

Hermetic Dimensional/Thermal Data

ABSTRACT

The following table identifies all of the hermetic package configurations and pin counts per package type offered by National Semiconductor. In addition, the table provides dimensional and thermal data for each of the ceramic and metal can packages offered by National.

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1 Introduction

The following table identifies all of the hermetic package configurations and pin counts per package type offered by National Semiconductor. In addition, the table provides dimensional and thermal data for each of the ceramic and metal can packages offered by National.

Selected packages may be offered through the use of subcontractors. The following table does not differentiate between subcontractor and in-house packages. National Semiconductor will use subcontractor packages based upon product needs defined by availability, cycle time and cost.

NOTE: The thermal information in this document is provided as a guideline. The data cover specific die sizes only and may vary dependent on the product and the end use configuration. For specific thermal data for individual products, please contact your local sales representative or distributor.

Table 1. Ceramic Package Dimensional Data

Package Type	Mkt Dwg	JEDEC Spec	Body Size		Lead Frame		Board Area	
			Wide Nom. (mils)	Long Nom. (mils)	Mt'l	Pitch (mils)	Max. (mils) (X)	Max. (mils) (Y)
Metal Leaded Chip Carrier (MLDCC)	AA44A	None	645	645	CU	50	695	695
	AA68A	None	945	945	CU	50	995	995
	AA84A	None	1145	1145	CU	50	1195	1195
	AA84B	None	1145	1145	CU	50	1195	1195
MQUAD	ALE128A	None	543	779		0.50mm	714	951
	AUA128A	None	1088	1088		0.80mm	1236	1236
	AFB132A	None	935	935		25	1103	1103
	AFA196A	None	1335	1335		25	1503	1503
	AUW208A	None	1088	1088		0.50mm	1213	1213
Ceramic Sidebrazed Dual-in-Line (SB)	D08C	MS-015-AA	310	520	A-42	100	310	540
	D14D	MS-015-AB	310	710	A-42	100	310	710
	D16C	MS-015-AC	310	810	A-42	100	310	810
	D18A	MS-015-AD	310	900	A-42	100	310	910
	D20A	MS-015-AE	310	1000	A-42	100	310	1010
	D20B	MS-015-AE	310	1010	A-42	100	310	1010
	D20CQ	None	275	1020	A-42	100	320	1020
	D24C	MS-015CB	605	1220	A-42	100	615	1220
	D24H	MS-015-AG	300	1212	A-42	100	310	1212
	D24I	None	795	1370	A-42	100	800	1380
	Sidebrazed (Continued)	D24K	None	395	1220	A-42	100	420
DA24A		MS-015(95)	595	1230	A-42	100	620	1230
DA24B		MS-015-CA	595	1230	A-42	100	620	1230
DA24C		MS-015-CA	595	1230	A-42	100	620	1230
D28D		MS-015-CB	605	1420	A-42	100	615	1420
D28F		MS-015-BD	405	1414	A-42	100	420	1414
D28G		MS-015-CB	610	1420	A-42	100	620	1420
D28H		MS-015-CB	610	1420	A-42	100	620	1420
D28JQ		None	610	1460	A-42	100	620	1460
DA32A		None	395	1616	A-42	100	420	1616

Table 1. Ceramic Package Dimensional Data (continued)

