POWER MOSFET IN HERMETIC ISOLATED TO257AB PACKAGE

SM8F13* SM8F23*** SM8F33*** SM8F43***

These devices offer the latest ruggedized MOSFET transistor die mounted in isolated and hermetically sealed metal packages. The standard MOSFET characteristics of very low on-state resistance and high transconductance are maintained. This product range features all of the proven advantages of MOSFET transistors such as excellent switching capability, low drive currents along with voltage control. SEMTECH power MOSFET's are ideally suited for applications such as switching power supplies, motor controls, choppers, audio amplifiers and high energy pulse circuits.

FEATURES

Fast Switching
Low Drive Current
Ease of Paralleling
Excellent Temperature Stability
Available with High Reliability Screening

QUICK REFERENCE DATA

- V_{DS} = 100V-500V
- I_D = 14A
- $R_{DS(ON)}$ = 0.18Ω

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

Parameter	Symbol	SM8F131	SM8F231	SM8F331	SM8F431	Units
Drain-Source Voltage	V_{DS}	100	200	400	500	V
Drain-Gate Voltage	V_{DGR}	100	200	400	500	V
Continuous Drain Current	I_D @ T_C=25°C	14	9.0	5.5	4.5	A
Continuous Drain Current	I_D @ T_C=100°C	9.0	6.0	3.5	3.0	A
Pulsed Drain Current (1)	I_{DM}	56	36	22	18	A
Max. Power Dissipation	P_D @ T_C=25°C	50	50	50	50	W
Gate-Source Voltage	V_{GS}	20	20	20	20	V
Operating Junction and Storage Temperature Range	T_J , T_{stg}	-55 to 150	-55 to 150	-55 to 150	-55 to 150	°C

(1) Pulse Test: Pulsewidth = 300µs; Duty Cycle < 2%

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ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

Symbol	Parameter	Device	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	SM8F431	500	-	-	V	V_{GS}=0V, I_D=1.0mA
		SM8F331	400	-	-		
		SM8F231	200	-	-		
		SM8F131	100	-	-		
$V_{GS(th)}$	Gate Threshold Voltage	all	2.0	-	4.0	V	V_{DS}=V_{GS}, I_D=250µA
I_{GSS}	Gate-Source Leakage	all	-	-	100	nA	V_{GS}=20V
I_{DSS}	Zero Gate Voltage Drain Current	all	-	-	50	µA	V_{DS}=.8 x Rated V_{DS}, V_{GS}=0V
$R_{DS(on)}$	Static Drain-Source On-State Resistance (1)	SM8F431	-	1.3	1.5	Ω	V_{GS}=10V, I_D=2..5A
		SM8F331	-	0.80	1.0		V_{GS}=10V, I_D=3.0A
		SM8F231	-	0.25	0.40		V_{GS}=10V, I_D=5.0A
		SM8F131	-	0.14	0.19		V_{GS}=10V, I_D= 8.0A
g_{fs}	Forward Transconductance (1)	SM8F431	2.5	3.25	-	S	V_{DS}=15V, I_D=2.5A
		SM8F331	3.0	4.0	-		V_{DS}=15V, I_D=3.0A
		SM8F231	3.0	4.8	-		V_{DS}=15V, I_D=5.0A
		SM8F131	4.0	5.5	-		V_{DS}=15V, I_D= 8.0A
C_{iss}	Input Capacitance	SM8F431	-	600	-	pF	V_{GS}=0V, V_{DS}=25V, f=1.0MHz
		SM8F331	-	600	-		
		SM8F231	-	600	-		
		SM8F131	-	600	-		
C_{oss}	Output Capacitance	SM8F431	-	100	-	pF	V_{GS}=0V, V_{DS}=25V, f=1.0MHz
		SM8F331	-	150	-		
		SM8F231	-	250	-		
		SM8F131	-	300	-		
C_{rss}	Reverse Transfer Capacitance	SM8F431	-	30	-	pF	V_{GS}=0V, V_{DS}=25V, f=1.0MHz
		SM8F331	-	40	-		
		SM8F231	-	80	-		
		SM8F131	-	100	-		
$t_{d(on)}$	Turn-On Delay Time	SM8F431	-	18	30	nS	V_{DD}=0.5 V_{DS} max., I_D=I_D max @ 25°C
		SM8F331	-	18	30		
		SM8F231	-	12	30		
		SM8F131	-	15	30		
t_r	Rise Time	SM8F431	-	20	30	nS	V_{DD}=0.5 V_{DS} max., I_D=I_D max @ 25°C
		SM8F331	-	20	35		
		SM8F231	-	18	50		
		SM8F131	-	35	75		
$t_{d(off)}$	Turn-Off Delay Time	SM8F431	-	42	55	nS	V_{DD}=0.5 V_{DS} max., I_D=I_D max @ 25°C
		SM8F331	-	40	55		
		SM8F231	-	35	50		
		SM8F131	-	38	40		
t_f	Fall Time	SM8F431	-	25	30	nS	V_{DD}=0.5 V_{DS} max., I_D=I_D max @ 25°C
		SM8F331	-	25	35		
		SM8F231	-	27	40		
		SM8F131	-	23	45		
$Q_{g(on)}$	On State Gate Charge	SM8F431	-	22	30	nC	V_{GS}=10V, I_D=I_D max @ 25°C, V_{DS}=.8 max RATING
		SM8F331	-	12	30		
		SM8F231	-	11	30		
		SM8F131	-	10	30		
Q_{gs}	Gate-Source Charge	SM8F431	-	22	16	nC	V_{GS}=10V, I_D=I_D max @ 25°C, V_{DS}=.8 max RATING
		SM8F331	-	18	16		
		SM8F231	-	19	15		
		SM8F131	-	18	14		
Q_{gd}	Gate-Drain Charge	SM8F431	-	11	17	nC	V_{GS}=10V, I_D=I_D max @ 25°C, V_{DS}=.8 max RATING
		SM8F331	-	11	18		
		SM8F231	-	10	15		
		SM8F131	-	9	13		

