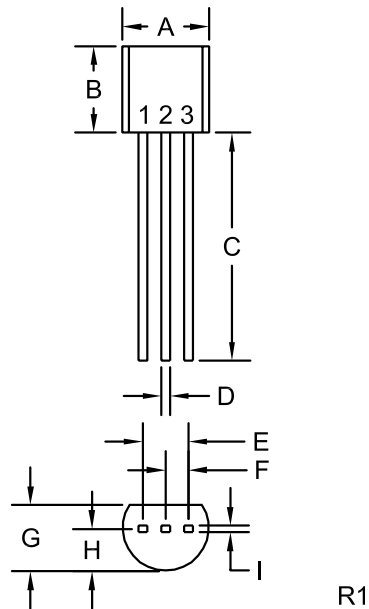


Package Details - TO-92

Mechanical Drawing



DIMENSIONS				
SYMBOL	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A (DIA)	0.175	0.205	4.45	5.21
B	0.170	0.210	4.32	5.33
C	0.500	-	12.70	-
D	0.016	0.022	0.41	0.56
E	0.100		2.54	
F	0.050		1.27	
G	0.125	0.165	3.18	4.19
H	0.080	0.105	2.03	2.67
I	0.015		0.38	

TO-92 (REV: R1)

LEAD CODE:

* SCR

- | | | |
|------------|----|------------|
| 1) ANODE | | 1) CATHODE |
| 2) GATE | or | 2) GATE |
| 3) CATHODE | | 3) ANODE |

* FET

- | | | |
|-----------|----|-----------|
| 1) DRAIN | | 1) DRAIN |
| 2) SOURCE | | 2) GATE |
| 3) GATE | or | 3) SOURCE |
| 1) GATE | | 1) SOURCE |
| 2) SOURCE | | 2) DRAIN |
| 3) DRAIN | | 3) GATE |

PUT

- 1) ANODE
- 2) GATE
- 3) CATHODE

TRIAC

- 1) MT1
- 2) GATE
- 3) MT2

* TRANSISTOR

- | | | |
|--------------|----|--------------|
| 1) EMITTER | | 1) EMITTER |
| 2) BASE | | 2) COLLECTOR |
| 3) COLLECTOR | | 3) BASE |
| | or | |
| 1) COLLECTOR | | 1) BASE |
| 2) BASE | | 2) EMITTER |
| 3) EMITTER | | 3) COLLECTOR |

* Note: See individual device datasheet for pinout information

Packing Code: D

D = White corrugated box with black conductive coating (surface resistivity of $<10^5$ ohms per square).

Standard Packing Quantity: 2.5K

Also available in the following lead form options
TO-92-SF, TO-92-ST, TO-92-ST1, TO-92-18F, TO-92-18R

Package Details - TO-92 TR

Tape and Reel Specifications

1.0. Purpose:

This specification defines the tape and reel packaging requirements for TO-92 devices. Devices supplied to this specification are taped in accordance with Electronic Industries Association Standard EIA-468-B.

2.0 Requirements:

- 2.1 Tape and Reel Requirements: Devices to be taped and reeled in accordance with Figures 2 and 3.
- 2.2 Style Type: A suffix is added to part number to indicate Style Type.
Example: CS92B TRE (CS92B taped and reeled in accordance with STYLE E). Note: STYLE E is preferred.
- 2.3 Packaging Base: Devices to be taped 2000 pieces per reel.

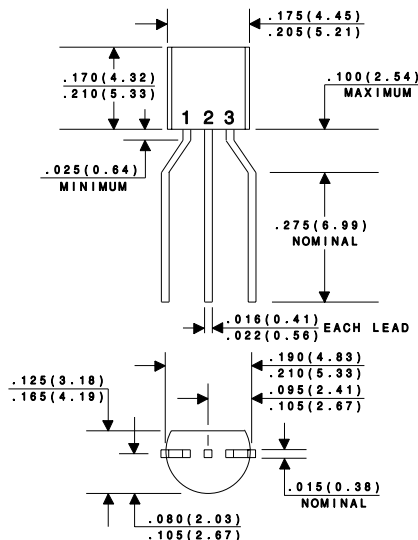


FIGURE 1. PHYSICAL DIMENSIONS
ALL DIMENSIONS IN INCHES (mm).

