

MOSIGBTs

T-39-13

IXYS' MOSIGBT combines the best characteristics of Power MOSFET and bipolar devices on a single monolithic chip. The MOS gated input allows the MOSIGBT to be voltage driven like a MOSFET. The complexity and cost of the drive circuitry is greatly reduced. Since the MOSIGBT uses minority carrier injection to improve current density, its turn-off behavior is a combination of MOSFET and bipolar characteristics.

Although turn-off time is slower than MOSFETs, MOSIGBTs have much faster turn-off time than bipolar darlington's of similar rating. On the other hand, the bipolar output characteristics yield ten times improved current handling and on-state voltage drop ($V_{CE(sat)}$) which significantly reduces conduction losses when compared to an equivalent size MOSFET.

IXYS' family of discrete MOSIGBTs extend from 10 to 40 amps (rated at $T_c=90^\circ\text{C}$) and are available in standard low cost TO-220, TO-247 and TO-204 packages.

High Peak Current At 1000 Volts

IXYS has significantly advanced the basic IGBT structure beyond what was previously available from competitors. Due to the combination of IXYS' proprietary HDMOS process and our unique ballasted gate cell structure, we now guarantee a peak current rating which is four times the 90°C continuous rating. The device performs reliably in the most demanding industrial, commercial and military applications.

The high current switching capability of MOSIGBTs extends to 1000 volts covering a broad range of line voltages. No other device now offers the MOSIGBTs' combination of low conduction losses, high peak current, and fast switching.

New Isolated Packages

The IXYS MOSIGBTs is currently available in standard TO-220, TO-204 and TO-247 non-isolated packages.

In applications which need a ruggedized isolated package, IXYS supplies its 40 amp MOSIGBT with a

Device:
IXGM40N50A

Conditions:

$T_c = 125^\circ\text{C}$

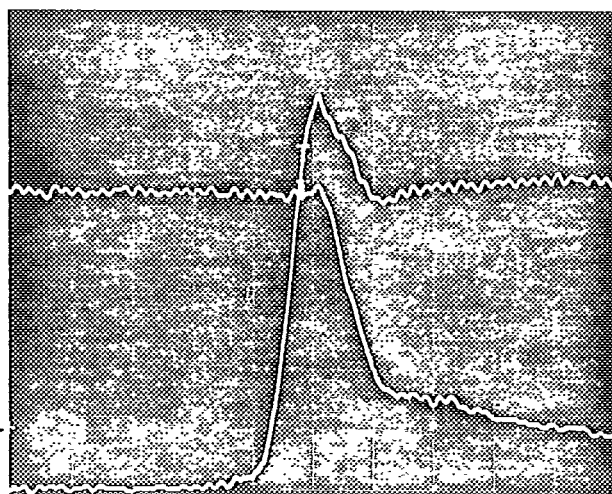
$R_g = 11\Omega$

$I = 10\text{ A/Div}$

$V = 50\text{ V/Div}$

$T = 100\text{ ns/Div}$

Zero Current 



Superior Efficiency At 20 kHz

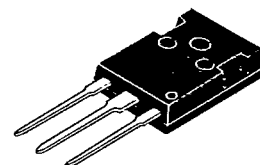
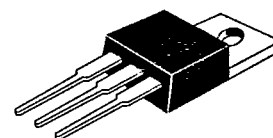
The MOSIGBT is a superior alternative for higher power inverter applications requiring switching frequencies above the audible range. The turn-off current fall time is typically under 300 ns at elevated temperature. Because they switch to 50 kHz, the designer has more alternatives to optimize a system design for size, weight and efficiency.

The low on-state voltage drop $V_{CE(sat)}$ of the MOSIGBT is typically 2.5 volts. With a reduced temperature coefficient of less than 10% from 25°C to 150°C junction temperature, a MOSIGBT further improves system efficiency by reducing conduction losses.

complementary fast recovery rectifier in the TO-238 package. With rugged screw-on terminals, all copper isolated base plate, and low-inductance internal construction meeting U/L requirements, it is an excellent cost-effective alternative for motor drives, UPS systems, and similar industrial and commercial applications.

