Comparison of IR3899 CTM to DTM

This comparison serves as both of CTM verification and its error estimate reference.

3-die CTM Compared to **DTM** on the evaluation board

DTM -- Detailed Thermal Model
CTM -- Compact Thermal Model

Normal condition comparison

T_ambient = 25 deg C, 1 phases, top Fet over bottom Fet power loss ratio= Q1/Q2, Pd_IC = 0.085W;

case #	Q1/Q2	Pd_pak	airflow	heatsink	T_Q1 (DTM)	T_Q1 (CTM)	T_Q1 rise diff.	T_Q2 (DTM)	T_Q2 (CTM)	T_Q2 rise diff.	T_IC (DTM)	T_IC (CTM)	T_IC rise diff.
		(W)	(LFM)	H=15mm	(deg C)	(deg C)	%	(deg C)	(deg C)	%	(deg C)	(deg C)	%
1	0.5	3.085	200	yes	70.5	70.8	0.7	85.9	85.6	-0.4	52.6	52.9	1.0
2	2	3.085	200	yes	87.2	86.4	-1.2	70.0	70.6	1.3	52.3	52.7	1.7
3	0.5	3.085	200	no	80.6	80.7	0.2	97.9	97.8	-0.2	63.1	63.7	1.7
4	2	3.085	200	no	97.8	97.4	-0.4	80.48	81.0	0.9	62.10	62.9	2.2

Note: For these normal cases, the junction temperature rise difference is within 1.2%; (red number is package junction temperature)

Extreme condition comparison

Q1/Q2 = 0.5 for the following cases

case #	voided of	Pd_pak	airflow	heatsink	T_Q1 (DTM)	T_Q1 (CTM)	T_Q1 rise diff.	T_Q2 (DTM)	T_Q2 (CTM)	T_Q2 rise diff.	T_IC (DTM)	T_IC (CTM)	T_IC rise diff.
		(W)	(LFM)	H=15mm	(deg C)	(deg C)	%	(deg C)	(deg C)	%	(deg C)	(deg C)	%
5	VIN pad	3.085	200	yes	76.07	76.1	0.1	86.4	86.3	-0.2	52.9	53.2	1.2
6	SW pad	3.085	200	yes	71.8	72.0	0.3	96.0	94.0	-2.9	53.3	53.4	0.4
7	VIN pad	3.085	200	no	87.4	87.7	0.5	99.0	98.9	-0.1	63.6	64.3	1.8
8	SW pad	3.085	200	no	83.0	82.8	-0.3	111.7	109.8	-2.2	64.8	65.1	0.9

Note: For these extreme cases, the junction temperature rise difference is within 3%; (red number is package junction temperature)
VIN pad voided --- the under-package solder pad below top Fet is voided.
SW pad voided --- the under-package solder pad below bottom Fet is voided.