Package Details - TO-92 TR

Tape and Reel Specifications (Continued)

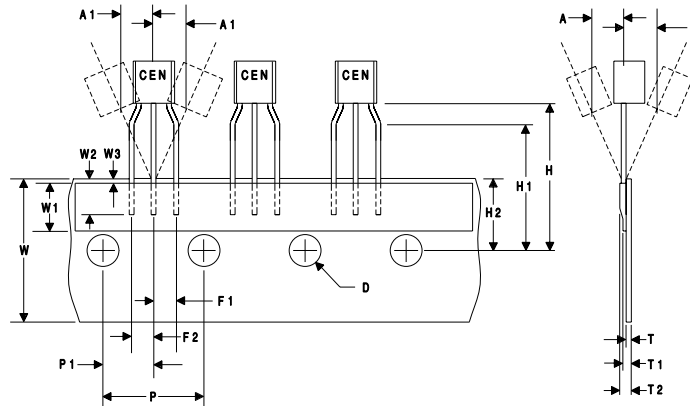


FIGURE 2. TAPING SPECIFICATIONS

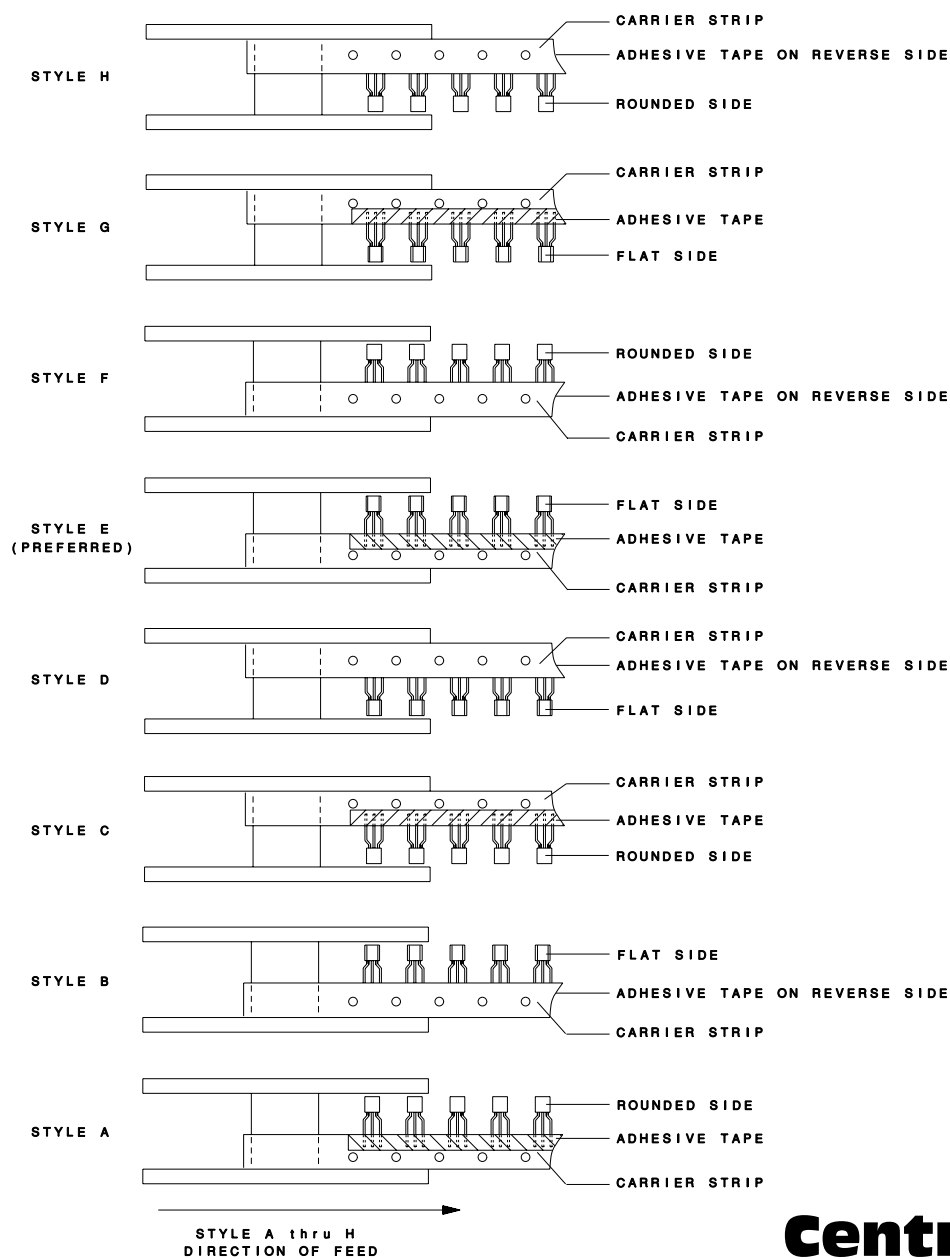
SYMBOL	DESCRIPTION	INCHES		MM		NOTE
		MIN	MAX	MIN	MAX	
A	FRONT TO REAR DEFLECTION	---	0.039	---	1.0	1
A1	LEFT TO RIGHT DEFLECTION	---	0.039	---	1.0	
D	FEED HOLE DIAMETER	0.15	0.17	3.8	4.2	
F1	COMPONENT LEAD PITCH	0.09	0.11	2.4	2.9	6
F2	COMPONENT LEAD PITCH	0.09	0.11	2.4	2.9	6
H	FEED HOLE TO BOTTOM OF COMPONENT	0.75	0.79	19.0	20.0	
H1	HEIGHT OF SEATING PLANE	0.61	0.65	15.5	16.5	2
H2	HEIGHT OF FEED HOLE LOCATION	0.33	0.37	8.5	9.5	7,8
P	FEED HOLE PITCH	0.49	0.51	12.5	12.9	3
P1	CENTER OF SEATING PLANE LOCATION	0.23	0.26	5.95	6.75	
T	CARRIER TAPE THICKNESS	0.015	0.027	0.38	0.68	4
T1	OVERALL TAPE THICKNESS	0.020	0.035	0.50	0.90	
T2	TOTAL TAPED PACKAGE THICKNESS	---	0.057	---	1.44	4
W	CARRIER TAPE WIDTH	0.69	0.75	17.5	19.0	
W1	ADHESIVE TAPE WIDTH	0.20	0.28	5.0	7.0	5
W2	LEAD ENCLOSURE	0.18	---	4.5	---	
W3	ADHESIVE TAPE POSITION	---	0.020	---	0.5	5

