

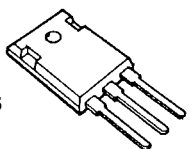
T-39-25

<b>IXYS</b>				
<b>MAXIMUM RATINGS</b>				
Parameter	Sym.	IXTH22P20 IXTM22P20	IXTH22P15 IXTM22P15	Unit*
Drain-Source Voltage (1)	V <sub>DSS</sub>	200	150	V <sub>dc</sub>
Drain-Gate Voltage (R <sub>GS</sub> = 1.0MΩ) (1)	V <sub>DGR</sub>	200	150	V <sub>dc</sub>
Gate-Source Voltage Continuous	V <sub>GS</sub>		± 20	V <sub>dc</sub>
Gate-Source Voltage Transient	V <sub>GSM</sub>		± 30	V
Drain Current Continuous (T <sub>C</sub> = 25°C)	I <sub>D</sub>		22	A <sub>dc</sub>
Drain Current Pulsed (3)	I <sub>DM</sub>		88	A
Total Power Dissipation	P <sub>D</sub>		200	W
Power Dissipation Derating > 25°C			1.6	W/°C
Operating and Storage Temperature	T <sub>J</sub> & T <sub>stg</sub>		-65 to +150	°C
Thermal Resistance	R <sub>thJC</sub>		0.625	°C/W
Max. Lead Temp. for Soldering	T <sub>L</sub>		300 (1.6mm from case for 10 sec.)	°C

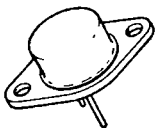
P-CHANNEL MOSFETS

IXTH22P20, 15  
IXTM22P20, 15

22 AMPS, 150-200V, 0.2 OHMS



IXTH SERIES  
TO-247  
(TO-3P)



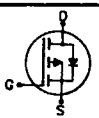
IXTM SERIES  
TO-204AA  
(TO-3)

\* ALL VOLTAGES AND CURRENTS ARE NEGATIVE UNLESS OTHERWISE SPECIFIED

**ELECTRICAL CHARACTERISTICS** \*T<sub>C</sub> = 25°C unless otherwise specified

Parameter	Type	Min.	Typ.	Max.	Units	Test Conditions
V <sub>(BR)DSS</sub> Drain-Source Breakdown Voltage	22P20	200	—	—	V	V <sub>GS</sub> = 0V
	22P15	150	—	—	V	I <sub>D</sub> = 250μA
V <sub>GS(th)</sub> Gate Threshold Voltage	ALL	2.0	—	4.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
I <sub>GSS</sub> Gate-Source Leakage	ALL	—	—	100	nA	V <sub>GS</sub> = ±20V
I <sub>DSS</sub> Zero Gate Voltage Drain Current	ALL	—	—	200	μA	V <sub>DS</sub> = 0.8 BV <sub>DSS</sub> , V <sub>GS</sub> = 0V
		—	—	1000	μA	V <sub>DS</sub> = 0.8 BV <sub>DSS</sub> , V <sub>GS</sub> = 0V, T <sub>C</sub> = 125°C
R <sub>DS(on)</sub> Static Drain-Source On-State Resistance (2)	ALL	—	—	0.2	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.5 I <sub>D</sub> Max.
g <sub>FS</sub> Forward Transconductance (2)	ALL	6	7	—	S	V <sub>DS</sub> > I <sub>D(on)</sub> x R <sub>DS(on)max.</sub> , I <sub>D</sub> = 0.5 I <sub>D</sub> Max.
C <sub>iss</sub> Input Capacitance	ALL	—	—	4300	pF	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 25V, f = 1.0 MHz
C <sub>oss</sub> Output Capacitance	ALL	—	—	1120	pF	
C <sub>rss</sub> Reverse Transfer Capacitance	ALL	—	—	460	pF	
t <sub>d(on)</sub> Turn-On Delay Time	ALL	—	—	—	ns	V <sub>DD</sub> = 0.5 BV <sub>DSS</sub> , I <sub>D</sub> = 0.5 I <sub>D</sub> Max.
t <sub>r</sub> Rise Time	ALL	—	—	—	ns	Z <sub>O</sub> = 50Ω
t <sub>d(off)</sub> Turn-Off Delay Time	ALL	—	—	—	ns	
t <sub>f</sub> Fall Time	ALL	—	—	—	ns	
Q <sub>g</sub> Total Gate Charge (Gate-Source Plus Gate-Drain)	ALL	—	—	210	nC	V <sub>GS</sub> = 10V, I <sub>D</sub> = I <sub>D</sub> Max., V <sub>DS</sub> = 0.8 BV <sub>DSS</sub>
Q <sub>gs</sub> Gate Source Charge	ALL	—	46	—	nC	
Q <sub>gd</sub> Gate-Drain ("Miller") Charge	ALL	—	92	—	nC	

**SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS** \*T<sub>C</sub> = 25°C unless otherwise specified

I <sub>S</sub> Continuous Source Current (Body Diode)	ALL	—	—	22	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier.	
I <sub>SM</sub> Pulse Source Current (Body Diode) (1)	ALL	—	—	88	A		
V <sub>SD</sub> Diode Forward Voltage (2)	ALL	—	—	1.5	V	I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0V	
t <sub>rr</sub> Reverse Recovery Time	ALL	—	350	—	ns		V <sub>R</sub> = 100V
Q <sub>rr</sub> Reverse Recovery Charge	ALL	—	3.0	—	μC	T <sub>J</sub> = 25°C	I <sub>F</sub> = I <sub>S</sub> dI <sub>F</sub> /dt = 100A/μS
		—	—	—		T <sub>J</sub> = 150°C	

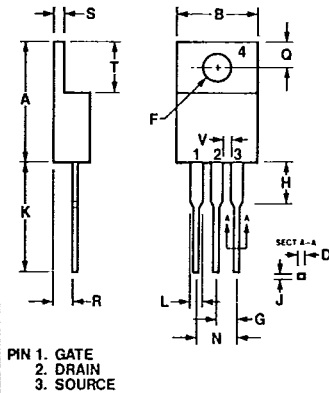
(1) T<sub>J</sub> = 25°C to 150°C

(2) Pulse test: Pulse width < 300μS, duty cycle < 2%

(3) Repetitive rating: Pulse width limited by max. junction temperature.