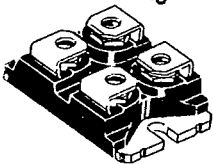
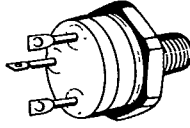
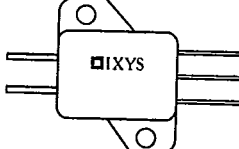
Power MOSIGBTs

Part Number	Collector- Emitter Voltage V _{CE} (Volts)	Continuous Collector Current		Pulsed Collector Current I _{CM} (Amps)	Collector Emitter Sat. Volt. V _{CE(sat)} (Volts)	Current Fall Time t _f (nS)	Power Diss. P _C Max (Watts)	Notes	Case Style
		T _C =25 °C I _{C(cont)} (Amps)	T _C =90 °C I _{C(cont)} (Amps)						
IXGP10N100	1000	20	10	40	2.7	3000	100		TO-220
IXGP10N100A	1000	20	10	40	3.5	1000	100		
IXGP10N90	900	20	10	40	2.7	3000	100		
IXGP10N90A	900	20	10	40	3.5	1000	100		
IXGP10N80	800	20	10	40	2.7	3000	100		
IXGP10N80A	800	20	10	40	3.5	1000	100		
IXGP10N60	600	20	10	40	2.5	2000	100		
IXGP10N60A	600	20	10	40	3.0	600	100		
IXGP10N50	500	20	10	40	2.5	2000	100		
IXGP10N50A	500	20	10	40	3.0	600	100		
IXGH25N100	1000	50	25	100	2.7	4000	200		TO-247
IXGH25N100A	1000	50	25	100	3.5	1500	200		
IXGH20N100	1000	40	20	70	2.7	3000	150		
IXGH20N100A	1000	40	20	70	3.5	1000	150		
IXGH25N90	900	50	25	100	2.7	4000	200		
IXGH25N90A	900	50	25	100	3.5	1500	200		
IXGH20N90	900	40	20	70	2.7	3000	150		
IXGH20N90A	900	40	20	70	3.5	1000	150		
IXGH25N80	800	50	25	100	2.7	4000	200		
IXGH25N80A	800	50	25	100	3.5	1500	200		
IXGH20N80	800	40	20	70	2.7	3000	150		
IXGH20N80A	800	40	20	70	3.5	1000	150		
IXGH40N60	600	75	40	150	2.7	3000	250		
IXGH40N60A	600	75	40	150	3.2	800	250		
IXGH30N60	600	50	30	100	2.5	3000	200		
IXGH30N60A	600	50	30	100	3.0	800	200		
IXGH20N60	600	40	20	70	2.5	2000	150		
IXGH20N60A	600	40	20	70	3.0	600	150		
IXGH40N50	500	75	40	150	2.7	3000	250		
IXGH40N50A	500	75	40	150	3.2	800	250		
IXGH30N50	500	50	30	100	2.5	3000	200		
IXGH30N50A	500	50	30	100	3.0	800	200		
IXGH20N50	500	40	20	70	2.5	2000	150		
IXGH20N50A	500	40	20	70	3.0	600	150		



