Use Infineon IGBT Library in Qspice

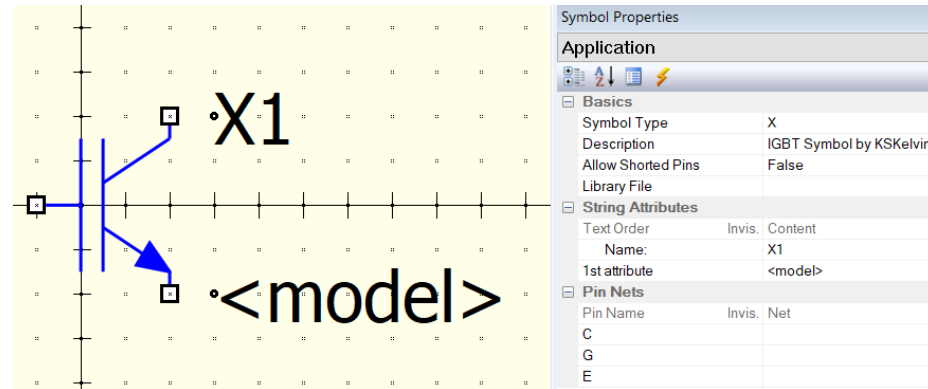KSKelvin Kelvin Leung
11-3-2023

Infineon IGBT Spice Library

- ## Infineon IGBT Spice Library
  - https://www.infineon.com/dgdl/Infineon-SPICE-L1-IGBT_1200V_HighSpeed3-SimulationModels-v01_01-EN.zip?fileId=8ac78c8c8929aa4d01899bfabcca3417
  - Unzip package, library of spice is
    - IGBT_1200V_HighSpeed3_L1.lib
  - L1-model name of available model is listed in comment of library
  - Model is a sub-circuit with pin order as C G and E

```
.SUBCKT IGW40N120H3_L1 C G E PARAMS: TJ={TEMP}
X11TG C G E E2 Z01T2 PARAMS: TJ={TJ}
.ENDS
```

  - A custom symbol need to be created for Qspice to use this library and subckt
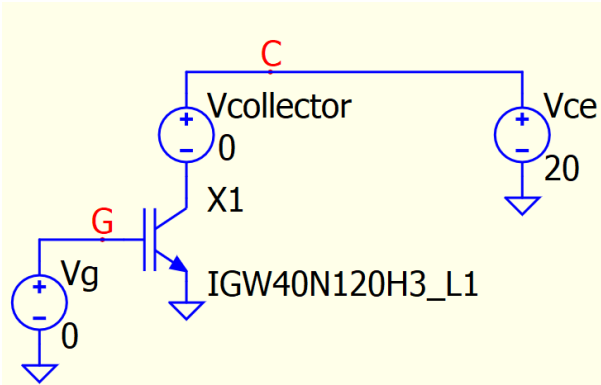   - IGBT_Symbol.qsym

```
* PINS:
* -------------------------------------------------------
* | PIN | DESCRIPTION
* -------------------------------------------------------
* | C   | IGBT collector for single devices and DuoPacks
*
* | G   | IGBT gate for single devices and DuoPacks
*
* | E   | IGBT emitter for single devices and DuoPacks
*
* | K   | IGBT Kelvin emitter sense for single devices and DuoPacks
*********************************************************
* Product      Device Type   Vce/V   Ic/A   Package       L1-model name
* -------------------------------------------------------
* IGW15N120H3   Single IGBT   1200    15     PG-TO247-3    IGW15N120H3_L1
* IGW25N120H3   Single IGBT   1200    25     PG-TO247-3    IGW25N120H3_L1
* IGW40N120H3   Single IGBT   1200    40     PG-TO247-3    IGW40N120H3_L1
* IKW15N120H3   DuoPack       1200    15     PG-TO247-3    IKW15N120H3_L1
* IKW25N120H3   DuoPack       1200    25     PG-TO247-3    IKW25N120H3_L1
* IKW40N120H3   DuoPack       1200    40     PG-TO247-3    IKW40N120H3_L1
* IKQ75N120CH3  DuoPack       1200    75     PG-TO247-3    IKQ75N120CH3_L1
* IKQ50N120CH3  DuoPack       1200    50     PG-TO247-3    IKQ50N120CH3_L1
* IKQ40N120CH3  DuoPack       1200    40     PG-TO247-3    IKQ40N120CH3_L1
* IKY75N120CH3  DuoPack       1200    75     PG-TO247-4    IKY75N120CH3_L1
* IKY50N120CH3  DuoPack       1200    50     PG-TO247-4    IKY50N120CH3_L1
* IKY40N120CH3  DuoPack       1200    40     PG-TO247-4    IKY40N120CH3_L1
*********************************************************
```


Symbol Properties		
Application		
Basics		
Symbol Type	X	
Description	IGBT Symbol by KSKelvin	
Allow Shorted Pins	False	
Library File		
String Attributes		
Text Order	Invis.	Content
Name:		X1
1st attribute		<model>
Pin Nets		
Pin Name	Invis.	Net
C		
G		
E		