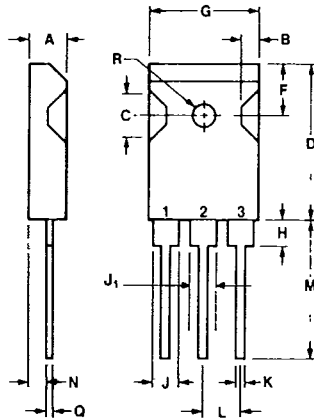
PACKAGE OUTLINES

TO-220 AB



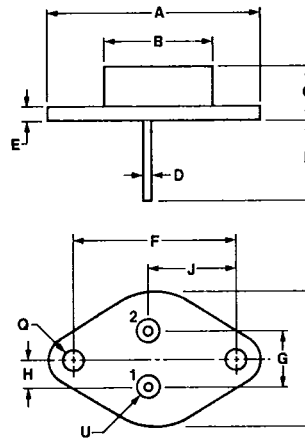
PIN 1. GATE  
2. DRAIN  
3. SOURCE

TO-247



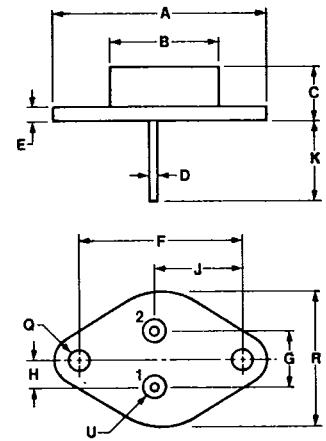
PIN 1. GATE  
2. DRAIN  
3. SOURCE

TO-204 AC



PIN 1. GATE  
2. SOURCE  
CASE - DRAIN

TO-204 AA



PIN 1. GATE  
2. SOURCE  
CASE - DRAIN

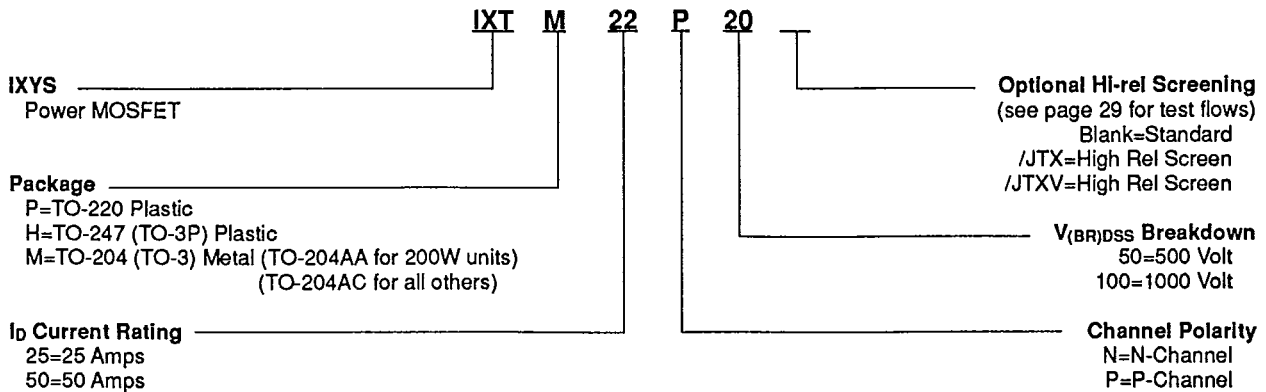
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	14.23	16.51	.560	.650
B	9.66	10.66	.380	.420
C	3.56	4.82	.140	.190
D	0.64	0.89	.025	.035
F	3.54	4.08	.139	.161
G	2.29	2.79	.090	.110
H	-	6.35	-	.250
J	0.51	.76	.020	.030
K	12.70	14.73	.500	.580
L	1.15	1.77	.045	.070
N	4.83	5.33	.190	.210
Q	2.54	3.42	.100	.135
R	2.04	2.49	.080	.115
S	0.64	1.39	.025	.055
T	5.85	6.85	.230	.270
V	1.15	-	.045	-

Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.8	5.2	.187	.203
B	1.7	2.7	.067	.106
C	5.1	6.1	.200	.240
D	20.8	21.2	.811	.827
F	5.7	6.3	.224	.248
G	15.7	15.9	.612	.620
H	-	4.5	-	.177
J	1.98	2.05	.078	.081
J <sub>1</sub>	2.98	3.03	.117	.119
K	1.18	1.22	.046	.048
L	5.43	1.47	.214	.215
M	18.8	19.2	.740	.756
N	2.2	2.4	.086	.094
Q	.58	.62	.023	.025
R	3.1	3.3	.121	.129

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	-	39.37	-	1.55
B	-	19.71	-	.776
C	6.58	6.81	.259	.268
D	0.97	1.09	.038	.043
E	1.40	1.65	.055	.065
F	30.15	BSC	1.187	BSC
G	10.74	11.05	.423	.435
H	5.46	BSC	.215	BSC
J	16.68	17.12	.657	.674
K	11.20	11.98	.441	.472
Q	3.86	4.11	.152	.162
R	24.84	25.27	.978	.995
U	4.19	5.56	.165	.203

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	-	39.37	-	1.55
B	-	19.71	-	.776
C	8.96	9.22	.353	.363
D	0.97	1.09	.038	.043
E	2.66	2.92	.105	.115
F	30.15	BSC	1.187	BSC
G	10.74	11.05	.423	.435
H	5.46	BSC	.215	BSC
J	16.68	17.12	.657	.674
K	11.20	11.98	.441	.472
Q	3.86	4.11	.152	.162
R	24.84	25.27	.978	.995
U	4.19	5.56	.165	.203

PART NUMBER DESCRIPTION

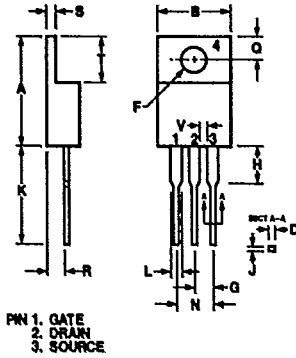


Note: Valid combinations are only those referenced in the IXYS price book or product selector guide. Consult your local IXYS sales office to confirm availability of specific combinations or new types.

