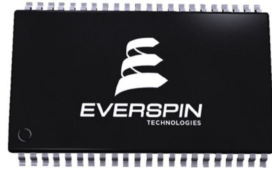
TSOP2 MRAM Packages



44-Pin TSOP2

54-Pin TSOP2

- Compliant with RoHS, REACH regulations and practices.
- Contains no Red Phosphorus.
- Lead Free.
- Assemble using a JEDEC standard reflow profile.
- Compliant with EICCeSI Environmental Guidelines.

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COMPLIANCE WITH ENVIRONMENTAL REGULATIONS AND DIRECTIVES

Environment	Statement Summary	Download Full Statement
RoHS	Everspin Technologies, Inc. MRAM products comply with RoHS Directive 2002/95/EC.	Full RoHS Compliance Statement
REACH	Under the definition of the REACH regulations EC1907/2006, Everspin Technologies is a producer of "articles". REACH requires article suppliers to inform recipients if an article contains a Substance of Very High Concern (SVHC) in excess of 0.1% by weight. Everspin products do not contain any of these SVHC in excess of 0.1% by weight.	Full REACH Statement
Red Phosphorus	Everspin Technologies, Inc. MRAM products do not contain Red Phosphorus CAS# 7723-14-0 as an intentional additive.	Full Red Phosphorus Statement
Environmental and Humanitarian Compliance	Materials from Conflict Regions Statement	Full Statement
	EICCeSI Environmental and Humanitarian Compliance Form	Form

MULTIPLE REFLOW CYCLES AND MOISTURE RESISTANCE

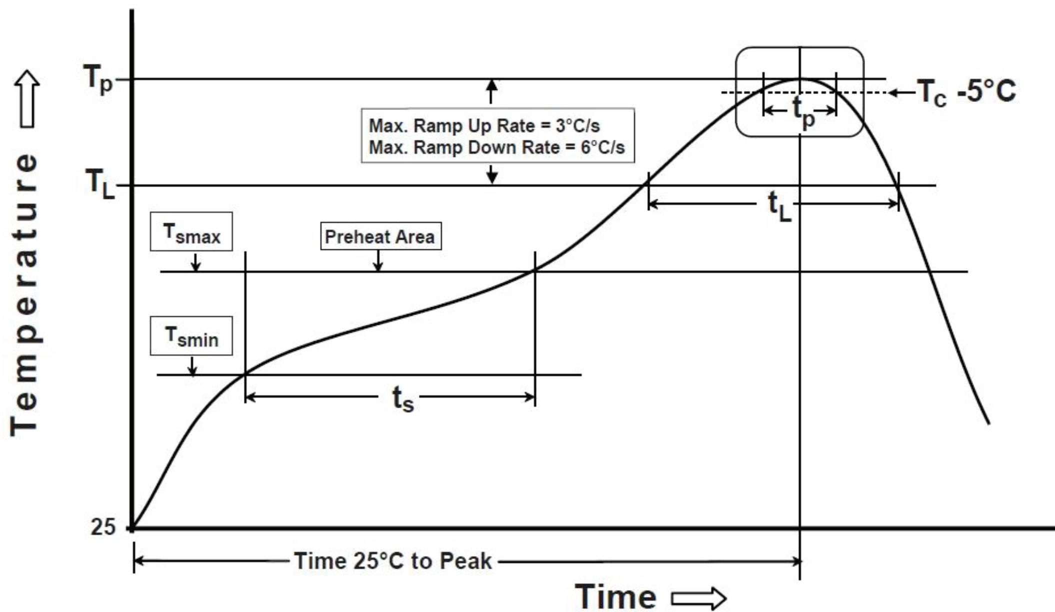
All Everspin packages are qualified by the procedure defined in IPC/JEDEC joint specification IPC/JEDEC J-STD-020D.1. They are guaranteed to withstand up to three reflow cycles without permanent damage, provided the conditions for the rated moisture resistance level for the part are observed prior to reflow.

Everspin parts are generally rated for MSL Level 3. Exceptions may exist and are noted in their respective data sheet. Please the check the latest individual product data sheet to confirm the rated MSL for the product.

RECOMMENDED REFLOW TEMPERATURES AND TIMING - ALL PACKAGES

Everspin products can be assembled using a standard reflow profile. The profile below is based on IPC/JEDEC J-STD-020D.1.