Package Type	Mkt Dwg	JEDEC Spec	Body Size		Lead Frame		Board Area	
			Wide Nom. (mils)	Long Nom. (mils)	Mt'l	Pitch (mils)	Max. (mils) (X)	Max. (mils) (Y)
Sidebrazed (Continued)	DA32B	None	600	1600	A-42	100	610	1616
	DA32C	None	405	1700	A-42	100	420	1700
	DA36A	MS-015-CD	600	1840	A-42	100	610	1840
	D40C	MS-015-CE	610	2065	A-42	100	615	2065
	D40J	MS-015-CE	610	2025	A-42	100	620	2025
	IS44A	None	1788	2200	A-42	100	1800	2200
	D48A	MS-015-CF	610	2424	A-42	100	615	2424
	D52A	MS-015-CG	610	2626	A-42	100	620	2626
	IS68A	None	1650	2700	A-42	75	1670	2700
	IS68B	None	1650	2700	A-42	75	1670	2700
Ceramic Leadless Chip Carrier (LCC)	E20A	MS-004-CB	350	350	N/A	50	358	358
	EA20B	None	350	350	N/A	50	358	358
	E24B	None	400	400	N/A	50	408	408
	E28A	MS-004-CC	450	450	N/A	50	458	458
	EA028C	None	400	735	N/A	50	408	743
	E32A	MO-041-AB	450	550	N/A	50	458	560
	E32B	MO-041-AB	450	550	N/A	50	460	560
	E32C	MO-041-AB	450	550	N/A	50	458	560
	EA32B	MO-041-AB	450	550	N/A	50	456	556
	EA32C	None	410	835	N/A	50	410	835
LCC (Continued)	EA32D	None	400	825	N/A	50	405	833
	E40A	MS-009-CD	460	460	N/A	40	490	490
	E44A	MS-004-CD	650	650	N/A	50	660	660
	EA48A	MS-009-AF	560	560	N/A	40	572	572
	EA48B	None	460	460	N/A	35	468	468
	E68B	MS-003-BD	950	950	N/A	50	960	960
	E68C	MS-004-CF	950	950	N/A	50	960	960
	E84A	MS-004-CG	1150	1150	N/A	50	1165	1165
	E84B	MS-003-BE	1150	1150	N/A	50	1161	1161
	EL132C	MO-090-AB	950	950	A-42	25	1084	1084
Ceramic Quad J-Bend (CQJB)	EL172D	None	1150	1150	A-42	25	1300	1300
	EL28A	None	450	450	A-42	50	494	494
	EL44A	None	651	651	A-42	50	700	700
	EL44B	None	614	614	A-42	50	700	700
	EL44C	None	650	650	A-42	50	700	700
	EL52A	None	750	750	A-42	50	800	800
	EL68A	MO-107-AD	950	950	A-42	50	1000	1000
	EL68B	None	914	914	A-42	50	1000	1000
	EL68C	MO-107-AD	950	950	A-42	50	1000	1000
	EL84A	MO-107-AE	1150	1150	A-42	50	1205	1205

Table 1. Ceramic Package Dimensional Data (continued)

Package Type	Mkt Dwg	JEDEC Spec	Body Size		Lead Frame		Board Area	
			Wide Nom. (mils)	Long Nom. (mils)	Mt'l	Pitch (mils)	Max. (mils) (X)	Max. (mils) (Y)
Ceramic Quad Flatpack (CQFP)	EL28B	None	450	450	A-42	50	494	494
	EL64A	None	900	900	A-42	50	1030	1030
	EL84A	MO-107-AE	1150	1150	A-42	50	1205	1205
	EL100A	None	1450	1450	A-42	50	1580	1580
	EL116A	None	850	850	A-42	25	1000	1000
	EL116B	None	850	850	A-42	25	1000	1000
	EL128A	None	770	770	A-42	20	910	910
	EL132B	MO-090-AB	950	950	A-42	25	1084	1084
	EL132D	MO-090-AB	950	950	A-42	25	1084	1084
	EL132E	MO-090-AB	950	950	A-42	25	1084	1084
CQFP (Continued)	EL132F	None	950	950	A-42	25	1164	1164
	EL144A	None	1050	1050	A-42	25	No data	No data
	EL152A	None	840	840	A-42	20	No data	No data
	U156A	MO-066-AG	1505	1505	KOVAR	100	1520	1520
	EL164A	None	1150	1150	A-42	25	1300	1300
	EL172B	None	1150	1150	A-42	25	1300	1300
	EL172C	None	1150	1150	A-42	25	1300	1300
	EL172E	None	940	940	A-42	20	No data	No data
	EL256A	None	1460	1460	A-42	20	No data	No data
	EL256B	None	1460	1460	A-42	20	No data	No data
	EL304A	None	1450	1850	A-42	20	No data	No data
Ceramic Flatpack	F10B	None	255	260	A-42	50	No data	No data
	F14C	None	255	259	A-42	50	No data	No data
	F16B	None	265	420	A-42	50	No data	No data
	FA32A	None	420	830	A-42	50	No data	No data
	FA36A	None	515	930	A-42	50	No data	No data
Ceramic Dual-in-Line (Cerdip)	J08A	MO-036-AA	255	400	A-42	100	360	400
	J14A	MO-036-AB	265	785	A-42	100	360	785
	J16A	MO-036-AB	265	785	A-42	100	360	785
	J18A	MO-036-AE	310	915	A-42	100	360	915
	J20A	None	310	985	A-42	100	360	985
	J22A	MO-037-AA	400	1110	A-42	100	485	1110
	J24A	MO-038-AA	520	1260	A-42	100	685	1260
	J24AQ	MO-038-AA	520	1260	A-42	100	685	1260
	J24BQ	MO-038-AA	577	1290	A-42	100	685	1290
	J24CQ	MO-058-AA	280	1290	A-42	100	360	1290
	J24E	None	390	1215	A-42	100	485	1215