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SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS

Symbol	Parameter	Device	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	SM8F431	-	-	4.5	A	
		SM8F331	-	-	5.5		
		SM8F231	-	-	9.0		
		SM8F131	-	-	14		
I_{SM}	Pulsed Source Current (Body Diode)	SM8F431	-	-	16	A	
		SM8F331	-	-	20		
		SM8F231	-	-	36		
		SM8F131	-	-	56		
V_{SD}	Diode Forward Voltage (1)	SM8F431	-	-	1.6	V	T_J=25°C, I_S=I_S max., V_{GS}=0V
		SM8F331	-	-	1.6		
		SM8F231	-	-	2 0		
		SM8F151	-	-	2.5		
t_{rr}	Reverse Recovery Time	SM8F431	-	370	760	ns	T_J=25°C, I_F=I_S max , di/dt=100 A/s
		SM8F331	-	300	660		
		SM8F231	-	170	400		
		SM8F131	-	120	250		
Q_{rr}	Reverse Recovery Charge	SM8F431	-	2.0	4.3	µC	T_J=25°C, I_F=I_S max., di/dt=100 A/s
		SM8F331	-	2.0	4.3		
		SM8F231	-	1.3	2.7		
		SM8F131	-	0.58	1.3		

(1) Pulse Test: Pulsewidth = 300µs; Duty Cycle < 2%

THERMAL RESISTANCE

Symbol	Parameter	Device	Max	Units
$R_{\theta JC}$	Junction to Case	All	2.5	°C/W
$R_{\theta JA}$	Junction to Ambient		80	°C/W

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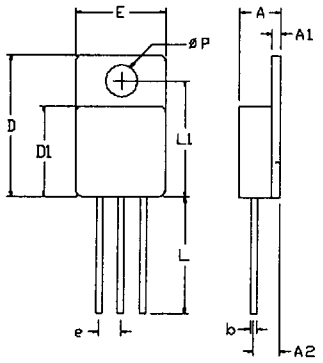
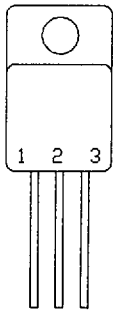
MECHANICAL OUTLINE AND CONFIGURATION