- NOTES:
- 1) MAXIMUM ALIGNMENT DEVIATION BETWEEN LEADS NOT TO BE GREATER THAN 0.2mm.
 - 2) AS ILLUSTRATED, THE CLEARANCE TO THE LEAD STANDOFF FORM SHALL BE DEFINED TO THE POINT OF RADIUS FOR THE STANDOFF FORM.
 - 3) MAXIMUM CUMULATIVE VARIATION BETWEEN TAPE FEED HOLES SHALL NOT EXCEED 1.0mm IN 20 PITCHES.
 - 4) OVERALL TAPED PACKAGE THICKNESS, INCLUDING COMPONENT LEADS AND TAPE SPLICES SHALL NOT EXCEED 1.44mm.
 - 5) HOLDDOWN TAPE NOT TO EXTEND BEYOND THE EDGES OF CARRIER TAPE AND THERE SHALL BE NO EXPOSURE OF ADHESIVE.
 - 6) NO MORE THAN 0.1% MISSING AND NO CONSECUTIVE MISSING COMPONENTS PER REEL IS PERMITTED.
 - 7) A TAPE LEADER AND TRAILER, HAVING AT LEAST 3 SPROCKET HOLES IS REQUIRED.
 - 8) NO MORE THAN 10 SPLICES PER REEL IS PERMITTED AND SPLICES SHALL NOT INTERFERE WITH SPROCKET FEED HOLES.

