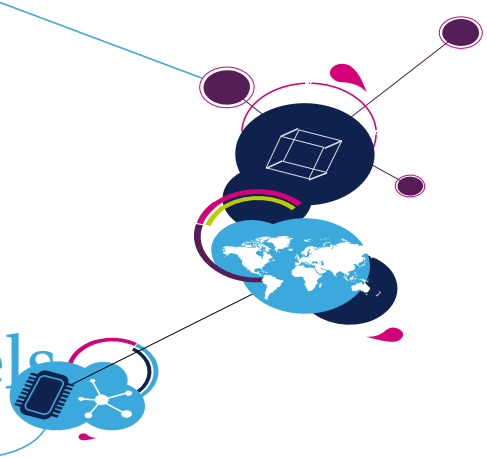
CMOS028FDSOI Technology

Vertical NPN bipolar transistor models

DK1.2_RF_mmW

Comparison with DK1.1_RF_mmW model(s)



Please use the bookmark to navigate

General information on models

- Maximum supply voltage is - V.
- Validity domain is defined as follows:
  - ✔ Device temperature varies from -40 C °C to 150 C °C.

Output parameters definitions

- Model(s): vnpn
  - ✔ Ic : Collector current
  - ✔ Ib : Base current
  - ✔ Beta : DC gain current

vnpn
Electrical characteristics per geometry

vnpn @ l=3.2e-6, w=3.2e-6, soa=0, temp=25.0, vbe=0.6

DK1.2_RF_mmW wrt DK1.1_RF_mmW

	TYP	IMIN	IMAX	BMIN	BMAX
Ic [nA]	11.53 0.0%	8.83 0.0%	14 0.0%	9 0.0%	13.74 0.0%
Ib [nA]	3.03 0.0%	1.92 0.0%	4.4 0.0%	3.87 0.0%	2.51 0.0%
Beta []	3.8 0.0%	4.59 0.0%	3.18 0.0%	2.33 0.0%	5.48 0.0%