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX	MIN.	MAX.
A	4.83	5 33	.190	.210
A1	.635	0.89	.025	D35
A2	2 79	BSC	110	BSC
b	.089	1.14	.035	.045
D	16 38	16.89	.645	.665
D1	10.41	10.92	.410	.430
e	2 54	BSC	.100	BSC
E	10.41	10.92	410	.430
L	12.70	19.05	.500	750
L1	13.21	13.72	520	.540
P	3.56	3.81	.140	.150



STANDARD	ALTERNATE
1. Drain	1. Gate
2. Source	2. Drain
3. Gate	3. Source

ORDERING INFORMATION

The last three characters of the SEMTECH part numbering system identify the device pinout, lead bend configuration and the level of testing required. All devices are tested for hermeticity and compliance to the appropriate electrical characteristics.

Pinout

1- Standard pinout Drain Source Gate
T- Alternate pinout Gate Drain Source

Lead Bend

S- Straight Leads
D- 90° Bend Down (see fig 6 at the end of this section)
C- Claw Bend Down (see fig 5 at the end of this section)

Screening

U- Unscreened
T- Screening per MIL-S-19500 Table II
F- Screening per MIL-S-19500/543 Table II

e.g SM8F431DF is a standard pinout SM8F431 with bent leads and screening to MIL-S-19500/543 Table II.

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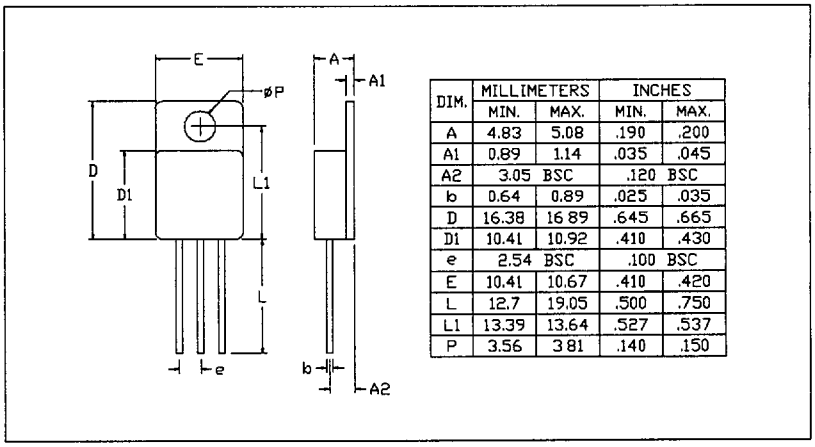
(Unless specified by the customer, devices will be standard pinout, have straight leads and be unscreened.)

PACKAGE OUTLINE DRAWINGS



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.83	5.08	.190	.200
A1	0.89	1.14	.035	.045
A2	3.05 BSC		.120 BSC	
b	0.64	0.89	.025	.035
D	16.38	16 89	.645	.665
D1	10.41	10.92	.410	.430
e	2.54 BSC		.100 BSC	
E	10.41	10.67	.410	.420
L	12.7	19.05	.500	.750
L1	13.39	13.64	.527	.537
P	3.56	3 81	.140	.150

Fig.1 STRAIGHT LEAD TO257AA (S-SUFFIX)

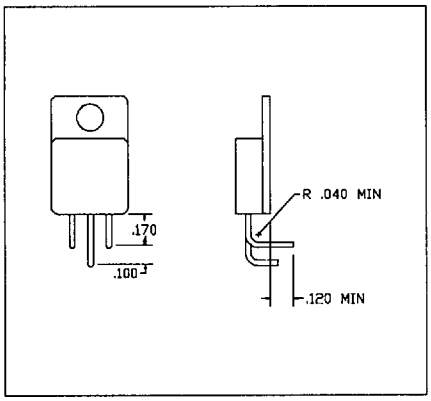


Fig.2 CLAW BEND TO257AA (C-SUFFIX)