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Power MOSIGBTs

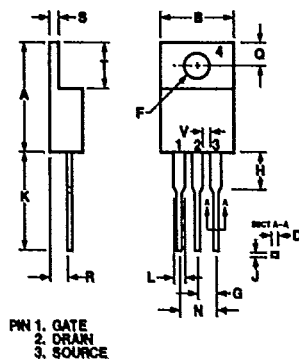
Part Number	Collector-Emitter Voltage V _{CE} (Volts)	Continuous Collector Current		Pulsed Collector Current I _{CM} (Amps)	Collector Emitter Sat. Volt. V _{CE(sat)} (Volts)	Current Fall Time t _f (nS)	Power Diss. P _C Max (Watts)	Notes	Case Style
		T _c =25 °C I _{C(cont)} (Amps)	T _c =90 °C I _{C(cont)} (Amps)						
IXGN50N100	1000	50	---	100	3.7	1000	250	1	N - Package 
IXGN75N60	600	75	---	150	3.2	800	250	1	
IXGN50N60	600	50	---	100	3.2	800	250	1	
IXGN75N50	500	75	---	150	3.2	800	250	1	
IXGN50N50	500	50	---	100	3.2	800	250	1	
IXGM25N100A	1000	50	25	100	3.5	1000	200	TO-204 (TO-3) 	
IXGM20N100A	1000	40	20	70	3.5	1000	150		
IXGM10N100A	1000	20	10	40	3.5	1000	100		
IXGM25N90A	900	50	25	100	3.5	1000	200		
IXGM20N90A	900	40	20	70	3.5	1000	150		
IXGM10N90A	900	20	10	40	3.5	1000	100		
IXGM25N80A	800	50	25	100	3.5	1000	200		
IXGM20N80A	800	40	20	70	3.5	1000	150		
IXGM10N80A	800	20	10	40	3.5	1000	100		
IXGM40N60A	600	60	40	150	3.2	800	250		
IXGM30N60A	600	50	30	100	3.0	800	200		
IXGM20N60A	600	40	20	70	3.0	600	150		
IXGM10N60A	600	20	10	40	3.0	600	100		
IXGM40N50A	500	60	40	150	3.2	800	250		
IXGM30N50A	500	50	30	100	3.0	800	200		
IXGM20N50A	500	40	20	70	3.0	600	150		
IXGM10N50A	500	20	10	40	3.0	600	100		
IXGS30N100	1000	30	17	72	3.5	1000	125	TO-210AC (TO-61) 	
IXGS30N90	900	30	17	72	3.5	1000	125		
IXGS30N80	800	30	17	72	3.5	1000	125		
IXGS30N60	600	30	20	84	3.0	600	125		
IXGS30N50	500	30	20	84	3.0	600	125		
IXGZ75N100	1000	75	35	140	3.7	1000	250	1	Z-Pac 
IXGZ50N100	1000	50	25	100	3.5	1000	200	1	
IXGZ75N90	900	75	35	140	3.7	1000	250	1	
IXGZ50N90	900	50	25	100	3.5	1000	200	1	
IXGZ75N80	800	75	35	140	3.7	1000	250	1	
IXGZ50N80	800	50	25	100	3.5	1000	200	1	
IXGZ75N60	600	75	40	150	3.2	800	250	1	
IXGZ50N60	600	50	30	100	3.0	800	200	1	
IXGZ75N50	500	75	40	150	3.2	800	250	1	
IXGZ50N50	500	50	30	100	3.0	800	200	1	

