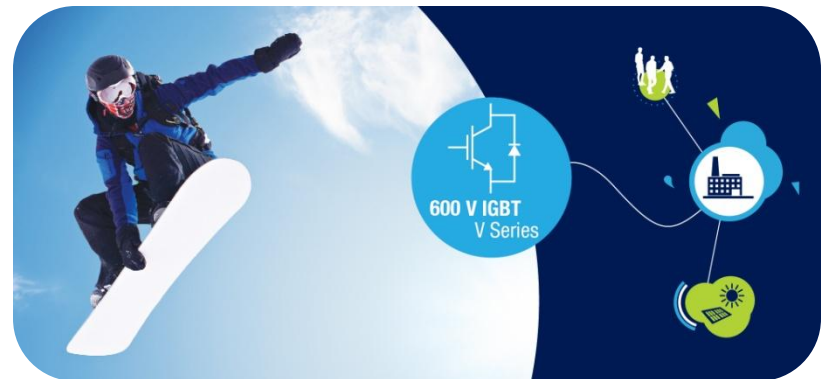




New 600 V IGBTs – “V Series”

Trench gate field stop – very high speed technology




Shaping a more efficient and reliable Power Switching


600 V IGBTs – V Series

New trench gate field stop technology – very high speed series




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Energy saving

Extremely low switching-off combined with low conduction losses increase efficiency of high frequency converters
- 

Power scalability

Both the positive $V_{CE(sat)}$ derating and the linear switching losses increasing with temperature yield a safer paralleling operation
- 

Robustness and reliability

Increased maximum junction temperature $T_{J(max)}$ up to 175 °C ensures longer lifetime

A comprehensive product line



STGW40V60DLF

- $I_{CN} = 40\text{ A}$
- $V_{CE(sat)} = 1.8\text{ V}$
- $E_{off}^{1)} = 140\text{ }\mu\text{J}$

STGW60V60DLF

- $I_{CN} = 60\text{ A}$
- $V_{CESAT} = 1.85\text{ V}$
- $E_{off}^{1)} = 220\text{ }\mu\text{J}$

STGW40V60DF

- $I_{CN} = 40\text{ A}$
- $V_{CESAT} = 1.8\text{ V}$
- $E_{off} = 411\text{ }\mu\text{J}$

STGW60V60DF

- $I_{CN} = 60\text{ A}$
- $V_{CESAT} = 1.85\text{ V}$
- $E_{off} = 550\text{ }\mu\text{J}$

STGP30V60DF

- $I_{CN} = 30\text{ A}$
- $V_{CESAT} = 1.85\text{ V}$
- $E_{off} = 233\text{ }\mu\text{J}$

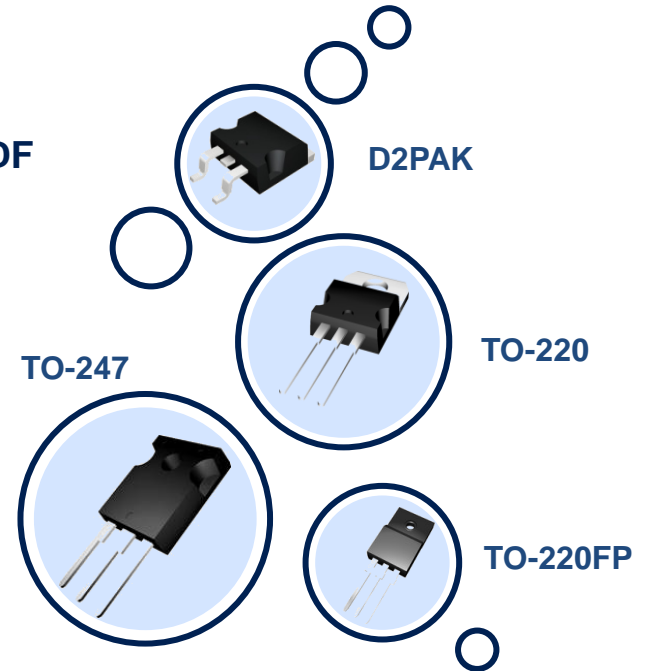
STGW80V60DF

- $I_{CN} = 80\text{ A}$
- $V_{CESAT} = 1.85\text{ V}$
- $E_{off} = 950\text{ }\mu\text{J}$

STGP20V60DF

- $I_{CN} = 20\text{ A}$
- $V_{CESAT} = 1.85\text{ V}$
- $E_{off} = 130\text{ }\mu\text{J}$