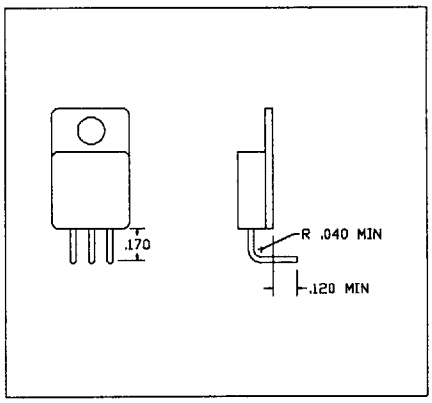


Fig.3 BENT DOWN LEAD TO257AA (D-SUFFIX)

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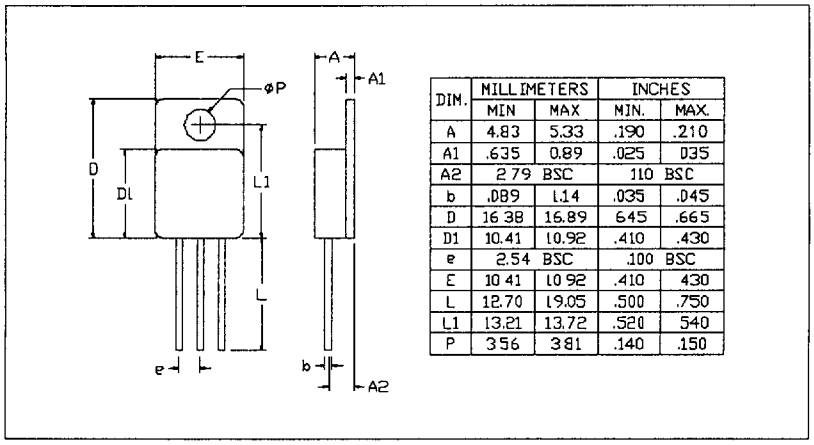
PACKAGE OUTLINE DRAWINGS



DIM.	MILLIMETERS		INCHES	
	MIN	MAX	MIN.	MAX.
A	4.83	5.33	.190	.210
A1	.635	0.89	.025	035
A2	2.79 BSC		110 BSC	
b	.089	1.14	.035	.045
D	16.38	16.89	645	.665
D1	10.41	10.92	.410	.430
e	2.54 BSC		.100 BSC	
E	10.41	10.92	.410	430
L	12.70	19.05	.500	.750
L1	13.21	13.72	.520	540
P	3.56	3.81	.140	.150

Fig.4 STRAIGHT LEAD TO257AB (S-SUFFIX)

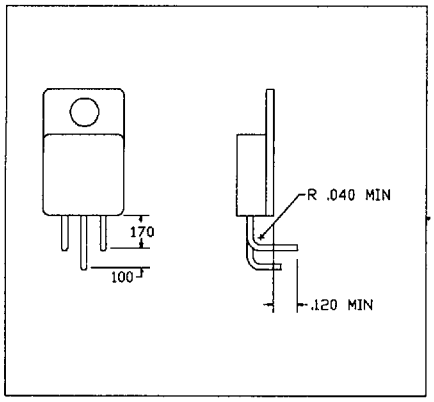


Fig.5 CLAW BEND TO257AB (C-SUFFIX)

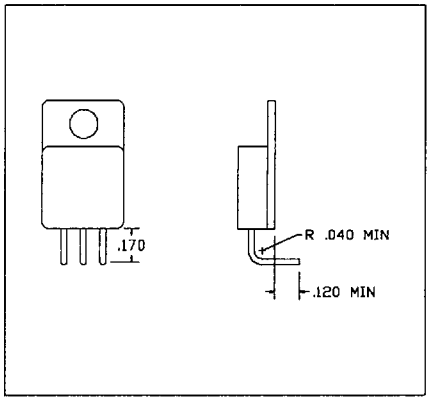


Fig.6 BENT DOWN LEAD TO257AB (D-SUFFIX)