vnpn @ l=3.2e-6, w=3.2e-6, soa=0, temp=25.0, vbe=0.7

DK1.2_RF_mmW wrt DK1.1_RF_mmW

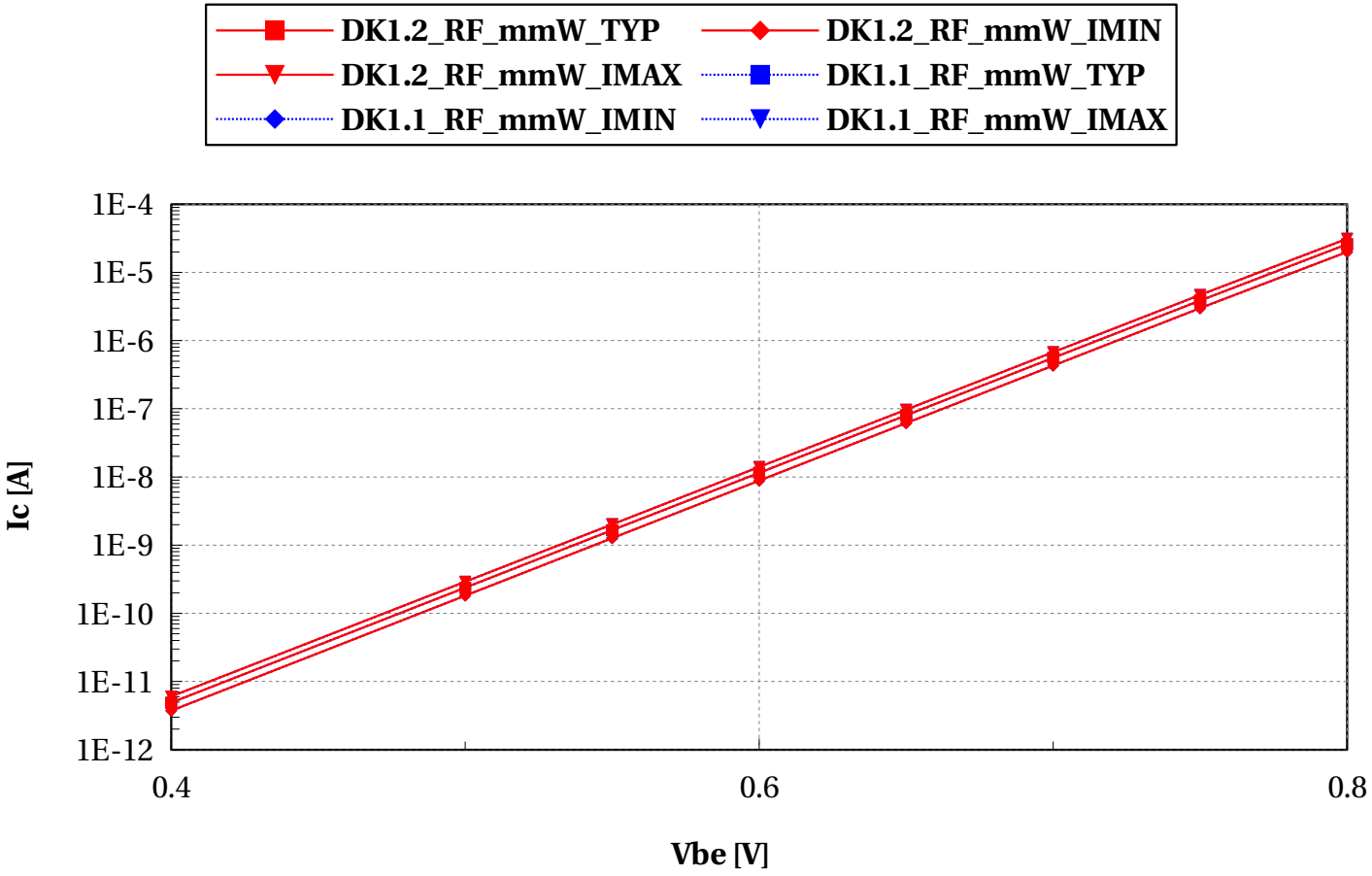
	TYP	IMIN	IMAX	BMIN	BMAX
Ic [nA]	558.4 0.0%	429.3 0.0%	674.4 0.0%	437.5 0.0%	661.8 0.0%
Ib [nA]	130.7 0.0%	94.14 0.0%	164.8 0.0%	146 0.0%	122.1 0.0%
Beta []	4.27 0.0%	4.56 0.0%	4.09 0.0%	3 0.0%	5.42 0.0%

vnpn
Electrical characteristics scaling

Ic/Ib scaling versus Vbe (W=3.2um&L=3.2um,Temp=25C)

