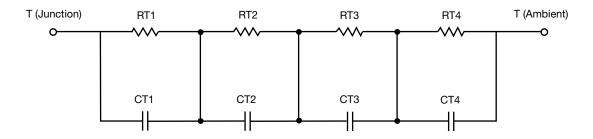# R-C Thermal Model Parameters

DESCRIPTION

The parametric values in the R-C thermal model have been derived using curve-fitting techniques. R-C values for the electrical circuit in the Foster/tank and Cauer/filter configurations are included. When implemented in PSpice, these values have matching characteristic curves to the single-pulse transient thermal impedance curves for the MOSFET.

These RC values can be used in the PSpice simulation to evaluate the thermal behavior of the MOSFET junction temperature under a defined power profile. These techniques are described in application note AN609, "Thermal Simulation of Power MOSFETs on the PSpice Platform".

R-C THERMAL MODEL FOR TANK CONFIGURATION

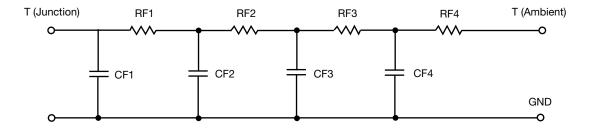| R-C VALUES FOR TANK CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	14.3052	166.1109m	n/a
RT2	2.5623	254.1876m	n/a
RT3	524.6000m	342.5956m	n/a
RT4	22.6079	237.1059m	n/a
THERMAL CAPACITANCE (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	4.2441	459.2189m	n/a
CT2	573.7672m	35.8467m	n/a
CT3	17.1537m	1.7806m	n/a
CT4	5.3899	46.5087m	n/a

Note
• n/a indicates not applicable

This document is intended as a SPICE modeling guideline and does not constitute a commercial product datasheet. Designers should refer to the appropriate datasheet of the same number for guaranteed specification limits.

R-C THERMAL MODEL FOR FILTER CONFIGURATION

255.8682m

R-C VALUES FOR FILTER CONFIGURATION			
THERMAL RESISTANCE (°C/W)			
Junction to	Ambient	Case	Foot
RF1	1.4797	421.9574m	n/a
RF2	5.5091	436.6613m	n/a
RF3	22.2263	60.8907m	n/a
RF4	10.7849	80.4906m	n/a
THERMAL CAPACITANCE (Joules/°C)			
Junction to	Ambient	Case	Foot
CF1	220.6806m	1.7133m	n/a
CF2	722.4747m	20.7951m	n/a
CF3	1.6229	292.6263m	n/a
CF4	2.4574	541.2706m	n/a

Note

• n/a indicates not applicable

SQM40061EL   Tank j-a   Temperature:27.0
(A) j-a.opt.dat, SQM40061EL_Rth-ja_txt.dat
V(RT1:1) "j-a"
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SQM40061EL   Filter j-a   Temperature:27.0
(A) j-a.opt.dat, SQM40061EL_Rth-ja_txt.dat
V(RF1:1) "j-a"
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SQM40061EL   Tank j-c   Temperature:27.0
(A) j-c.opt.dat, SQM40061EL_Rth-jc_txt.dat
V(CT1:1) "j-c"
October 04, 2017   Page 1   20:44:11

SQM40061EL   Filter j-c   Temperature:27.0
(A) j-c.opt.dat, SQM40061EL_Rth-jc_txt.dat
V(CF1:1) "j-c"
October 04, 2017   Page 1   21:02:51