Package Details - TO-92 TR

Tape and Reel Specifications (Continued)

FIGURE 3. TAPING STYLE



Package Details - TO-92 AP

Ammopack

Specifications

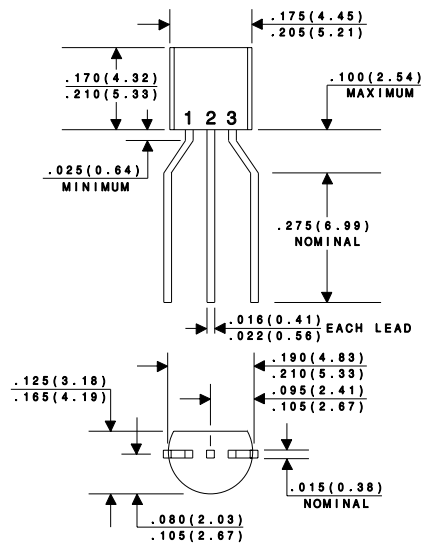
1.0. PURPOSE:

This specification defines the TO-92 Ammopack requirements. Devices supplied to this specification are taped in accordance with Electronic Industries Association Standard EIA-468-B.

2.0 REQUIREMENTS:

- 2.1 Tape Requirements: Devices to be taped in accordance with Figure 2.
- 2.2 Style Type: STYLE M (PREFERRED) or STYLE P (See Figures 3 and 4).
- 2.3 Ordering Info: Add suffix to part number to indicate Style Type .
Suffix APM For STYLE M (Equivalent to reel pack STYLE E).
Example: CS92B APM (CS92B SCR, Ammopack STYLE M).
or
Suffix APP For STYLE P (Equivalent to reel pack STYLE A).
Example: CS92B APP (CS92B SCR, Ammopack STYLE P).
- 2.4 Packaging Base: Devices to be taped 2000 pieces per Ammopack.

FIGURE 1. PHYSICAL DIMENSIONS
All Dimensions in Inches (mm)



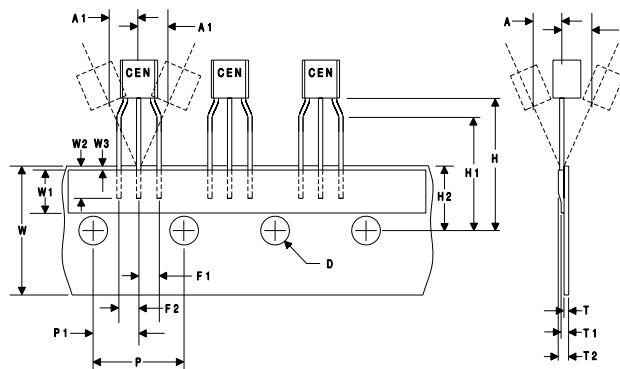
Package Details - TO-92 AP

TO-92 Ammopack

Specifications

(Continued)

FIGURE 2. (TAPING SPECIFICATIONS)



SYMBOL	DESCRIPTION	INCHES		MM		NOTE
		MIN	MAX	MIN	MAX	
A	FRONT TO REAR DEFLECTION	---	0.039	---	1.0	1
A1	LEFT TO RIGHT DEFLECTION	---	0.039	---	1.0	
D	FEED HOLE DIAMETER	0.15	0.17	3.8	4.2	
F1	COMPONENT LEAD PITCH	0.09	0.11	2.4	2.9	6
F2	COMPONENT LEAD PITCH	0.09	0.11	2.4	2.9	6
H	FEED HOLE TO BOTTOM OF COMPONENT	0.75	0.79	19.0	20.0	
H1	HEIGHT OF SEATING PLANE	0.61	0.65	15.5	16.5	2
H2	HEIGHT OF FEED HOLE LOCATION	0.33	0.37	8.5	9.5	7,8
P	FEED HOLE PITCH	0.49	0.51	12.5	12.9	3
P1	CENTER OF SEATING PLANE LOCATION	0.23	0.26	5.95	6.75	
T	CARRIER TAPE THICKNESS	0.015	0.027	0.38	0.68	4
T1	OVERALL TAPE THICKNESS	0.020	0.035	0.50	0.90	
T2	TOTAL TAPED PACKAGE THICKNESS	---	0.057	---	1.44	4
W	CARRIER TAPE WIDTH	0.69	0.75	17.5	19.0	
W1	ADHESIVE TAPE WIDTH	0.20	0.28	5.0	7.0	5
W2	LEAD ENCLOSURE	0.18	---	4.5	---	
W3	ADHESIVE TAPE POSITION	---	0.020	---	0.5	5