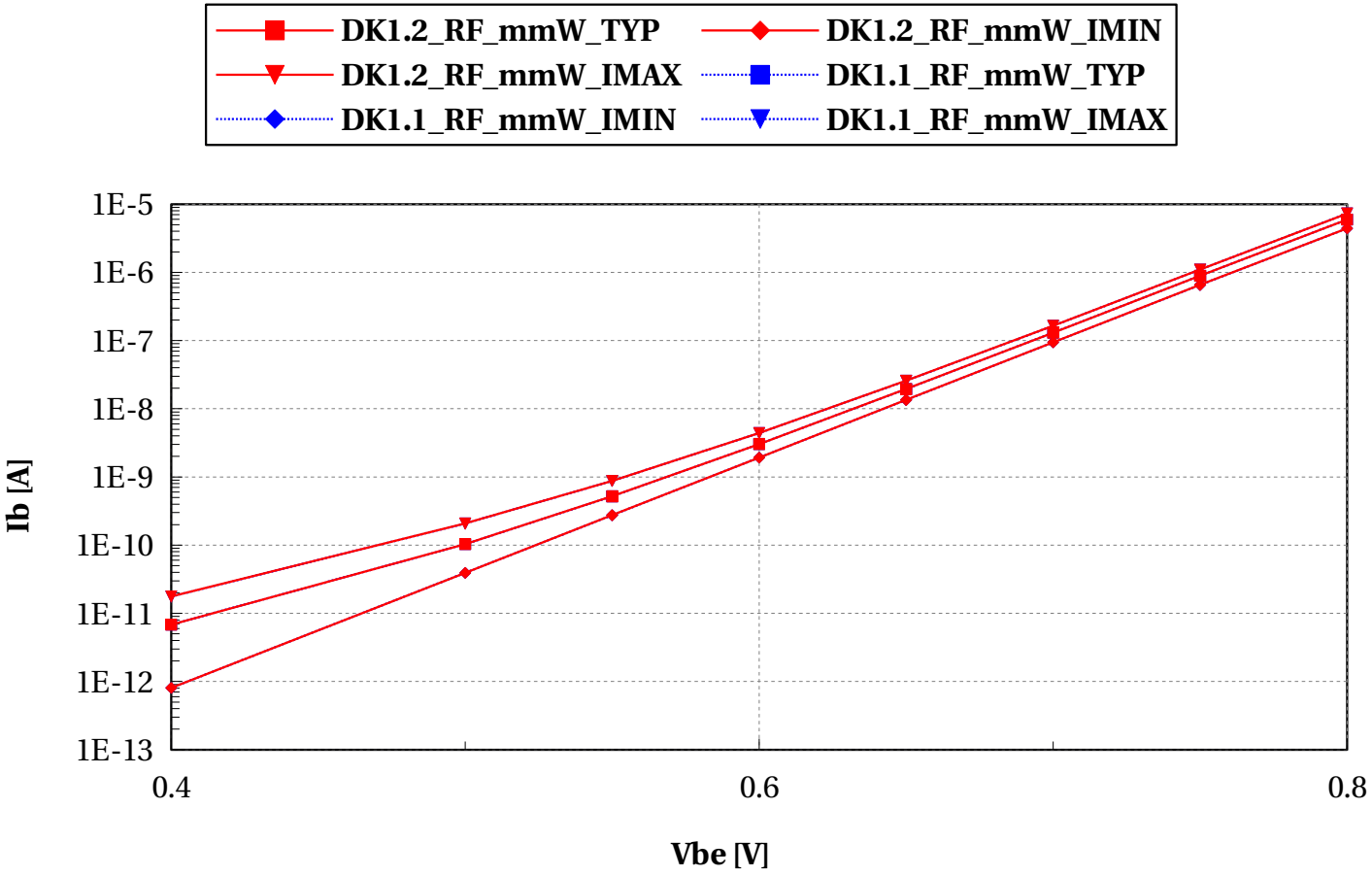
vnpn, Ic [A] vs Vbe [V]