# DETAILED PACKAGE OUTLINES

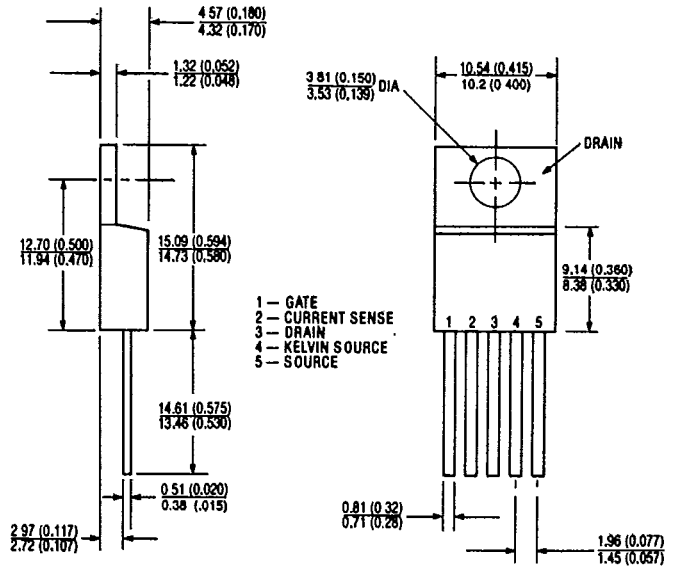
T-91-20

**TO-220 AB**

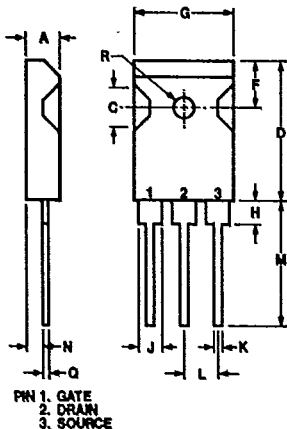


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	14.23	16.51	.560	.650
B	9.66	10.66	.380	.420
C	3.56	4.82	.140	.190
D	0.64	0.89	.025	.035
F	3.54	4.08	.139	.161
G	2.29	2.79	.090	.110
H	-	6.35	-	.250
J	0.51	.76	.020	.030
K	12.70	14.73	.500	.580
L	1.15	1.77	.045	.070
N	4.83	5.33	.190	.210
Q	2.54	3.42	.100	.135
R	2.04	2.49	.080	.115
S	0.64	1.39	.025	.055
T	5.85	6.85	2.30	2.70
V	1.15	-	.045	-