Table 1. Ceramic Package Dimensional Data (continued)

Package Type	Mkt Dwg	JEDEC Spec	Body Size		Lead Frame		Board Area	
			Wide Nom. (mils)	Long Nom. (mils)	Mt'l	Pitch (mils)	Max. (mils) (X)	Max. (mils) (Y)
Cerdip (Continued)	J24F	MO-058-AA	295	1285	A-42	100	360	1285
	J28A	MO-103-AB	600	1490	A-42	100	668	1490
	J28AQ	MO-103-AB	520	1450	A-42	100	685	1450
	J28B	MO-103-AB	577	1490	A-42	100	685	1490
	J28BQ	MO-103-AB	577	1490	A-42	100	685	1490
	J28CQ	MO-103-AB	522	1465	A-42	100	685	1465
	JA28A	None	295	1460	A-42	100	360	1480
	J32AQ	None	585	1660	A-42	100	685	1660
	J32B	None	585	1660	A-42	100	685	1660
	J40A	MO-038-AC	530	2080	A-42	100	685	2080
	J40AQ	MO-038-AC	530	2080	A-42	100	685	2080
	J40BQ	MO-038-AC	590	2096	A-42	100	668	2096
Ceramic Small Outline Package (CSOP)	MC16A	None	300	405	A-42	50	480	405
	MC20A	None	300	505	A-42	50	480	505
	MC20B	None	300	505	A-42	50	480	505
	MC24A	None	300	605	A-42	50	480	605
	MC28A	None	300	705	A-42	50	480	705
	MC28B	None	300	705	A-42	50	480	705
Ceramic Pin Grid Array (CPGA)	U44A	None	800	800	KOVAR	100	810	810
	UA65A	None	1050	1050	KOVAR	100	1060	1060
	U68B	MO-067-AB	1060	1060	KOVAR	100	1080	1080
	U68C	MO-066-AC	1110	1110	KOVAR	100	1110	1110
	U68D	None	1150	1150	KOVAR	100	1162	1162
	U68E	MO-066-AC	1098	1098	KOVAR	100	1110	1110
	U75A	MO-066-AC	1110	1110	KOVAR	100	1120	1120
	U84A	MO-066-AC	1100	1100	KOVAR	100	1120	1120
	U84B	MO-067-AB	1060	1060	KOVAR	100	1080	1080
	U84C	MO-066-AE	1300	1300	KOVAR	100	1320	1320
CPGA (Continued)	U84D	MO-066-AC	1100	1100	KOVAR	100	1120	1120
	UA84E	None	1200	1200	KOVAR	100	1215	1215
	U99A	MO-066-AG	1300	1300	KOVAR	100	1320	1320
	U100A	MO-066-AE	1320	1320	KOVAR	100	1332	1332
	UA101A	None	1450	1450	KOVAR	100	1465	1465
	U109A	MO-066-AE	1300	1300	KOVAR	100	1315	1315
	UA109A	None	1300	1300	KOVAR	100	1315	1315
	U120C	MO-066-AE	1320	1320	KOVAR	100	1332	1332
	U121A	MO-066-AE	1320	1320	KOVAR	100	1332	1332
	U124A	None	1310	1310	KOVAR	100	1323	1323