L==3.2e-06 and W==3.2e-06 and Temp==25



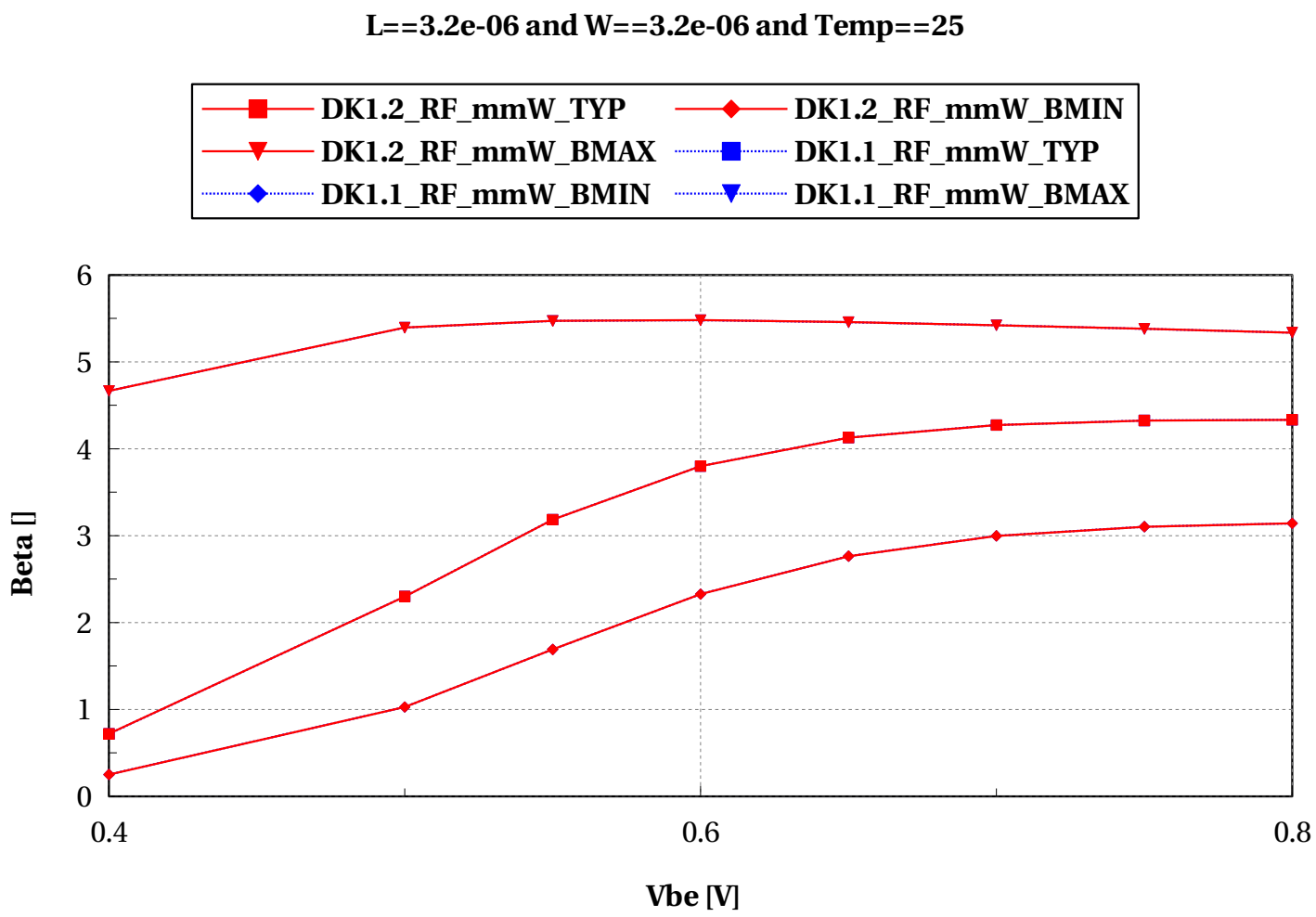
vnpn, Ib [A] vs Vbe [V]

L==3.2e-06 and W==3.2e-06 and Temp==25



Beta scaling versus Vbe (W=3.2um&L=3.2um,Temp=25C)

