```
sfa_doc_bool_vs_decidable  THM

⊢  ∀P:Prop. Dec(P) ⟺ (∃b:𝔹. P ⟺ b)  by UnivCD
|
1. P : Prop
⊢  Dec(P) ⟺ (∃b:𝔹. P ⟺ b)  by 2 Times Analyze
|
|\
| 2. Dec(P)
| ⊢  ∃b:𝔹. P ⟺ b  by Analyze-1
| |
| |\
| | 2. P
| | ⊢  ∃b:𝔹. P ⟺ b  by Witness: true₂
| | |
| | 3. P
| | ⊢  true₂  by Reduce Concl
| | |
| | ⊢  True  by Trivial
| |
| .\
| . 2. ¬P
| . ⊢  ∃b:𝔹. P ⟺ b  by Witness: false₂
| . |
| . 3. false₂
| . ⊢  P  by Reduce Hyp:-1
| . |
| . 3. False
| . ⊢  P  by Trivial
|
.\
. 2. ∃b:𝔹. P ⟺ b
. ⊢  Dec(P)  by Analyze-1 THEN Def
. |
. 2. b : 𝔹
. 3. P ⟺ b
. ⊢  P ∨ ¬P  by BoolCases Hyp:-2
. |
. |\
. | 2. P ⟺ true₂
. | ⊢  P ∨ ¬P  by Reduce Hyp:-1
. | |
. | 2. P ⟺ True
. | ⊢  P ∨ ¬P  by Select: 1
. | |
. | ⊢  P  by BackThru: Hyp:2
. |
. .\
. . 2. P ⟺ false₂
. . ⊢  P ∨ ¬P  by Reduce Hyp:-1
. . |
. . 2. P ⟺ False
. . ⊢  P ∨ ¬P  by Select: 2
. . |
. . ⊢  ¬P  by Rewrite by P ⟺ False
```

```
. . |
. . ⊢  ¬False  by Analyze
END
```