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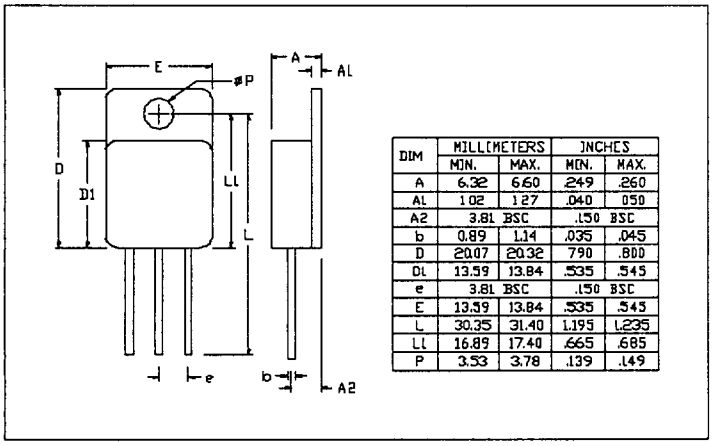


DIM	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	6.32	6.60	.249	.260
A1	1.02	1.27	.040	.050
A2	3.81 BSC		.150 BSC	
b	0.89	1.14	.035	.045
D	20.07	20.32	.790	.800
D1	13.59	13.84	.535	.545
e	3.81 BSC		.150 BSC	
E	13.59	13.84	.535	.545
L	30.35	31.40	1.195	1.235
L1	16.89	17.40	.665	.685
P	3.53	3.78	.139	.149

Fig.7 STRAIGHT LEAD TO254AA (S-SUFFIX)

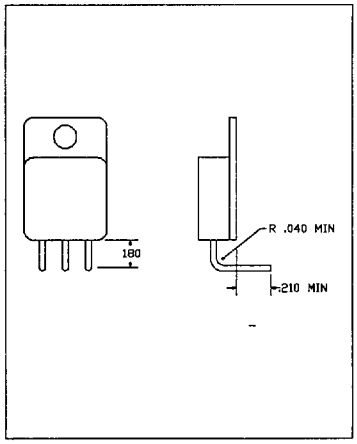
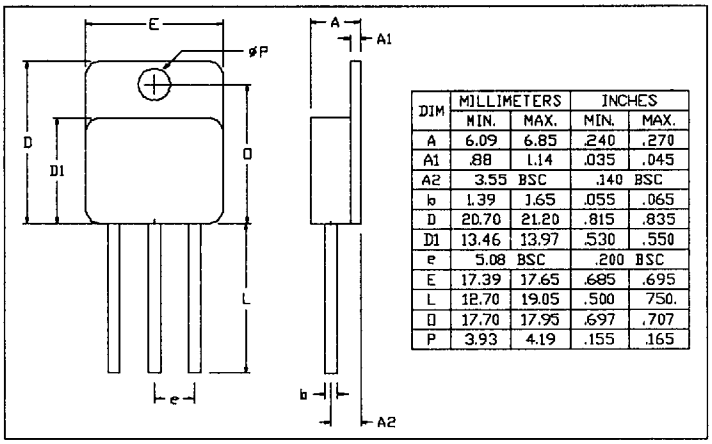


Fig.8 BENT DOWN LEAD TO254AA (D-SUFFIX)



DIM	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	6.09	6.85	.240	.270
A1	.88	1.14	.035	.045
A2	3.55 BSC		.140 BSC	
b	1.39	1.65	.055	.065
D	20.70	21.20	.815	.835
D1	13.46	13.97	.530	.550
e	5.08 BSC		.200 BSC	
E	17.39	17.65	.685	.695
L	12.70	19.05	.500	750.
Q	17.70	17.95	.697	.707
P	3.93	4.19	.155	.165

Fig.9 STRAIGHT LEAD TO258AA (S-SUFFIX)

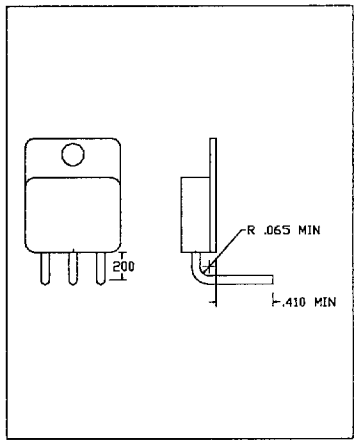


Fig.10 BENT DOWN LEAD TO258AA (D-SUFFIX)