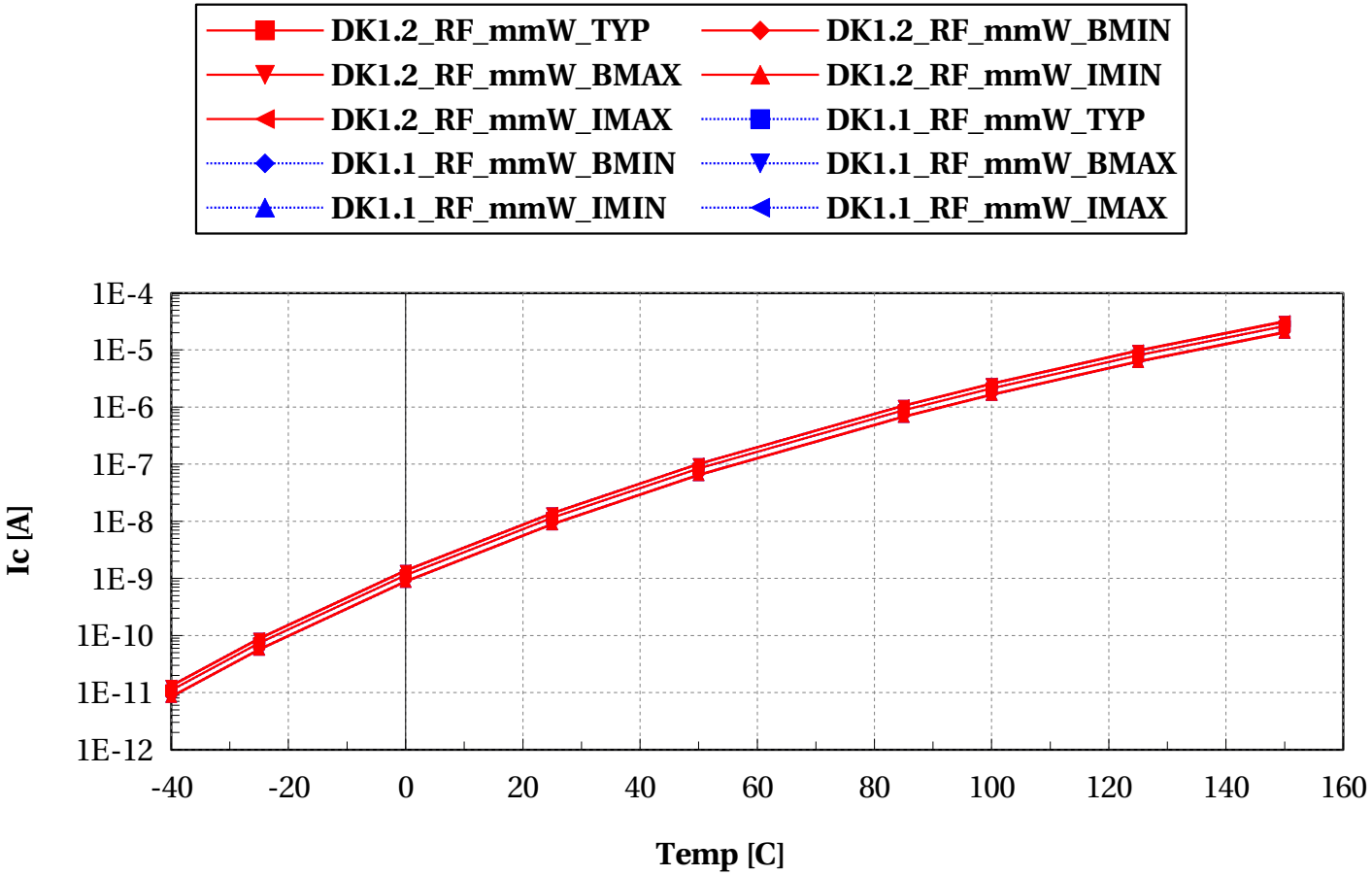
vnpn, Beta [] vs Vbe [V]



Ic/Ib scaling versus Temp (W=3.2um&L=3.2um,Vbe=0.6V)