Table 1. Ceramic Package Dimensional Data (continued)

Package Type	Mkt Dwg	JEDEC Spec	Body Size		Lead Frame		Board Area	
			Wide Nom. (mils)	Long Nom. (mils)	Mt'l	Pitch (mils)	Max. (mils) (X)	Max. (mils) (Y)
CPGA (Continued)	U132A	MO-066-AF	1400	1400	KOVAR	100	1420	1420
	U132B	MO-066-AF	1400	1400	KOVAR	100	1415	1415
	U144A	MO-067-AG	1575	1575	KOVAR	100	1591	1591
	UA149A	MO-066-AG	1505	1505	KOVAR	100	1520	1520
	UA149B	MO-066-AG	1505	1505	KOVAR	100	1520	1520
	UA155A	MO-067-AH	1660	1660	KOVAR	100	1677	1677
	U156B	MO-066-AG	1505	1505	KOVAR	100	1520	1520
	U169A	MO-067-AJ	1750	1750	KOVAR	100	1770	1770
	UA169A	None	1750	1750	KOVAR	100	1765	1765
	U173A	MO-066-AH	1600	1600	KOVAR	100	1616	1616
CPGA (Continued)	UA173A	None	1600	1600	KOVAR	100	1676	1676
	U175A	MO-067-AH	1650	1650	KOVAR	100	1670	1670
	U180A	MO-067-AG	1575	1575	KOVAR	100	1600	1600
	U223A	MO-067-AM	1860	1860	KOVAR	100	1880	1880
	UA223A	None	1860	1860	KOVAR	100	1879	1879
	U224A	MO-067-AL	1575	1575	KOVAR	100	1595	1595
	UA251A	None	1960	1960	KOVAR	100	1980	1980
	U257A	MO-066-AM	2000	2000	KOVAR	100	2020	2020
	U259A	MO-067-AL	1950	1950	KOVAR	100	1968	1968
	UA296A	None	1950	1950	KOVAR	50	1965	1965
CPGA (Continued)	UF296A	None	1950	1950	KOVAR	100	1960	1960
	U299A	MO-067-AM	2060	2060	KOVAR	100	2080	2080
	U301A	MO-067-AM	2060	2060	KOVAR	100	2086	2086
	UA302A	MO-067-AM	2060	2060	KOVAR	100	2081	2081
	U303A	MO-067-AM	2060	2060	KOVAR	100	2086	2086
	UA319A	None	2160	2160	KOVAR	100	2178	2178
	UA320A	None	1950	1950	KOVAR	50	1965	1965
	U323A	None	2160	2160	KOVAR	100	2182	2182
Cerpack	W10A	MO-003-AG	241	270*	A-42	50	270	440
	WG10A	None	241	270*	A-42	50	270	420
	W14B	MO-004-AF	250	386*	A-42	50	386	440
	W14C	None	241	275*	A-42	50	317	440
	WG14A	None	250	390*	A-42	50	390	420
	W16A	MO-092-AC	250	390*	A-42	50	390	480
	WG16A	None	250	390*	A-42	50	390	420
	W20A	None	266	540 *	A-42	50	540	480
	WG20A	None	266	540*	A-42	50	420	540
	WG20B	None	155	342	A-42	25	350	244

Table 1. Ceramic Package Dimensional Data (continued)