Notes: 1. Available 4Q89

DETAILED PACKAGE OUTLINES

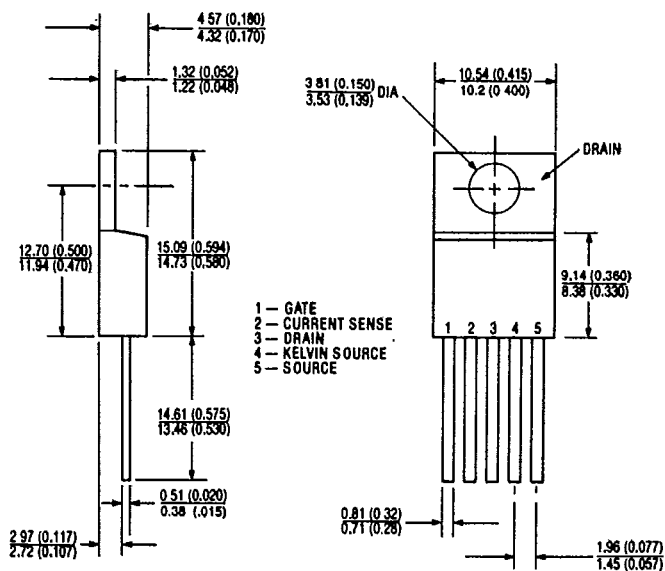
T-91-20

TO-220 AB

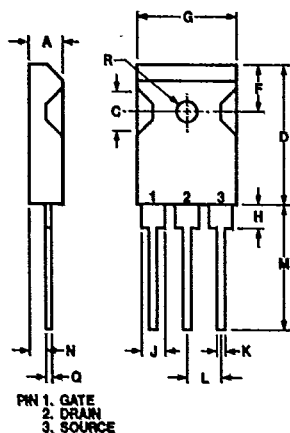


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	14.23	16.51	.560	.650
B	9.66	10.66	.380	.420
C	3.56	4.82	.140	.190
D	0.64	0.89	.025	.035
F	3.54	4.08	.139	.161
G	2.29	2.79	.090	.110
H	—	6.35	—	.250
J	0.51	.76	.020	.030
K	12.70	14.73	.500	.580
L	1.15	1.77	.045	.070
N	4.83	5.33	.190	.210
Q	2.54	3.42	.100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

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

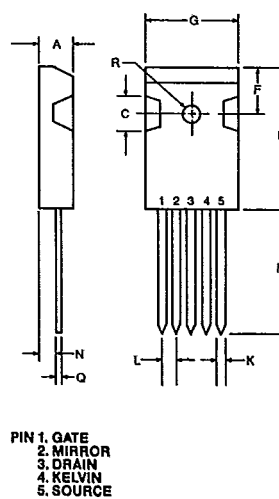


TO-247 (3 LEADED)



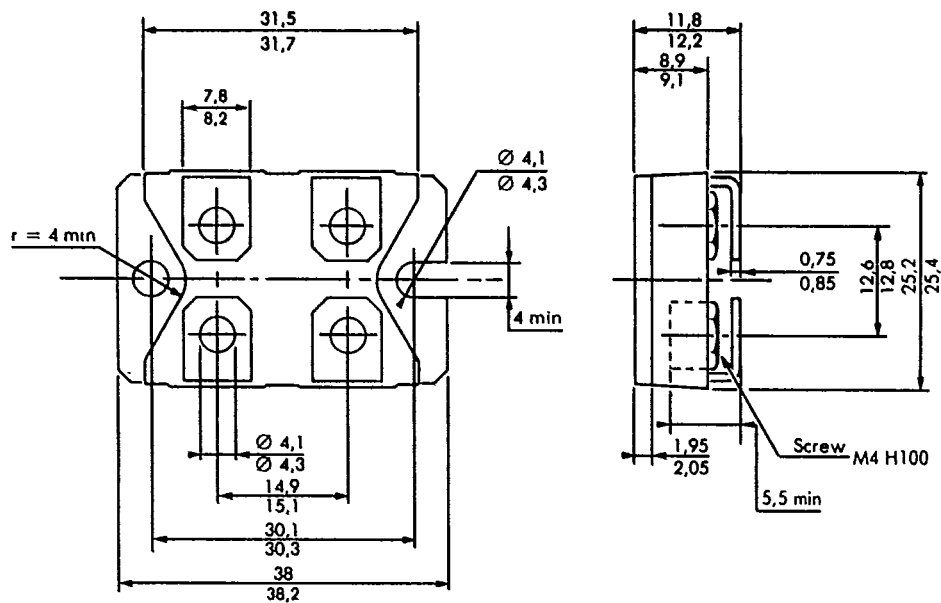
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
C	4.5	6.0	.178	.236
D	19.7	21.4	.776	.843
F	5.3	6.1	.209	.240
G	15.3	15.9	.602	.625
H	3.7	4.3	.146	.169
J	1.95	2.4	.077	.094
J ₁	2.97	3.4	.117	.134
K	1.0	1.4	.040	.055
L	5.4	5.5	.213	.217
M	19.9	20.2	.783	.795
N	2.2	2.6	.087	.102
Q	0.4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

TO-247 (5 LEADED)