IGBT IGW40N120H3 Simulation and Datasheet Comparison
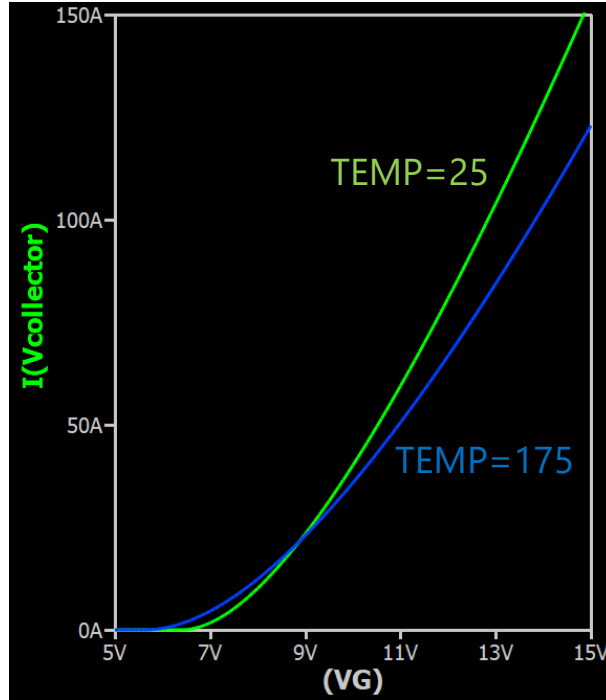
Qspice : Parent - IGBT - IC vs Vg.qsch

Qspice Schematic
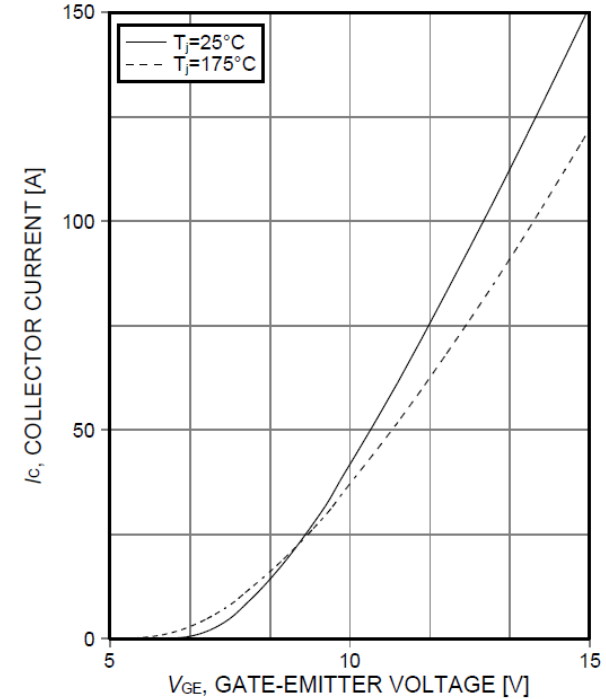


```
.lib IGBT_1200V_HighSpeed3_L1.lib
.dc Vg 5 15 0.1
.TEMP 25 175
.plot I(Vcollector)
```
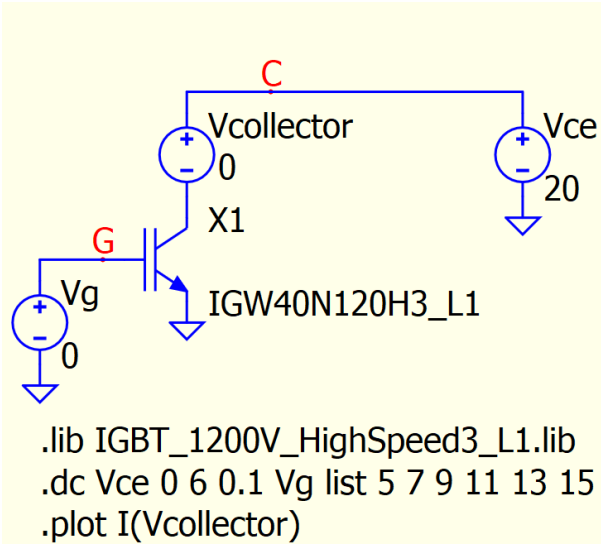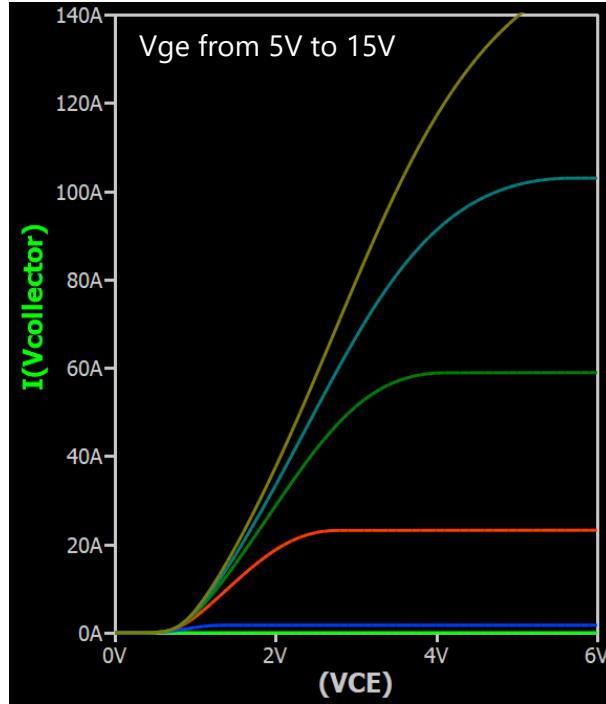
Simulation Results

Datasheet Figure 7

Qspice Schematic

C

Vcollector
0

Vce
20

X1

G

Vg
0

IGW40N120H3_L1

.lib IGBT_1200V_HighSpeed3_L1.lib
.dc Vce 0 6 0.1 Vg list 5 7 9 11 13 15
.plot I(Vcollector)

Simulation Results

Vge from 5V to 15V

Datasheet Figure 5