- NOTES:
- 1) MAXIMUM ALIGNMENT DEVIATION BETWEEN LEADS NOT TO BE GREATER THAN 0.2mm.
 - 2) AS ILLUSTRATED, THE CLEARANCE TO THE LEAD STANDOFF FORM SHALL BE DEFINED TO THE POINT OF RADIUS FOR THE STANDOFF FORM.
 - 3) MAXIMUM CUMULATIVE VARIATION BETWEEN TAPE FEED HOLES SHALL NOT EXCEED 1.0mm IN 20 PITCHES.
 - 4) OVERALL TAPED PACKAGE THICKNESS, INCLUDING COMPONENT LEADS AND TAPE SPLICES SHALL NOT EXCEED 1.44mm.
 - 5) HOLDDOWN TAPE NOT TO EXTEND BEYOND THE EDGES OF CARRIER TAPE AND THERE SHALL BE NO EXPOSURE OF ADHESIVE.
 - 6) NO MORE THAN 0.1% MISSING AND NO CONSECUTIVE MISSING COMPONENTS PER REEL IS PERMITTED.
 - 7) A TAPE LEADER AND TRAILER, HAVING AT LEAST 3 SPROCKET HOLES IS REQUIRED.
 - 8) NO MORE THAN 10 SPLICES PER REEL IS PERMITTED AND SPLICES SHALL NOT INTERFERE WITH SPROCKET FEED HOLES.

Package Details - TO-92 AP

Ammopack

Specifications (Continued)

FIGURE 3. STYLE M (PREFERRED)

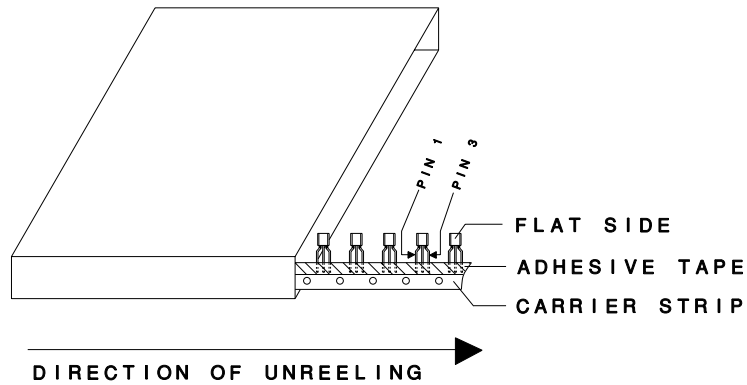
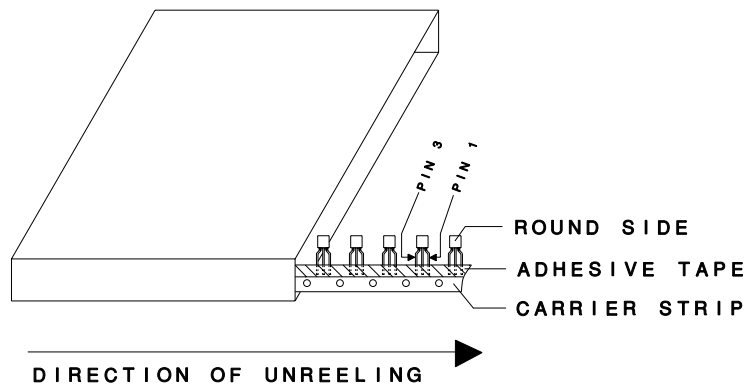


FIGURE 4. STYLE P



Note: The box is accessible from either side depending upon whether PIN 1 or PIN 3 is required at the leading edge.