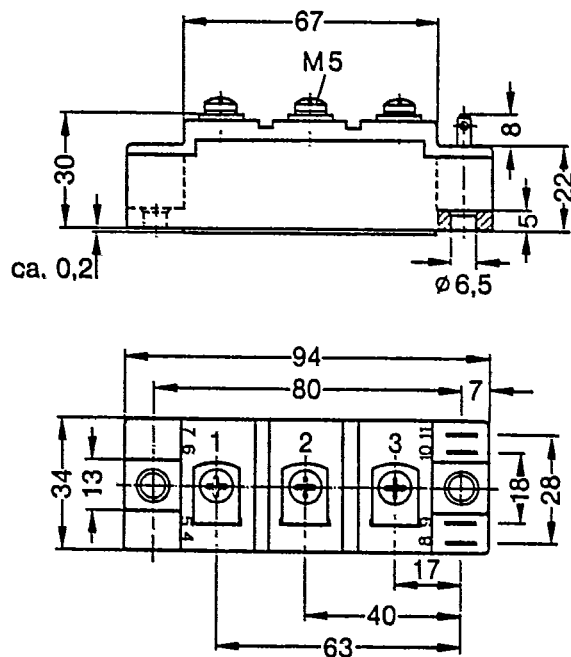


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
C	4.5	6.0	.178	.236
D	19.7	21.4	.776	.843
F	5.3	6.1	.209	.240
G	15.3	15.9	.602	.625
K	1.1	1.3	.043	.051
L	2.51	2.56	.099	.101
M	19.9	20.2	.783	.795
N	2.2	2.6	.087	.102
Q	0.4	0.8	.016	.031
R	2.9	3.3	.114	.129

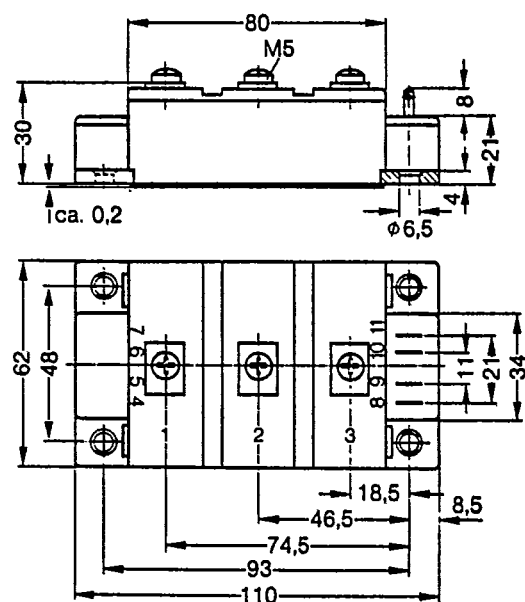
TO-238
Dimensions in Millimeters



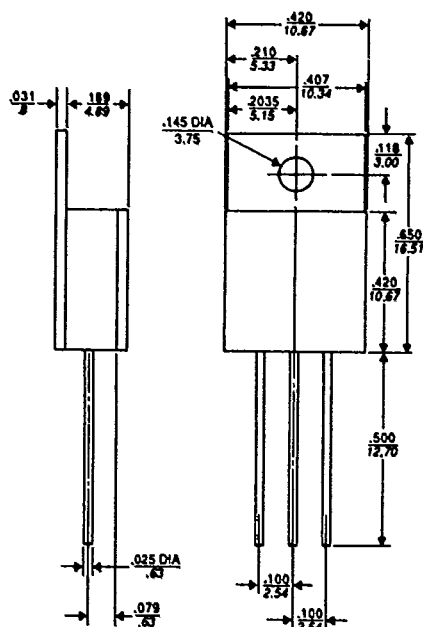
Y-4
Dimensions in Millimeters



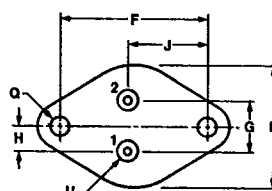
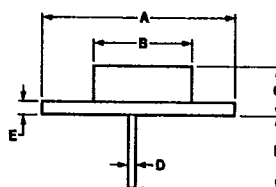
Y-3
Dimensions in Millimeters