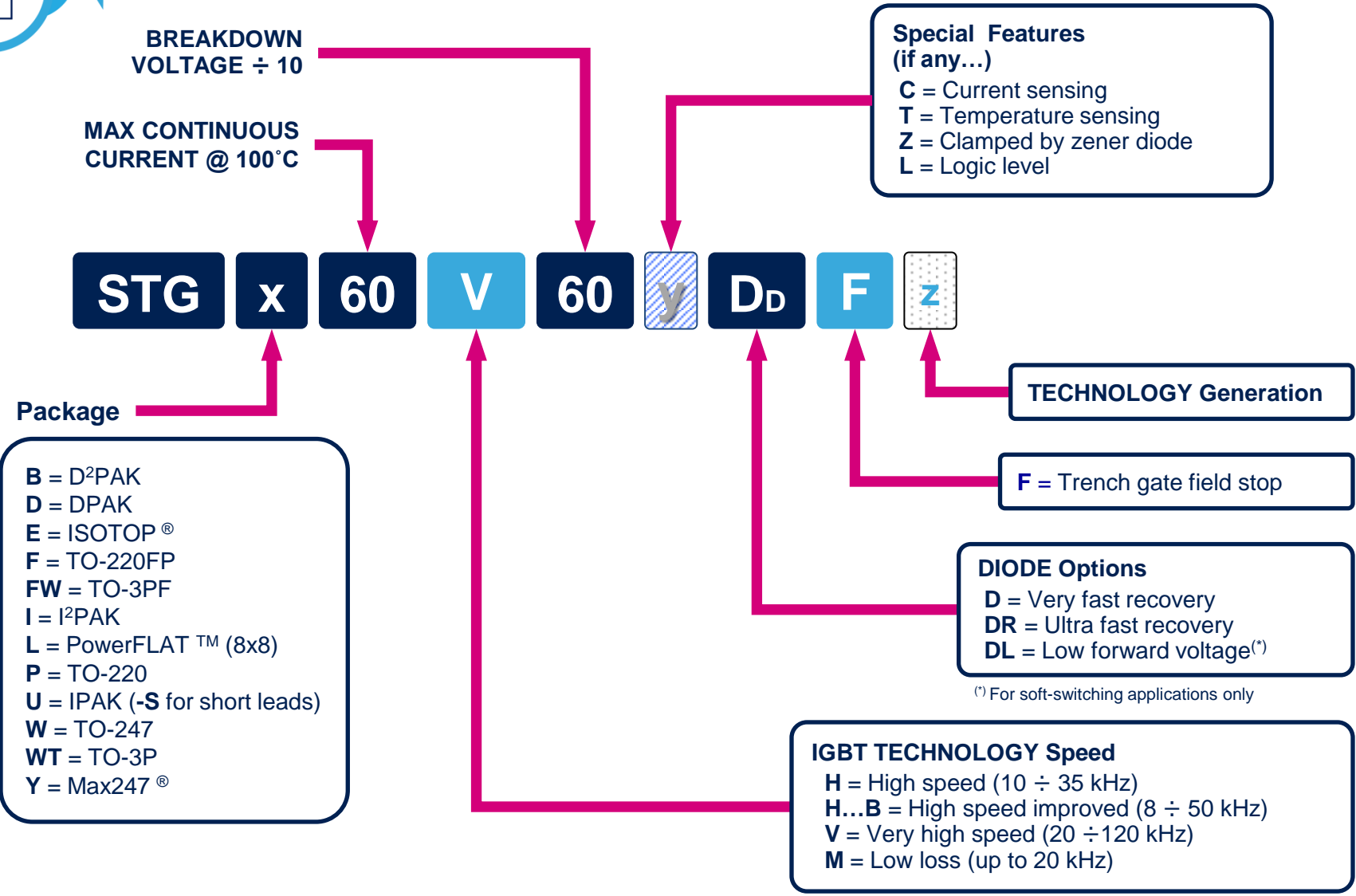
$T_{J(max)} = 175^\circ\text{C}$



...in a wide offer of packages

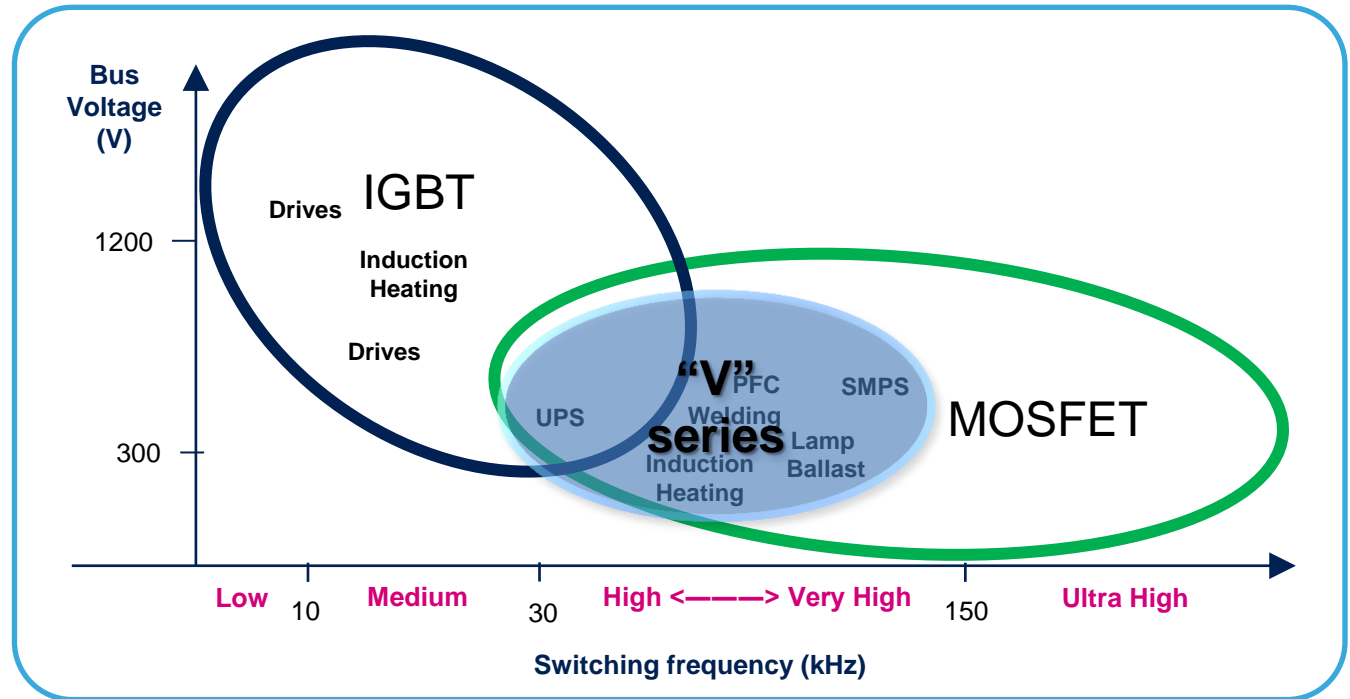
I_{CN} : IGBT nominal collector current @ $T_J=100\text{ }^\circ\text{C}$
 $V_{CE(sat)}$: typical conduction losses @ I_{CN} , $T_J=25\text{ }^\circ\text{C}$
 E_{off} : switching-off energy losses @ I_{CN} , $T_J=25\text{ }^\circ\text{C}$
- on inductive load @ $V_{CC}=400\text{ V}$
- ¹⁾ on capacitive load @ $V_{CC}=320\text{ V}$, $C_{sub}=20\text{ nF}$