Material Composition Specification

TO-92 (Eutectic Die Attach)



Pb (lead)-free plating**



Device average mass 206 mg

Fluctuation margin +/-10%

Component	Material	Material		Substance	CAS No.	Substance		
		(%wt)	(mg)			(%wt)	(mg)	(ppm)
active device	doped Si	0.034%	0.07	Si	7440-21-3	0.034%	0.07	340
bond wire	gold	0.016%	0.032	Au	7440-57-5	0.016%	0.032	155
leadframe	Cu alloy w/ silver plating	44.824%	92.338	Cu	7440-50-8	44.641%	91.96	446,408
				Fe	7439-89-6	0.045%	0.092	447
				P	7723-14-0	0.016%	0.032	155
				Ag	7440-22-4	0.123%	0.254	1,233
encapsulation*	EMC	52.286%	107.71	silica	7631-86-9	40.694%	83.83	406,942
				epoxy resin	29690-82-2	5.267%	10.85	52,670
				phenol resin	9003-35-4	4.748%	9.78	47,476
				carbon black	1333-86-4	0.149%	0.306	1,485
				Sb ₂ O ₃	1309-64-4	1.146%	2.36	11,456
				TBBA	79-94-7	0.283%	0.584	2,835
	EMC GREEN	52.286%	107.71	silica	7631-86-9	38.816%	79.96	388,155
				epoxy resin	29690-82-2	5.024%	10.35	50,243
				phenol resin	9003-35-4	4.529%	9.33	45,291
				carbon black	1333-86-4	0.568%	1.17	5,680
				metal hydroxide	1309-42-8	3.35%	6.9	33,495
plating**	tin lead process	2.84%	5.85	Sn	7440-31-5	2.282%	4.7	22,816
				Pb	7439-92-1	0.558%	1.15	5,583
	100% matte tin	2.84%	5.85	Sn	7440-31-5	2.84%	5.85	28,398

*EMC GREEN molding compound is Halogen Free.

**Specify Lead-Free when ordering 100% tin (Pb-free) plating.

Disclaimer

The information provided in this Material Composition data sheet is, to the best of our knowledge, correct. However, there is no guarantee to completeness or accuracy, as some information is derived from data sources outside the company.

R2 (25-October 2010)

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Material Composition Specification

TO-92 (Solder Die Attach)



Pb (lead)-free plating**



Device average mass 206 mg

Fluctuation margin +/-10%

Component	Material	Material		Substance	CAS No.	Substance		
		(%wt)	(mg)			(%wt)	(mg)	(ppm)
active device	doped Si	0.035%	0.07	Si	7440-21-3	0.035%	0.073	354
bond wire	gold	0.016%	0.032	Au	7440-57-5	0.016%	0.032	155
leadframe	Cu alloy w/ silver plating	44.82%	92.34	Cu	7440-50-8	44.64%	91.96	446,408
				Fe	7439-89-6	0.045%	0.092	447
				P	7723-14-0	0.016%	0.032	155
				Ag	7440-22-4	0.123%	0.254	1,233
die attach	silver epoxy	0.121%	0.25	Pb	7439-92-1	0.113%	0.232	1,126
				Sn	7440-31-5	0.006%	0.012	58
				Ag	7440-22-4	0.003%	0.006	29
encapsulation*	EMC	52.16%	107.46	silica	7631-86-9	40.6%	83.64	406,019
				epoxy resin	29690-82-2	5.25%	10.82	52,524
				phenol resin	9003-35-4	4.74%	9.76	47,379
				carbon black	1333-86-4	0.148%	0.305	1,481
				Sb ₂ O ₃	1309-64-4	1.14%	2.35	11,408
				TBBA	79-94-7	0.283%	0.582	2,825
	EMC GREEN	52.16%	107.46	silica	7631-86-9	38.72%	79.77	387,233
				epoxy resin	29690-82-2	5.015%	10.33	50,146
				phenol resin	9003-35-4	4.519%	9.31	45,194
				carbon black	1333-86-4	0.567%	1.167	5,665
				metal hydroxide	1309-42-8	3.34%	6.88	33,398
plating**	tin lead process	2.84%	5.85	Sn	7440-31-5	2.282%	4.7	22,816
				Pb	7439-92-1	0.558%	1.15	5,583
	100% matte tin	2.84%	5.85	Sn	7440-31-5	2.84%	5.85	28,398

*EMC GREEN molding compound is Halogen Free.

**Specify Lead-Free when ordering 100% tin (Pb-free) plating.

Disclaimer

The information provided in this Material Composition data sheet is, to the best of our knowledge, correct. However, there is no guarantee to completeness or accuracy, as some information is derived from data sources outside the company.

R2 (25-October 2010)

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