Package Type	Mkt Dwg	JEDEC Spec	Body Size		Lead Frame		Board Area	
			Wide Nom. (mils)	Long Nom. (mils)	Mt'l	Pitch (mils)	Max. (mils) (X)	Max. (mils) (Y)
Cerpack (Continued)	W24C	MO-019-AC	420*	615*	A-42	50	615	600
	W28A	MO-019-AB	335*	705*	A-42	50	705	560
	WA28D	MO-019	360	740*	A-42	50	740	560
	WG28A	None	440	805	A-42	50	815	561
	WG28A	None	440	805	A-42	50	815	561
	WA44A	None	590	590	A-42	50	No data	No data
	WG44A	None	590	590	A-42	50	790	790
	WA48A	None	380	640*	A-42	25	No data	No data
	WA56A	None	380	740*	A-42	25	No data	No data
Cerquad	W24B	None	370	370	A-42	50	560	560
	W56B	None	480	480	A-42	25	660	660
	W64A	None	480	480	A-42	25	660	660
	W68A	None	872	872	A-42	20	1060	1060
	WA80A	None	550	550	A-42	0.65mm	683	683
	WA80AQ	None	550	550	A-42	0.65mm	683	683
	WKV80A	None	550	550	A-42	0.65mm	681	681
	W84A	None	1060	1060	A-42	50	1220	1220
	WJW100A	None	550	550	A-42	0.50mm	681	681
	W144B	None	1060	1060	A-42	25.6	No data	No data
	WSB144A	None	756	756	A-42	0.50mm	878	878

Table 2. Ceramic Package Thermal Data

Package Type	Mkt Dwg	JEDEC Spec	Typical Thermal Data					θ_{JC} (°C/W)	
			Die Size (Sq mils)	θ_{JA} (°C/W) ⁽¹⁾ Air Flow— LFM (Linear Feet/Minute)	0	225	500		1000
Ceramic Sidebraced Dual-In-Line Package (SB)	D08C	MS-015-AA	6000	115	75	55	45	21	
	D14D	MS-015-AB	10000	75	55	49	43	18	
	D16C	MS-015-AC	8137	76	52	44	38	17	
	D18A	MS-015-AD	10000	71	50	42	36	17	
	D20A	MS-015-AE	10000	65	49	41	35	17	
	D20B	MS-015-AE	10000	65	49	41	35	17	
	D24C	MS-015-CB	46314	47	34	27	22	15	
	D24H	MS-015-AG	10000	60	44	37	32	17	
	D24K	MS-015-BC	10000	59	42	36	30	17	
	D28D	MS-015-CB	10000	53	39	32	28	16	
	D28G	MS-015-CB	46314	46	34	27	22	12	
	D28H	MS-015-CB	46314	46	34	27	22	12	
	D40C	MS-015-CE	19600	45	31	26	22	14	
	D40J	MS-015-CE	20000	45	31	26	22	14	
	D48A	MS-015-CF	19600	41	29	23	20	13	
D52A	MS-015-CG	20000	40	28	22	20	13		
Ceramic Leadless Chip Carrier (LCC)	E20A	MS-004-CB	10961	80	61	53	46	15	
	EA20B	None	10961	80	61	53	46	15	
	E24B	None	11000	72	55	47	41	15	
	E28A	MS-004-CC	10900	66	50	42	37	15	
	EAO28C	None	Emulator Use Only						
	E32A	MO-041-AB	11000	65	49	41	36	14	
	E32B	MO-041-AB	11000	65	49	41	36	14	
	E32C	MO-041-AB	11000	65	49	41	36	14	
	E40A	MS-009-AE	11000	64	48	40	35	14	
	E44A	MS-004-CD	48840	49	40	32	28	11	
	E48A	None	Data Not Available at This Time						
	E68B	MS-003-BD	59000	37	28	24	21	10	
	E68C	MS-004-CF	59000	39	30	26	23	10	
	E84A	MS-004-CG	62500	36	28	24	20	9	
	E84B	MS-003-BE	62500	38	30	26	22	10	

(1) Packages are board mounted with 1W of power applied. A-42—Alloy42A-52—Alloy52

Table 2. Ceramic Package Thermal Data (continued)