TO-220 HERMETIC



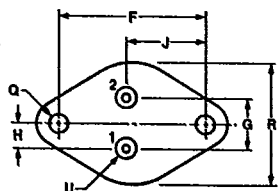
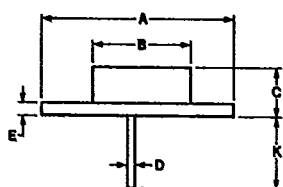
TO-204 AE



PIN 1. GATE
2. SOURCE
CASE - DRAIN

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

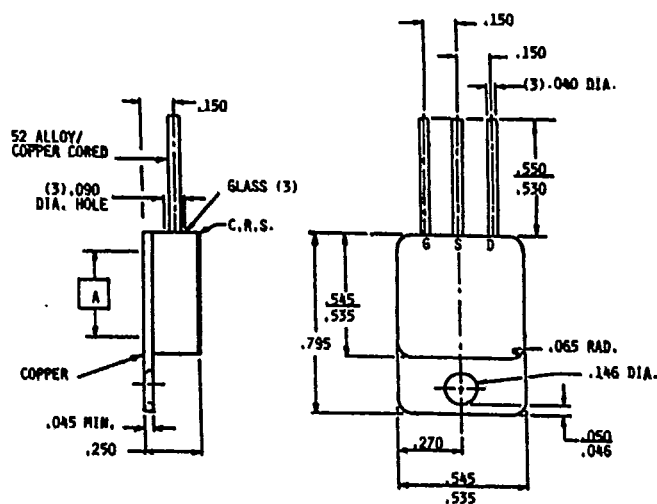
TO-204 AA



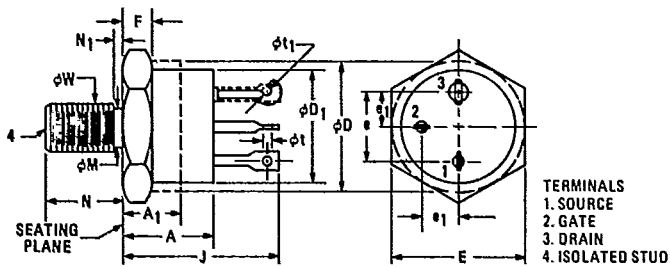
PIN 1. GATE
2. SOURCE
CASE - DRAIN

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

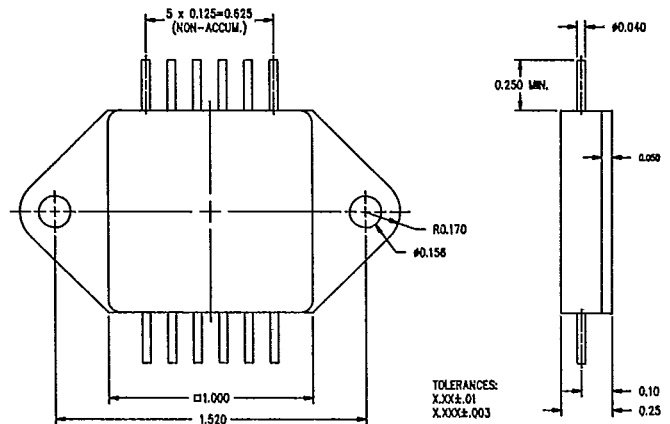
Symbol	Inches		Millimeters		Notes
	Min.	Max.	Min.	Max.	
A	0.325	0.450	8.26	11.68	
A ₁		0.270		6.86	2
ϕD	0.610	0.687	15.49	17.45	2
ϕD ₁	0.570	0.610	14.48	15.49	
E	0.667	0.687	16.94	17.45	
e	0.340	0.415	8.64	10.54	5
e ₁	0.170	0.213	4.32	5.41	5
F	0.090	0.150	2.29	3.81	1

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 ₁		0.090		2.29	
ϕt	0.055	0.072	1.19	1.83	
ϕt ₁	0.045	0.077	1.17	1.96	4
ϕW	0.2225	0.2268	5.661	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 IS SCREW 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