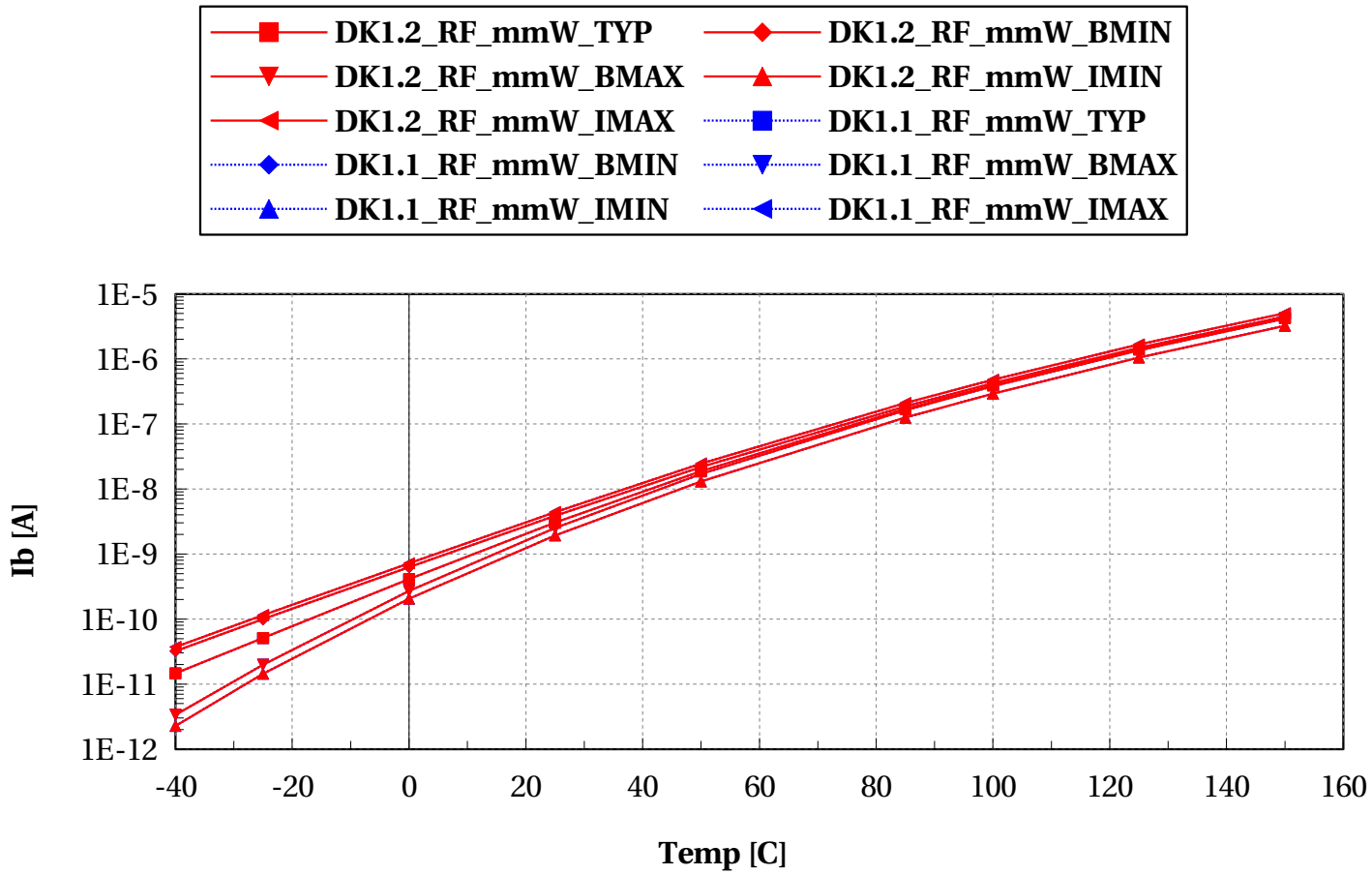
vnpn, Ic [A] vs Temp [C]

L==3.2e-06 and W==3.2e-06 and Vbe==0.6



vnpn, Ib [A] vs Temp [C]