Figure 1 – Recommended Reflow Profile - All Packages



Profile Step	Parameter	Symbol	Time/Temp	Unit
Preheat / Soak	Temperature mininumum	T_{SMIN}	150	°C
	Temperature maximum	T_{SMAX}	200	°C
	Soak Time	t_S	60 - 120	Seconds
Ramp Up	Rate from T_L to T_P	T_L to T_P	3° / Sec Max	° / Sec
	25°C to T_P		8 minutes max	Minutes
Reflow	Liquidous Temperature	T_L	217	°C
	Time Above T_L		60 - 150	Seconds
	Peak Package Body Temperature	T_P	260	°C
	Time within 5° of Peak Package Body Temperature		20 - 40	Seconds
Ramp Down	Rate from T_P to T_L	T_P to T_L	6° / Sec Max	° / Sec

THERMAL RESISTANCE

Table 1 – Thermal Resistance 44-Pin TSOP2

All values determined by simulation.

Velocity (m/s)	Θ_{JA} (°C/W)	Θ_{JB} (°C/W) [3]	Θ_{JC} (°C/W) [4]	Θ_{JL} (°C/W) [6]	Ψ_{JT} (°C/W) [5]
0	60 [1]	20	7	12	2
3	47 [2]				

Notes:

1. Per SEMI G38-87 and JEDEC JESD51-2 with the single layer board (JESD51-3) horizontal.
2. Per JEDEC JESD51-6 with the board (JESD51-7) horizontal. There are no thermal vias connecting the package to the two planes in the board.
3. Thermal resistance between the die and the printed circuit board per JEDEC JESD51-8. Board temperature is measured on the top surface of the board near the package.
4. Thermal resistance between the die and the case top surface as measured by the cold plate method (MIL SPEC-883 Method 1012.1).
5. Thermal characterization parameter indicating the temperature difference between package top and the junction temperature per JEDEC JESD51-2. When Greek letters are not available, the thermal characterization parameter is written as Psi-JT.
6. Thermal resistance between the junction and the thermal (fused) lead is not a JEDEC specified thermal resistance, but is useful for calculation.

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Table 2 – Thermal Resistance 54-Pin TSOP2

All values determined by simulation.

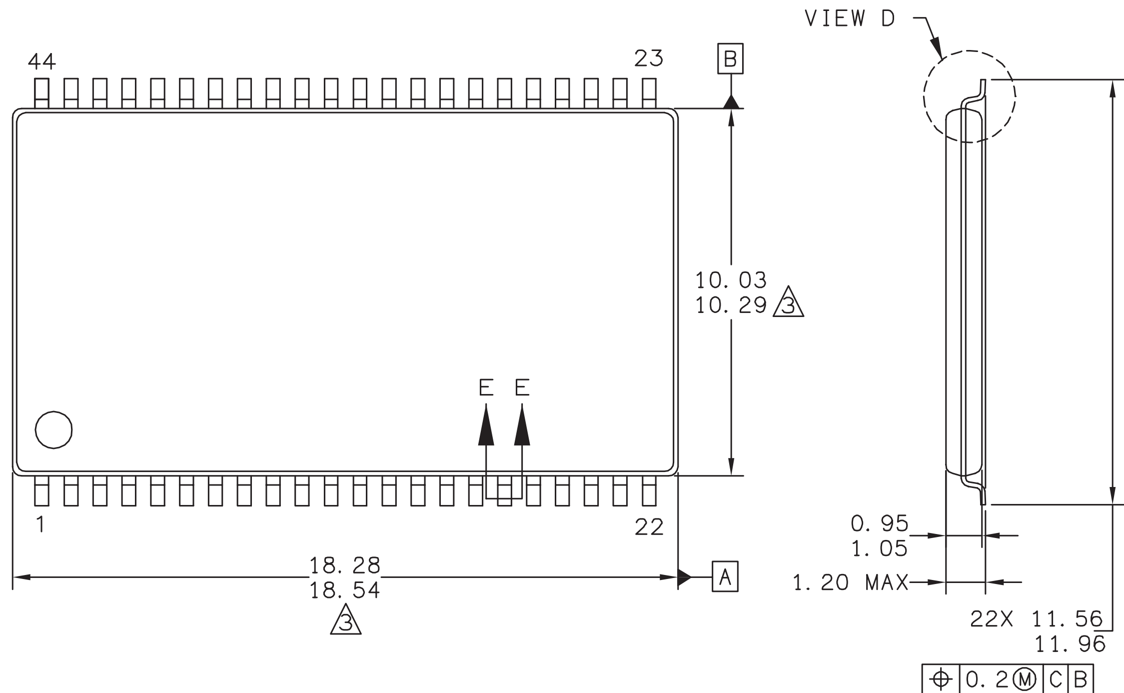
Velocity (m/s)	Ambient Temp	Θ_{JA} (°C/W)	Θ_{JB} (°C/W)	Θ_{JC} (°C/W)
0	55°C	45.16	33.47	14.42
1		35.78	NA	
2		33.81		
3		32.65		
0	125°C	42.09	32.82	14.30
1		35.78	NA	
2		33.81		
3		32.65		