**CONFORMS TO OUTLINE TO-220 (IR H-7)**  
Dimensions in Millimeters (Inches)

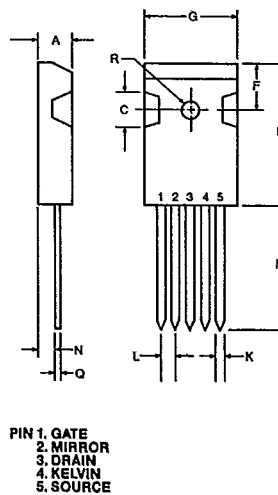


**TO-247 (3 LEADED)**



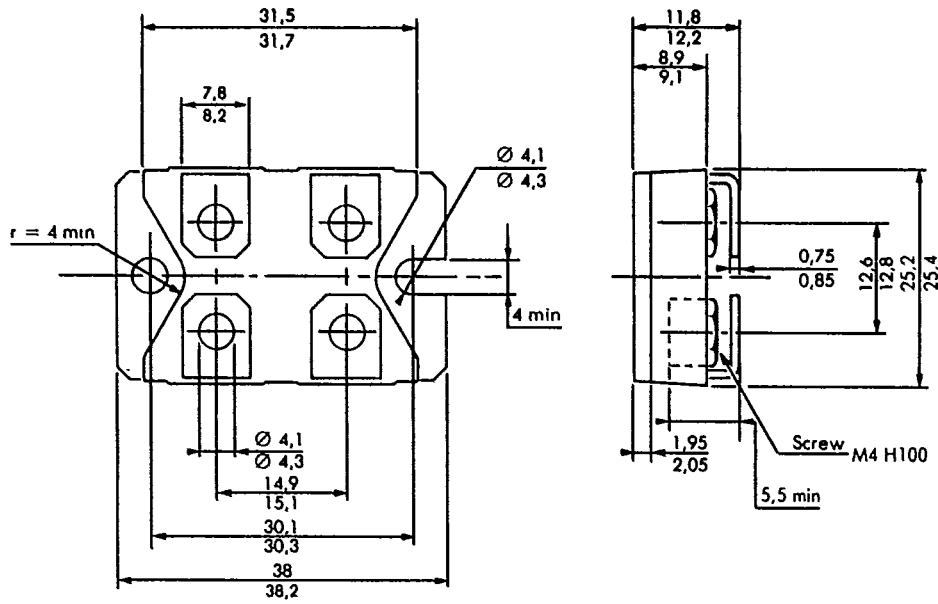
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
C	4.5	6.0	.178	.236
D	19.7	21.4	.776	.843
F	5.3	6.1	.209	.240
G	15.3	15.9	.602	.625
H	3.7	4.3	.146	.169
J	1.95	2.4	.077	.094
J <sub>1</sub>	2.97	3.4	.117	.134
K	1.0	1.4	.040	.055
L	5.4	5.5	.213	.217
M	19.9	20.2	.783	.795
N	2.2	2.6	.087	.102
Q	0.4	0.8	.016	.031
R	2.9	3.3	.114	.129

**TO-247 (5 LEADED)**

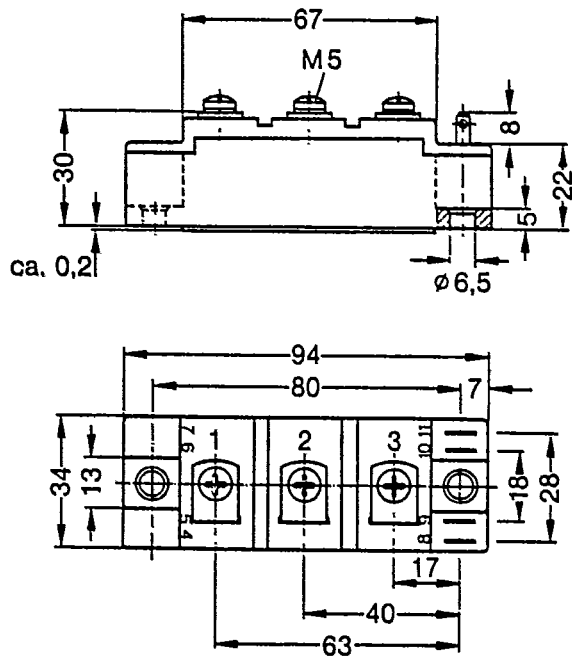


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
C	4.5	6.0	.178	.236
D	19.7	21.4	.776	.843
F	5.3	6.1	.209	.240
G	15.3	15.9	.602	.625
K	1.1	1.3	.043	.051
L	2.51	2.56	.099	.101
M	19.9	20.2	.783	.795
N	2.2	2.6	.087	.102
Q	0.4	0.8	.016	.031
R	2.9	3.3	.114	.129