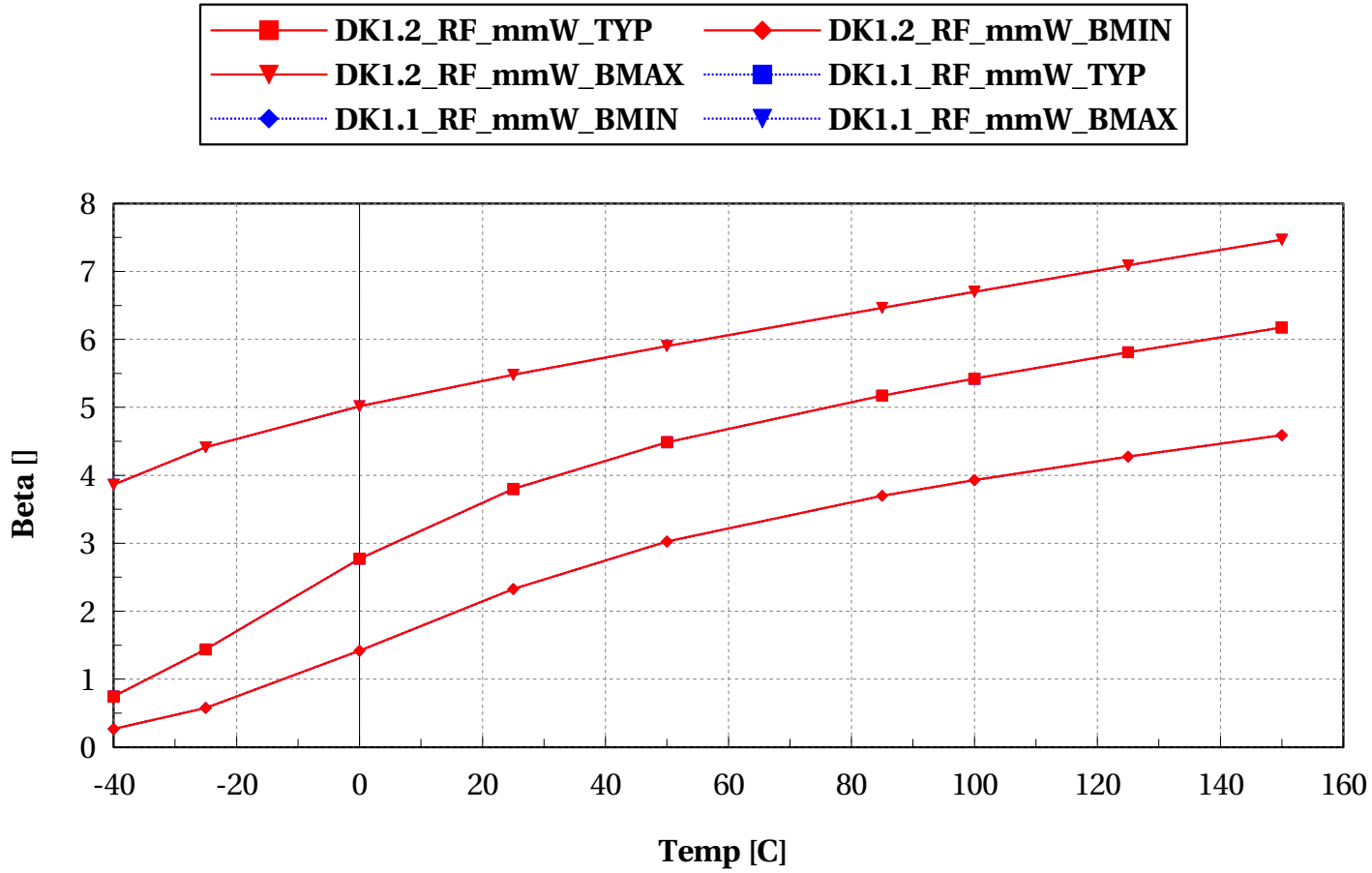
L==3.2e-06 and W==3.2e-06 and Vbe==0.6



Beta scaling versus Temp (W=3.2um&L=3.2um,Vbe=0.6V)

vnpn, Beta [] vs Temp [C]

L==3.2e-06 and W==3.2e-06 and Vbe==0.6



Annex

Conditions of simulations

The simulations were done with SBenchLSF Alpha using Eldo simulator 2018.3.

- Model vnpn (DK1.2_RF_mmW)
  - ✔ Input Parameters
    - ✘ vcb = 0 V
    - ✘ vbe = 0.6 V
    - ✘ temp = 25 °C
    - ✘ mc_sens = 0
    - ✘ sbenchlsf_release = Alpha
    - ✘ ams_release = 2018.3
    - ✘ model_version = 1.0
    - ✘ vsub = 0 V
    - ✘ mc_runs = 1000
    - ✘ mc_nsigma = 3
  - ✔ Sweep Parameters
    - ✘ vbe = 0.4, 0.5, 0.55, 0.6, 0.65, 0.7, 0.75, 0.8
    - ✘ temp = -40.0, -25.0, 0.0, 0.0, 25.0, 50.0, 85.0, 100.0, 125.0, 150.0
  - ✔ Extra parameters

- ✘ vnpn_user = 0
- ✘ npnv_dev = 0

● Model vnpn (DK1.1_RF_mmW)

- ✔ Input Parameters
  - ✘ vcb = 0 V
  - ✘ vbe = 0.6 V
  - ✘ temp = 25 °C
  - ✘ mc_sens = 0
  - ✘ sbenchlsf_release = Alpha
  - ✘ ams_release = 2018.3
  - ✘ model_version = 1.0
  - ✘ vsub = 0 V
  - ✘ mc_runs = 1000
  - ✘ mc_nsigma = 3
- ✔ Sweep Parameters
  - ✘ vbe = 0.4, 0.5, 0.55, 0.6, 0.65, 0.7, 0.75, 0.8
  - ✘ temp = -40.0, -25.0, 0.0, 0.0, 25.0, 50.0, 85.0, 100.0, 125.0, 150.0
- ✔ Extra parameters
  - ✘ vnpn_user = 0
  - ✘ npnv_dev = 0