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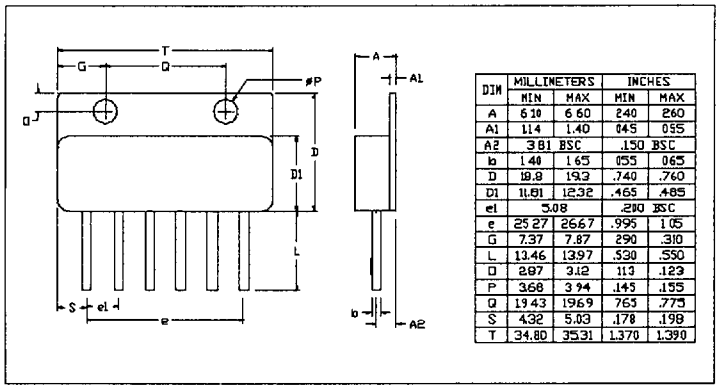
PACKAGE OUTLINE DRAWINGS



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.10	6.60	.240	.260
A1	1.14	1.40	.045	.055
A2	3.81 BSC		.150 BSC	
b	1.40	1.65	.055	.065
D	19.8	19.3	.740	.760
D1	11.81	12.32	.465	.485
e1	5.08		.200 BSC	
e	25.27	26.67	.995	1.05
G	7.37	7.87	.290	.310
L	13.46	13.97	.530	.550
Q	2.87	3.12	.113	.123
P	3.68	3.94	.145	.155
Q	19.43	19.69	.765	.775
S	4.32	5.03	.178	.198
T	34.80	35.31	1.370	1.390

Fig.11 STRAIGHT LEAD 6 PIN TOP MOUNT (S-SUFFIX)

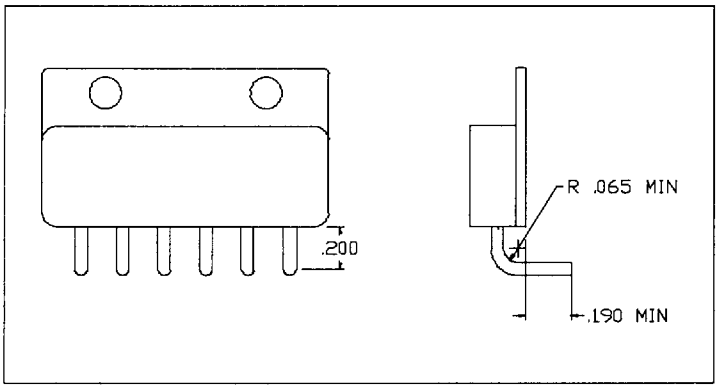
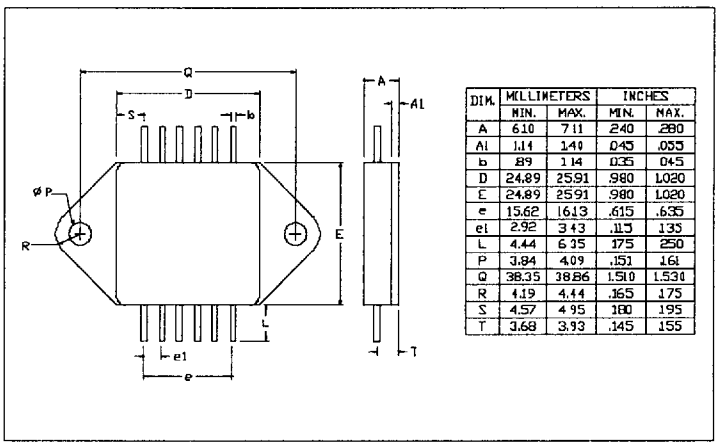


Fig.12 BENT DOWN 6 PIN TOP MOUNT (D-SUFFIX)



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	6.10	7.11	.240	.280
A1	1.14	1.40	.045	.055
b	.89	1.14	.035	.045
D	24.89	25.91	.980	1.020
E	24.89	25.91	.980	1.020
e	15.62	16.13	.615	.635
e1	2.92	3.43	.115	.135
L	4.44	6.35	.175	.250
P	3.84	4.09	.151	.161
Q	38.35	38.86	1.510	1.530
R	4.19	4.44	.165	.175
S	4.57	4.95	.180	.195
T	3.68	3.93	.145	.155

Fig.13 12 PIN "QUADPACK"

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