Package Type	Mkt Dwg	JEDEC Spec	Typical Thermal Data				θ_{JC} (°C/W)	
			Die Size (Sq mils)	θ_{JA} (°C/W) ⁽¹⁾ Air Flow— LFM (Linear Feet/Minute)				
				0	225	500		1000
Ceramic Quad J-Bend (CQJB)	EL28A	None	20000	64	48	40	35	13
	EL44A	None	48840	50	39	33	29	11
	EL44B	None	Emulator Use Only					
	EL44C	None	48840	49	38	32	28	11
	EL52A	None	50000	46	36	29	26	10
	EL68A	MO-107-AD	59000	42	31	26	21	10
	EL68B	None	Emulator Use Only					
	EL68C	MO-107-AD	59000	42	31	26	21	10
	EL84A	MO-107-AE	100000	29	25	20	15	3
Ceramic Quad Flatpack (CQFP)	EL28B	None	Data Not Available at This Time					
	EL64A	None	Data Not Available at This Time					
	EL100A	None	Data Not Available at This Time					
	EL116A	None	48400	30	25	20	16	3
	EL132B	MO-090-AB	132858	32	25	22	18	8
	EL132C	MO-090-AB	132858	37	26	21	18	8
	EL132D	MO-090-AB	132858	37	26	21	18	8
	EL164A	None	132858	25	17	14	12	2
	EL172B	None	132858	28	22	20	17	8
	EL172C	None	132858	25	17	14	12	2
Ceramic Flatpack	F10B	MO-004-AE	5000	159	125	109	100	25
	F14C	None	4761	158	125	109	100	25
	F16B	MO-004-AH	3600	148	119	99	90	24

Table 2. Ceramic Package Thermal Data (continued)

Package Type	Mkt Dwg	JEDEC Spec	Typical Thermal Data		θ_{JA} (°C/W) ⁽¹⁾ Air Flow— LFM (Linear Feet/Minute)				θ_{JC} (°C/W)
			Die Size (Sq mils)						
Ceramic Dual-In-Line Package (Cerdip)	J08A	MO-036-AA	6136	129	85	62	42	17	
	J14A	MO-036-AB	8568	84	57	46	37	13	
	J16A	MO-036-AB	8568	85	58	44	36	13	
	J18A	MO-036-AE	8568	80	55	42	35	12	
	J20A	None	8439	79	53	40	34	12	
	J22A	MO-037-AA	9646	65	44	34	32	11	
	J24A	MO-038-AA	10961	63	42	33	30	10	
	J24AQ	MO-038-AA	10961	63	42	33	30	10	
	J24E	None	6106	65	46	38	32	11	
	J24F	MO-058-AA	11224	68	49	42	33	12	
	J24CQ	MQ-058-AA	11224	68	49	42	33	12	
	J24BQ	MO-038-AA	11000	57	41	31	29	10	
	J28A	MO-038-AB	11900	56	40	30	28	10	
	J28AQ	MO-038-AB	11900	56	40	30	28	10	
	J28B	MO-038-AB	11900	58	42	32	29	10	
	J28BQ	MO-038-AB	11900	58	42	32	29	10	
	J28CQ	MO-038-AB	11900	58	42	32	29	10	
	J32B	None	15000	52	36	30	26	9	
	J32AQ	None	15000	52	36	30	26	9	
	J40A	MO-038-AC	17800	48	33	28	25	9	
J40AQ	MO-038-AC	17800	48	33	28	25	9		
J40BQ	MO-038-AC	17800	48	33	28	25	9		
Ceramic Small Outline Package, Wide	MC16A	None	Emulator Use Only						
	MC20A	None	Emulator Use Only						
	MC20B	None	Emulator Use Only						
	MC24A	None	Emulator Use Only						
	MC28A	None	Emulator Use Only						
	MC28B	None	Emulator Use Only						

Table 2. Ceramic Package Thermal Data (continued)

