

dissipation of one transistor is calculated from the supply voltage and from the load resistor equally for the whole volume of a chip. The temperature of surroundings is 25 °C. The model applies natural way of cooling.

The solution result is shown in Fig. 4. The graphical output describes the temperature field of power stage. The signal excitation of power stage  $m = 0,1$ . The surface temperature of simulated physical model is

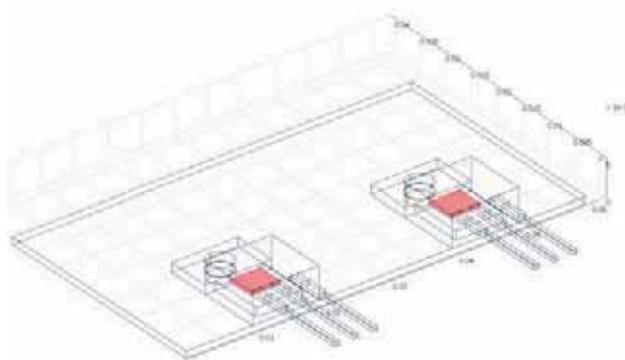


Fig. 3. Geometrical model of a power amplifier

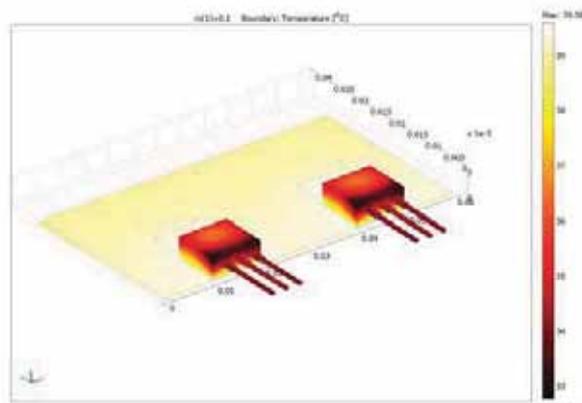


Fig. 4. Boundary temperature field of the power amplifier at  $m = 0,1$

within the interval 32,8 °C to 39,6 °C.

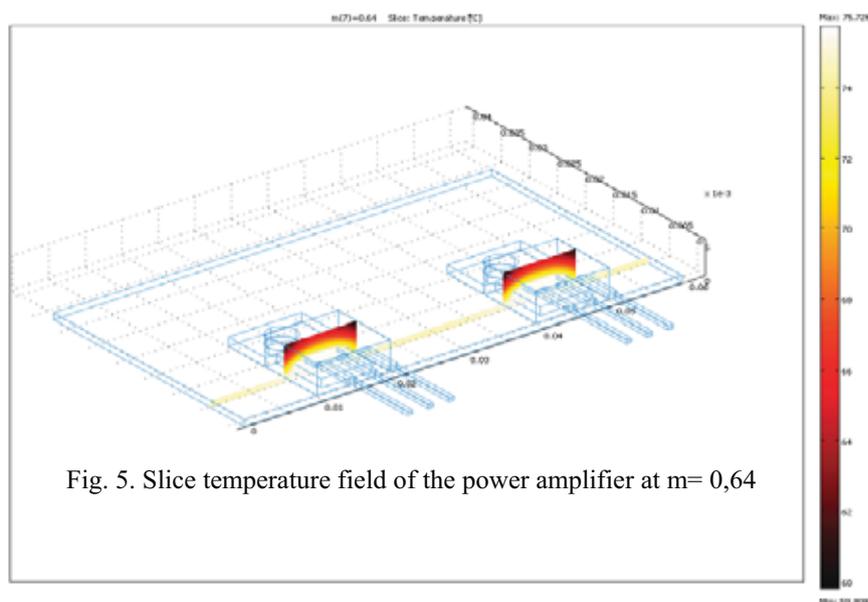


Fig. 5. Slice temperature field of the power amplifier at  $m= 0,64$

The highest heat dissipation of transistor is when the signal excitation achieves the value  $m=0,64$ . The situation is visible in Fig. 5 . Fig. 5 shows the temperature of slice of simulated model in steady state within interval 59,8 °C to 75,7 °C. The temperature of chip does not exceed 76 °C, as indicated in Fig. 5.

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## References

- [1] Elberg, S. - M, P. : *Odvod tepla z elektronických zařízení*. SNTL Praha 1983
- [2] Kassakian, J.G. - Schlecht, M.F. - Verghese, G.C.: *Principles of Power Electronics*. Addison-Wesley Publishing Company, Massachusetts, June 1992
- [3] Dudřík, J.: *Power Semiconductor Devices*, TU Košice, 2001, 70pp
- [4] Kováčová, I. – Kováč, D.: *Electric power systems – EMC*. Advances in Electrical and Electronic Engineering (AEEE), Vol. 5/2006, No. 3., pp. 392 - 396.
- [5] Benda, V.: *Power Semiconductors and Integrated Structures*. ČVUT Editor, Prague (CZ), 1994
- [6] Locatelli, M. L.- Gamal, S. H.-Chante, J.P.: *Semiconductor Material for High Temperature Power Devices*. EPE Journal (4) 1994, No. 1, pp. 43-46
- [7] *COMSOL – Users' Guide*