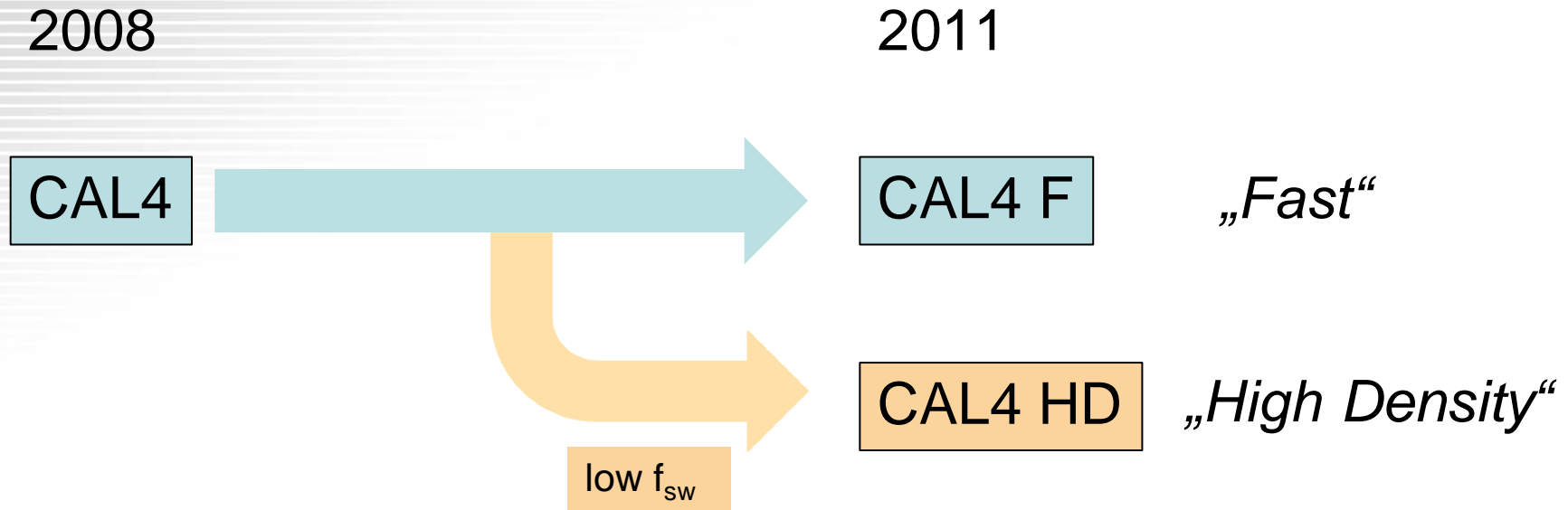


# **Introduction of CAL4 HD 1200V diode**

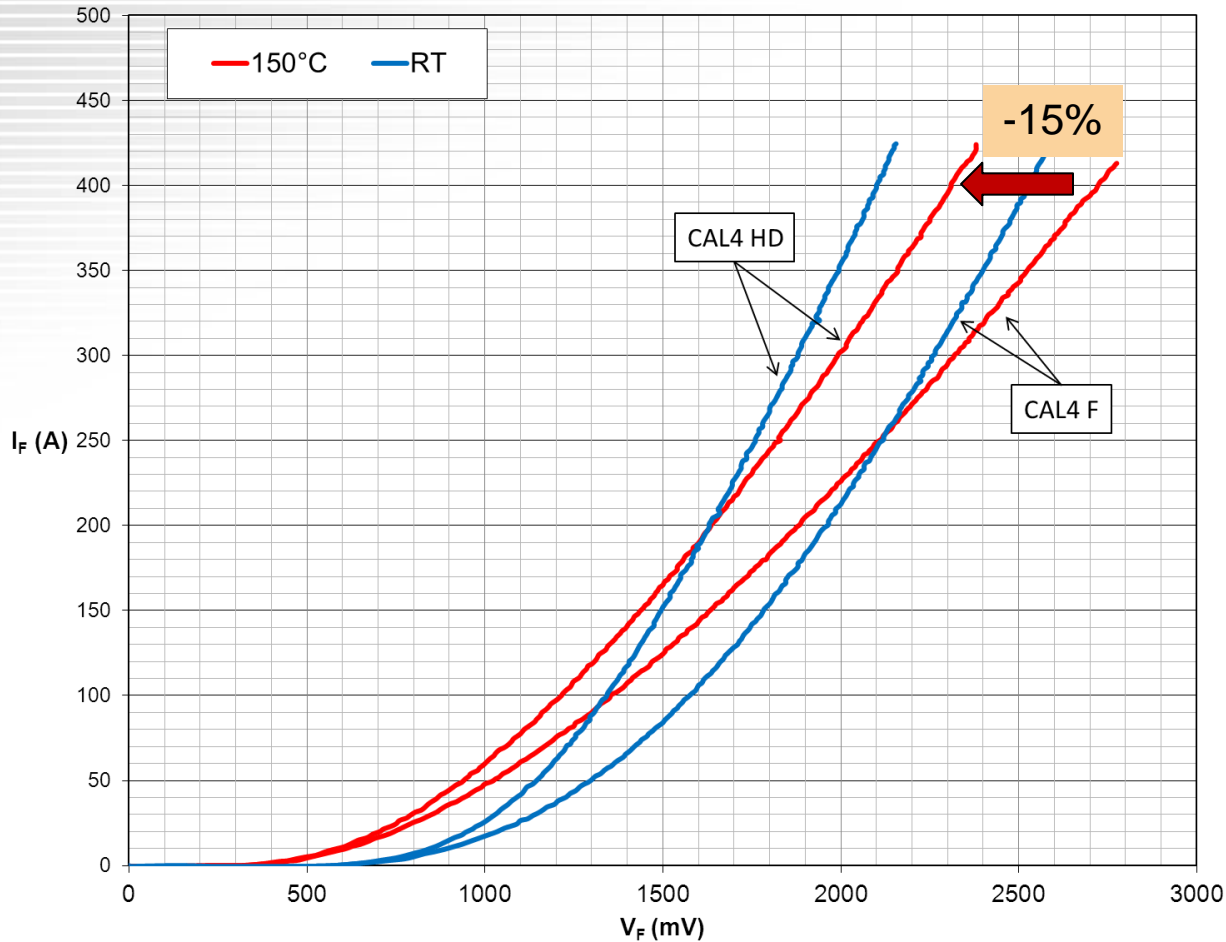
Martin Hansmann, 2011-04-05

# Evolution of 4th gen CAL diode 1200V



- Standard CAL4 evolves into CAL4 F
  - ▶ Identical electrical characteristics
  - ▶ Optimized for  $f_{sw} = 8$  kHz and above
- Introduction of new CAL4 HD subtype
  - ▶ Optimized for  $f_{sw} = 3$  kHz
  - ▶ Ideal for medium power IGBT