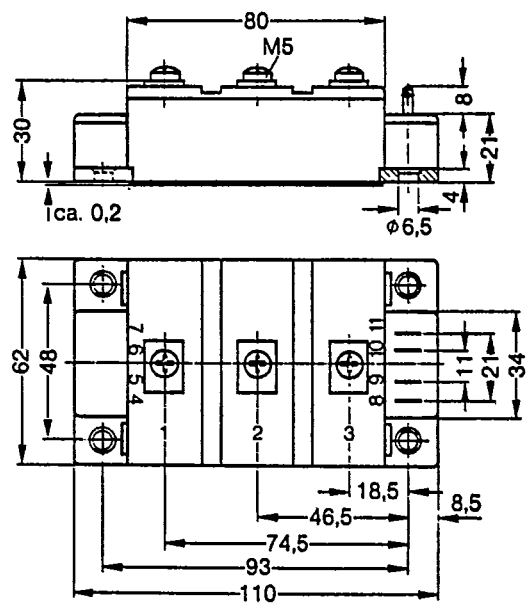
**TO-238**  
Dimensions in Millimeters



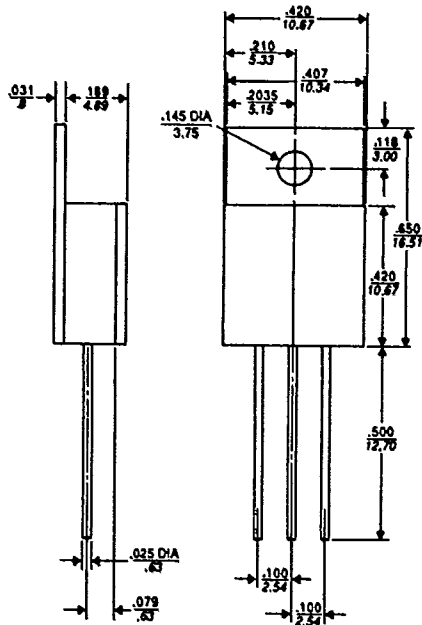
**Y-4**  
Dimensions in Millimeters



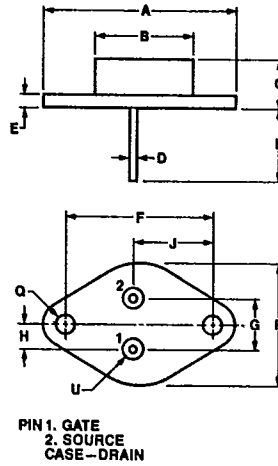
**Y-3**  
Dimensions in Millimeters



TO-220 HERMETIC

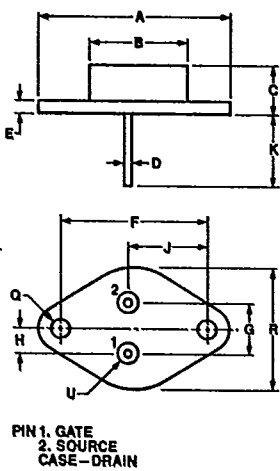


TO-204 AE



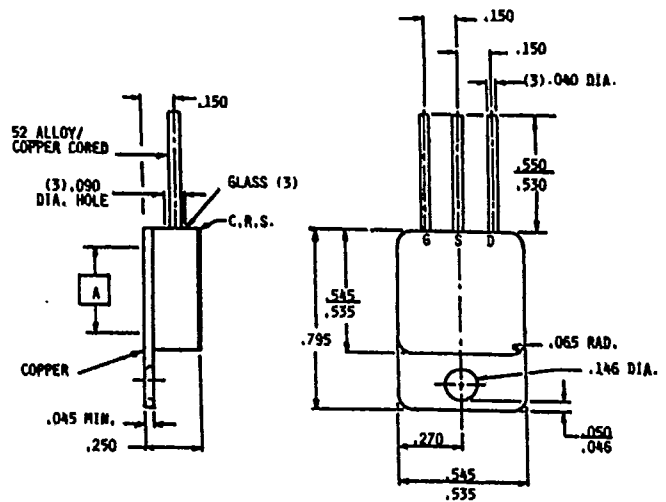
Dim.	Millimeter	Max.	Inches	Max.
A	—	39.37	—	1.55
B	—	19.71	—	.776
C	7.62	10.16	.300	.400
D	1.47	1.57	.058	.062
E	1.52	3.43	.060	.135
F	30.15	BSC	1.187	BSC
G	10.67	11.18	.420	.440
H	5.33	6.10	.210	.240
J	16.68	17.12	.657	.674
K	11.20	11.98	.441	.472
Q	3.86	4.11	.152	.162
R	24.84	25.27	.978	.995

