A	. . 6	. . 02	. 23	. 4.	
B	. 4 5	. 411	3 45	4 . 5	
C	. 170	. 2. 6	7 74	. 14	
	. .. R N		0 32R N		
F	. 034	. 050	4 3.	4 7.	
H	. .	. 5	0 34	0 74	
J	. 3. 1	. 3 7	0 56	1 6	
O	. 5	. 11	0 76	1 16	
	. . 23	. . 33	3	17	
J	. 2	. 1.	0 7	1 1	
O	. 00	. 16	1 .	1 3.	
D	. . 70	. . 6	0 12	0 52	

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