# CAL4 F vs. HD: Forward Characteristics



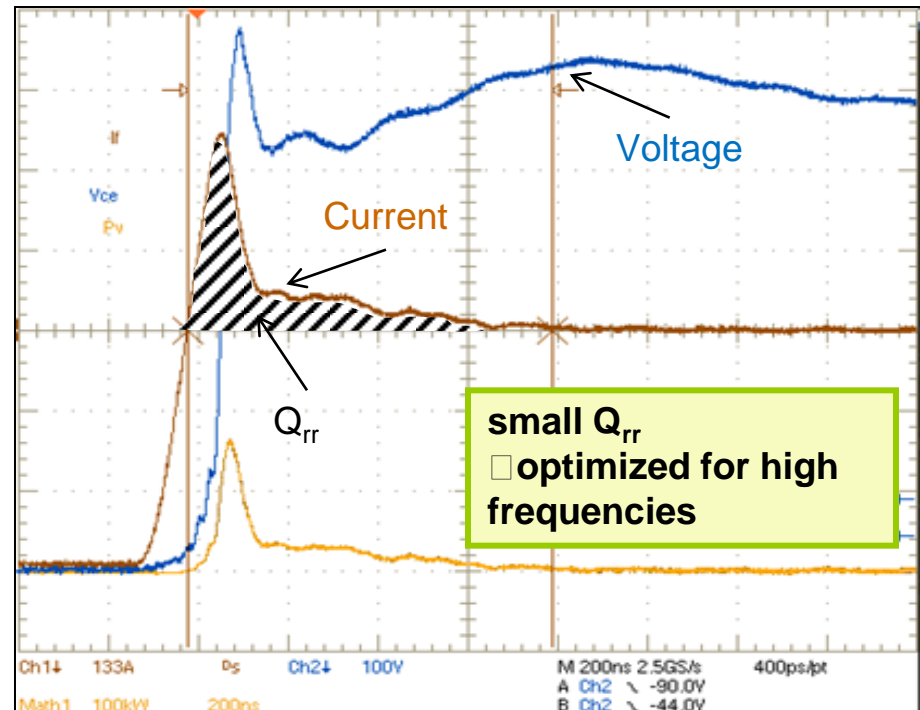
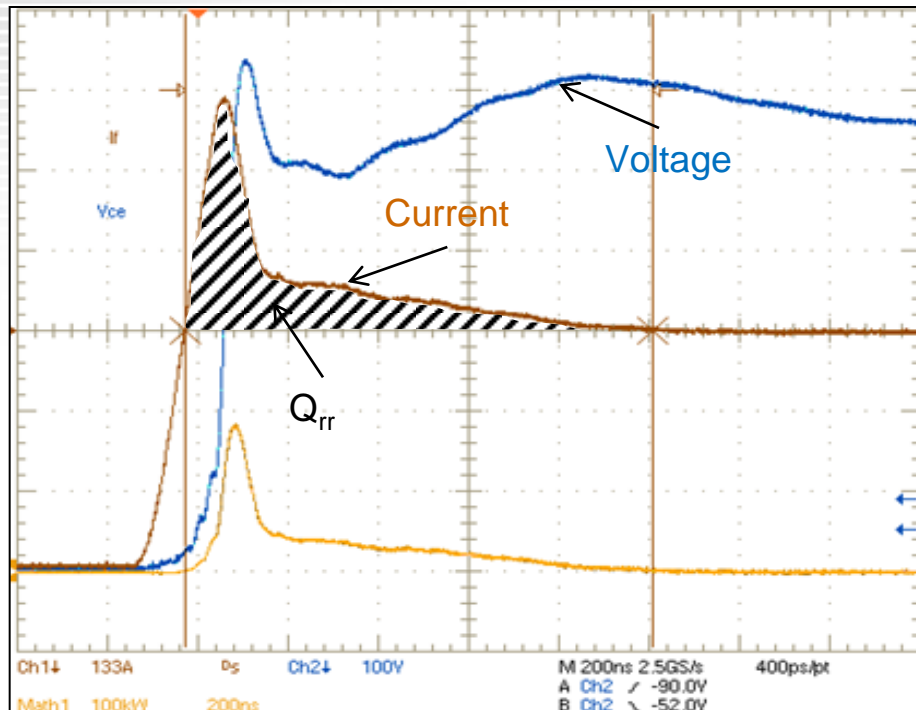
Tested in  
SEMiX  
404GB12E4s

- CAL HD (**H**igh **D**ensity) is optimized for low static losses
- ideal for low switching frequencies