TO-204 AA

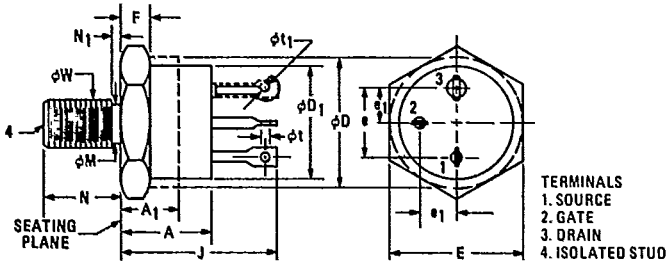


Dim.	Millimeter	Max.	Inches	Max.
A	—	39.37	—	.155
B	—	19.71	—	.776
C	6.35	8.89	.250	.350
D	.097	1.09	.038	.043
E	—	3.43	—	.135
F	30.15	BSC	1.187	BSC
G	10.67	11.18	.420	.440
H	5.33	6.10	.210	.240
J	16.68	17.12	.657	.674
K	11.20	11.98	.441	.472
Q	3.86	4.11	.152	.162
R	24.84	25.47	.978	1.00

TO-254 HERMETIC



**CONFORMS TO JEDEC OUTLINE TO-210AC (TO-61)**  
 Dimensions in Millimeters (Inches)



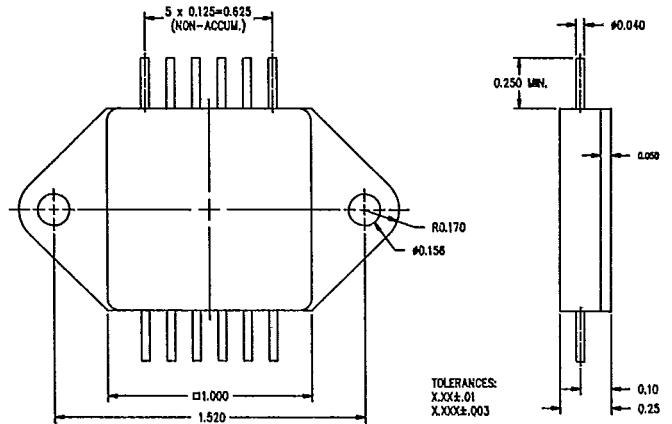
TERMINALS  
 1. SOURCE  
 2. GATE  
 3. DRAIN  
 4. ISOLATED STUD

Symbol	Inches		Millimeters		Notes
	Min.	Max.	Min.	Max.	
A	0.325	0.450	8.26	11.68	
A <sub>1</sub>	0.270		6.86		2
φD	0.610	0.687	15.49	17.45	2
φD <sub>1</sub>	0.570	0.610	14.48	15.49	
E	0.667	0.687	16.94	17.45	
e	0.340	0.415	8.64	10.54	5
e <sub>1</sub>	0.170	0.213	4.32	5.41	5
F	0.090	0.150	2.29	3.81	1

Symbol	Inches		Millimeters		Notes
	Min.	Max.	Min.	Max.	
J	0.640	0.875	16.26	22.23	
φM	0.220	0.249	5.59	6.32	
N	0.422	0.455	10.72	11.56	
N <sub>1</sub>		0.090		2.29	
φt	0.055	0.072	1.19	1.83	
φt <sub>1</sub>	0.046	0.077	1.17	1.96	4
φW	0.2225	0.2768	5.561	5.761	3

- NOTES
1. DIMENSION DOES NOT INCLUDE SEALING FLANGES.
  2. PACKAGE CONTOUR OPTIONAL WITHIN DIMENSIONS SPECIFIED.
  3. PITCH DIAMETER - THREAD 1/4 28 UNF 2A (COATED).  
 REFERENCE ISCREW THREAD STANDARDS FOR FEDERAL SERVICES - HANDBOOK H 281.
  4. THIS TERMINAL CAN BE FLATTENED AND PIERCED OR HOOK TYPE.
  5. POSITION OF LEADS IN RELATION TO THE HEXAGON IS NOT CONTROLLED.

**QUADPAC**



**Z-Pac**