Package Type	Mkt Dwg	JEDEC Spec	Typical Thermal Data					θ_{JC} (°C/W)	
			Die Size (Sq mils)	θ_{JA} (°C/W) ⁽¹⁾ Air Flow— LFM (Linear Feet/Minute)	0	225	500		1000
Ceramic Pin Grid Array (CPGA)	U44A	None	59048	54	31	22	18	5	
	U68B	MO-067-AB	14762	41	34	30	25	7	
	U68C	MO-066-AC	14762	45	36	32	27	7	
	U68D	None	14762	40	31	27	22	6	
	U68E	MO-066-AC	14762	43	35	31	26	7	
	U75A	MO-066-AC	14762	41	32	27	22	3	
	U84A	MO-066-AC	48400	32	22	18	16	5	
	U84B	MO-067-AB	14762	43	33	28	22	6	
	U84C	MO-066-AE	59048	30	17	13	11	2	
	U99A	MO-066-AG	59048	30	17	13	11	2	
	U100A	MO-066-AE		Data Not Available at This Time					
	U109A	MO-066-AE		Data Not Available at This Time					
	U120A	None	59048	35	22	17	15	5	
	U120C	MO-066-AE	59048	35	22	17	15	5	
	U124A	MO-066-AG	59049	38	25	19	16	5	
	U132A	MO-066-AF	25000	32	22	18	15	3	
	U132B	MO-066-AF		Data Not Available at This Time					
	U144A	MO-067-AG	67600	28	20	16	14	5	
	U156A	MO-066-AG	59048	27	15	12	10	2	
	U156B	MO-066-AG		Data Not Available at This Time					
	U169A	MO-067-AJ	132858	20	12	8	6	1	
	U173A	MO-066-AH	212000	21	12	9	7	1.2	
	U175A	MO-067-AH	21200	21	12	9	7	1.2	
	U180A	MO-067-AG	132900	29	18	14	11	3	
	U223A	MO-067-AM	369050	16	9	6	5	1.2	
	U224A	MO-067-AL	122500	29	18	14	11	3	
	U257A	MO-066-AM		Data Not Available at This Time					
	U259A	MO-067-AL		Data Not Available at This Time					

Table 2. Ceramic Package Thermal Data (continued)

Package Type	Mkt Dwg	JEDEC Spec	Typical Thermal Data					
			Die Size (Sq mils)	θ_{JA} (°C/W) ⁽¹⁾	Air Flow—LFM (Linear Feet/Minute)			
					0	225	500	1000
			Time					
	U299A	MO-067-AM	Data Not Available at This Time					
	U301A	MO-067-AM	160000	19	14	11	10	1
	U303A	MO-067-AM	160000	19	14	11	10	1
	U323A	None	160000	19	14	11	10	1
Cerpack	W10A	MO-003-AG	4000	208	156	127	102	19
	W14B	MO-004-AF	6900	141	109	91	76	14
	W14C	None	4000	208	156	127	102	19
	W16A	MO-092-AC	6900	141	109	91	76	14
	W20A	None	10000	115	90	75	65	13
	W24C	MO-019-AC	17800	85	60	50	45	10
	W28A	MO-019-AB	17800	80	55	45	40	9
	WA28D	MO-019	17800	80	55	45	40	9
Cerquad	W24B	None	17800	92	69	59	51	11
	W56B	None	34189	50	39	32	25	7
	W64A	None	34189	50	39	32	25	7
	W68A	None	132858	41	32	26	20	6
	W84A	None	132858	36	28	24	18	6
Cerquad, EIAJ	WA80A	None	Data Not Available at This Time					
	WA80AQ	None	Data Not Available at This Time					
	W120A	None	132858	34	26	23	18	6
	W144A	None	132858	32	25	22	18	5
	W144B	None	132858	32	25	22	18	5
	W160A	None	132858	30	23	20	17	5
	W208A	None	132858	27	21	19	15	4