# CAL4 1200V F vs. HD: Dynamic Losses

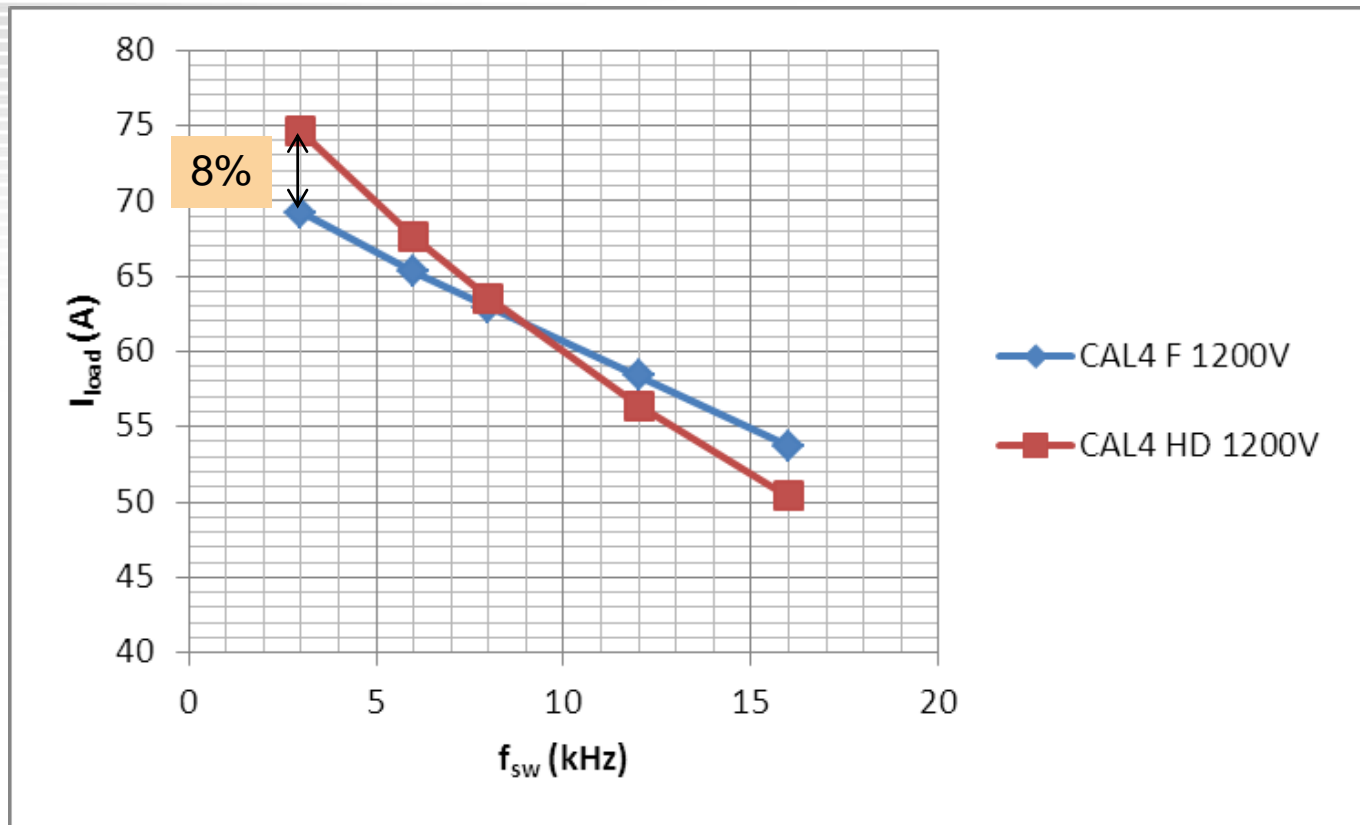
CAL4 HD

CAL4 F



➡ Switching at  $I_F=400$  A,  $V_R=600$  V,  $di/dt=5400$  A/ $\mu$ s,  $150$  °C in Semix404GB12E4s

# CAL4 HD and CAL4 F: Simulation of Load Current



- Max. load current of CAL4 HD increased by 8% @3kHz
- Parameters:  $I_F=100A$ ,  $T_j=150^\circ C$ ,  $T_c=80^\circ C$ ,  $di/dt=1500A/\mu s$

- With the introduction of the new CAL4 HD diode, SEMIKRON provides a new chip solution optimized for medium power applications at low switching frequencies (e.g. 3 kHz).
- CAL4 F features the same electrical properties as CAL4, and is ideal at high switching frequencies of 8kHz and above.
- Transition between the two regimes lies at 6...8 kHz (depends on application).