



Baking Conditions

(IPC/JEDEC J-STD-033) Different packages have different levels of moisture sensitivity. The higher the amount of moisture inside a package, the higher the thermo-mechanical stresses inside the package during board mounting will be. These stresses are brought about by the rapid vaporization of the trapped moisture, and can be large enough to fracture the package during board mounting. Package cracking under such circumstances is known as 'popcorn cracking'. *IPC/JEDEC J-STD-020* defines the Moisture Sensitivity Levels (MSL) of surface mount devices.

Moisture-sensitive devices are baked and vacuum-sealed inside a moisture barrier bag prior to shipment in order to minimize their tendency to exhibit popcorn cracking during board mounting. Users of such devices are likewise required to board mount the units within a prescribed period after the bag has been opened. Failure to do so calls for a re-bake of the units prior to board mounting. Table 1 shows the bake conditions recommended by *IPC/JEDEC J-STD-033* at the user's site if the out-of-bag time prescribed has expired prior to board mounting. Table 2 shows the bake conditions required by *IPC/JEDEC J-STD-033* at the manufacturer's site, prior to dry-packing the parts.

Table 1. IPC/JEDEC J-STD-033							
Bake Conditions for Drying Mounted or Unmounted SMD Package							
(User Bake: Floor life begins counting at time = 0 after bake)							
Package Body	MSL	Bake @ 125°C		Bake @ 90°C ≤ 5% RH		Bake @ 40°C ≤ 5% RH	
		Exposure Time > 72h	Exposure Time ≤ 72h	Exposure Time > 72h	Exposure Time = < 72h	Exposure Time > 72h	Exposure Time ≤ 72h
Thickness ≤ 1.4 mm	2	5 hours	3 hours	17 hours	11 hours	8 days	5 days
	2a	7 hours	5 hours	23 hours	13 hours	9 days	7 days
	3	9 hours	7 hours	33 hours	23 hours	13 days	9 days
	4	11 hours	7 hours	37 hours	23 hours	15 days	9 days
	5	12 hours	7 hours	41 hours	24 hours	17 days	10 days
	5a	16 hours	10 hours	54 hours	24 hours	22 days	10 days
Thickness > 1.4 mm ≤ 2.0 mm	2	18 hours	15 hours	63 hours	2 days	25 days	20 days
	2a	21 hours	16 hours	3 days	2 days	29 days	22 days
	3	27 hours	17 hours	4 days	2 days	37 days	23 days
	4	34 hours	20 hours	5 days	3 days	47 days	28 days
	5	40 hours	25 hours	6 days	4 days	57 days	35 days
	5a	48 hours	40 hours	8 days	6 days	79 days	56 days
Thickness > 2.0 mm ≤ 4.5 mm	2	48 hours	48 hours	10 days	7 days	79 days	67 days
	2a	48 hours	48 hours	10 days	7 days	79 days	67 days
	3	48 hours	48 hours	10 days	8 days	79 days	67 days
	4	48 hours	48 hours	10 days	10 days	79 days	67 days
	5	48 hours	48 hours	10 days	10 days	79 days	67 days
	5a	48 hours	48 hours	10 days	10 days	79 days	67 days
BGA package > 17 mm x 17 mm or any stacked die package	2_6	96 hours	As Above per package thickness and moisture level	Not Applicable	As Above per package thickness and moisture level	Not Applicable	As Above per package thickness and moisture level

Table 2. IPC/JEDEC J-STD-033			
Default Baking Times Used Prior to Dry-Pack that were Exposed to Conditions ≤ 60% RH			
(Supplier Bake: "MET" = 24 h)			
Package Thickness	MSL	Bake @ 125°C	Bake @ 150°C
≤ 1.4 mm	2a	8 hours	4 hours
	3	16 hours	8 hours
	4	21 hours	10 hours
	5	24 hours	12 hours
	5a	28 hours	14 hours
≤ 2.0 mm	2a	23 hours	11 hours
	3	43 hours	21 hours
	4	48 hours	24 hours
	5	48 hours	24 hours
	5a	48 hours	24 hours
≤ 4.5 mm	2a	48 hours	24 hours
	3	48 hours	24 hours
	4	48 hours	24 hours
	5	48 hours	24 hours
	5a	48 hours	24 hours