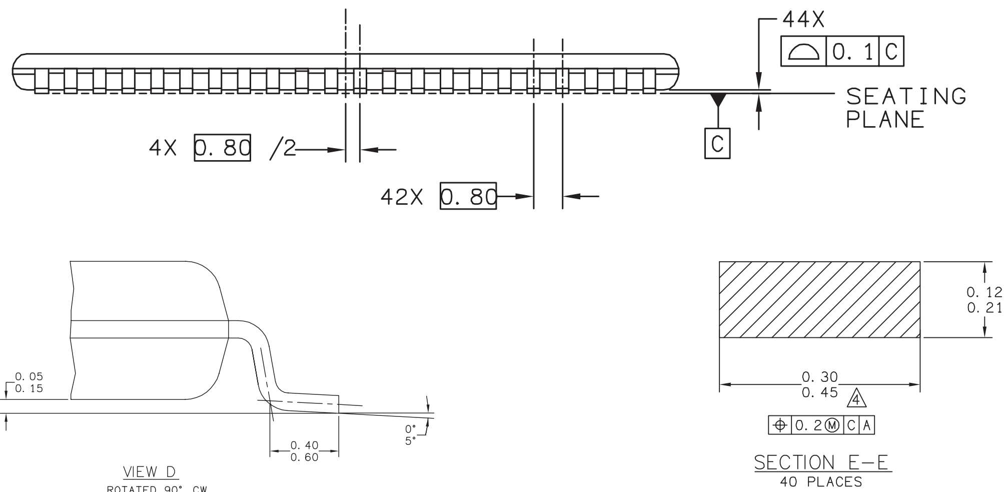
Notes:

1. Θ_{JB} value assumes 4-layer PCB.

PACKAGE OUTLINE DRAWINGS

Figure 2 – Package Outline 44-Pin TSOP2





Print Version Not To Scale

1. Dimensions and tolerances per ASME Y14.5M - 1994.
2. Dimensions in Millimeters.
3. Dimensions do not include mold protrusion.
4. Dimension does not include DAM bar protrusions.
5. DAM Bar protrusion shall not cause the lead width to exceed 0.58.

Figure 3 – Package Outline 54-Pin TSOP2

Ref	Min	Nominal	Max
A			1.20
A1	0.05	0.10	0.15
A2	0.95	1.00	1.05
b	0.30	0.35	0.45
c	0.12		0.21
D	22.10	22.22	22.35
E	11.56	11.76	11.95
E1	10.03	10.16	10.29
e	0.80 BSC		
L	0.40	0.50	0.60
L1	0.80 REF		
R1	0.12	-	-
R2	0.12	-	0.25
θ	0°	-	8°
θ1	0.40	-	-
θ2	15° REF		
θ3	15° REF		

Print Version Not To Scale

1. Dimensions in Millimeters.
2. Package dimensions refer to JEDEC MS-024

REVISION HISTORY

Revision	Date	Description of Change
1.0	August 7, 2013	Initial release.
1.1	August 27, 2013	Added 25°C to T_P data to the Temperature Profile Table 1.
1.2	October 21, 2014	Added Reflow Cycle and Moisture Resistance section.

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EST02603_EverspinTSOP2MRAMPackageGuide_Revision1.2102114