Table 3. Metal Can Package Dimensional Data

Package Type	Mkt Dwg	JEDEC Spec	Body Size		Lead Frame		Board Area	
			Wide Nom. (mils)	Long Nom. (mils)	Mt'l	Pitch (mils)	Max. (mils) (X)	Max. (mils) (Y)
Transistor Outline (TO-5)	H06C	TO-99		360DI	KOVAR		200PC	380DI
	H08A	MO-006-AH		360DI	KOVAR		230PC	380DI
	H08C	TO-99		360DI	KOVAR		200PC	380DI
	H10C	TO-100		360DI	KOVAR		230PC	380DI
Transistor Outline (TO-18)	H03C	TO-18		212DI	KOVAR		100PC	230DI
Transistor Outline (TO-39)	H03A	TO-205-AG		360DI	KOVAR		200PC	380DI
	H03B	TO-39		360DI	KOVAR		200PC	380DI
	HA04E	TO-205-AG		360DI	KOVAR		200PC	380DI
Transistor Outline (TO-46)	H02A	TO-46		212DI	KOVAR		100PC	230DI
	H03H	TO-46		212DI	KOVAR		100PC	230DI
	H04A	TO-46		212DI	KOVAR		100PC	230DI
	H04D	None		212DI	KOVAR		100PC	230DI
Transistor Outline (TO-52)	H03J	TO-52		212DI	KOVAR		100PC	230DI
Transistor Outline (TO-72)	H04C	TO-72		212DI	KOVAR		100PC	230DI
Transistor Outline (TO-3)	K02A	TO-3	1020	1550	A-42	430	1040	1570
	K02B	TO-3	1050	1550	A-42	430	1070	1570
	K02C	TO-3	1050	1550	A-42	430	1070	1570
	KC02A	None	1050	1550	A-42	470PC	1070	1570
	K04A	None	1050	1550	A-42	470PC	1070	1570
	KA04B	None	1050	1550	A-42	500PC	1070	1570
	K08A	MO-097	1050	1550	A-42	600PC	1070	1570
	KA15A	TO-3	1050	1550	A-42	430	1070	1570

Table 4. Metal Can Package Thermal Data

Package Type	Mkt Dwg	JEDEC Spec	Typical Thermal Data		Die Size (Sq mils)	θ_{JA} (°C/W) ⁽¹⁾ Air Flow— LFM (Linear Feet/Minute)	0	225	500	1000	θ_{JC} (°C/W)
TO-5	H06C	70-99	300	220	160	130	110	60			
	H08A	MO-006-AH	300	220	160	130	110	60			
	H08C	TO-99	300	220	160	130	110	60			
	H10C	TO-100	300	220	160	130	110	60			
TO-18	H03C	TO-18	300	220	160	130	110	60			
TO-39	H03A	TO-205-AG	300	220	160	130	110	60			
	H03B	TO-39	300	220	160	130	110	60			
	HA04E	TO-205-AG	300	220	160	130	110	60			

(1) Packages are board mounted with 1W of power applied. A-42—Alloy42A-52—Alloy52

Table 4. Metal Can Package Thermal Data (continued)

Package Type	Mkt Dwg	JEDEC Spec	Typical Thermal Data					θ_{JC} (°C/W)
			Die Size (Sq mils)	θ_{JA} (°C/W) ⁽¹⁾ Air Flow— LFM (Linear Feet/Minute)				
				0	225	500	1000	
TO-46	H02A	TO-46	300	220	160	130	110	60
	H03H	TO-46	300	220	160	130	110	60
	H04A	TO-46	300	220	160	130	110	60
	H04D	None	300	220	160	130	110	60
TO-52	H03J	TO-52	300	220	160	130	110	60
TO-72	H04C	TO-72	300	220	160	130	110	60
TO-3	K02A	TO-03	5000	35	23	18	14	2
	K02B	TO-03	5000	35	23	18	14	2
	K02C	TO-03	5000	35	23	18	14	2
	K04A	None	5000	35	23	18	14	2
	KA04B	None	5000	35	23	18	14	2
	K08A	None	5000	35	23	18	14	2
	KA15A	MO-097	5000	35	23	18	14	2
	KC02A	TO-3	5000	35	23	18	14	2

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