IGBTs: Nomenclature for new products in trench gate field stop technology



- B** = D²PAK
- D** = DPAK
- E** = ISOTOP[®]
- F** = TO-220FP
- FW** = TO-3PF
- I** = I²PAK
- L** = PowerFLAT[™] (8x8)
- P** = TO-220
- U** = IPAK (-S for short leads)
- W** = TO-247
- WT** = TO-3P
- Y** = Max247[®]

600 V IGBT V series positioning

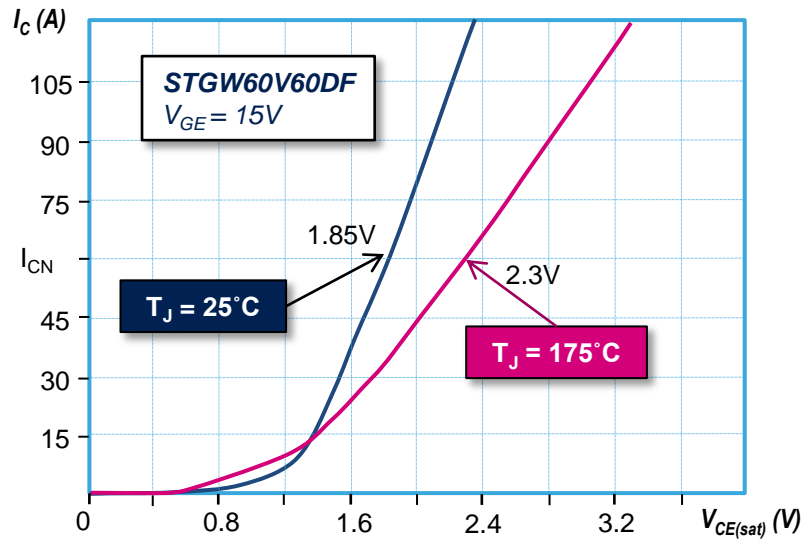


New IGBT "V" series: developed to bridge the gap between IGBTs and MOSFETs in high-frequency hard-switching applications above 20kHz

V series improved performance

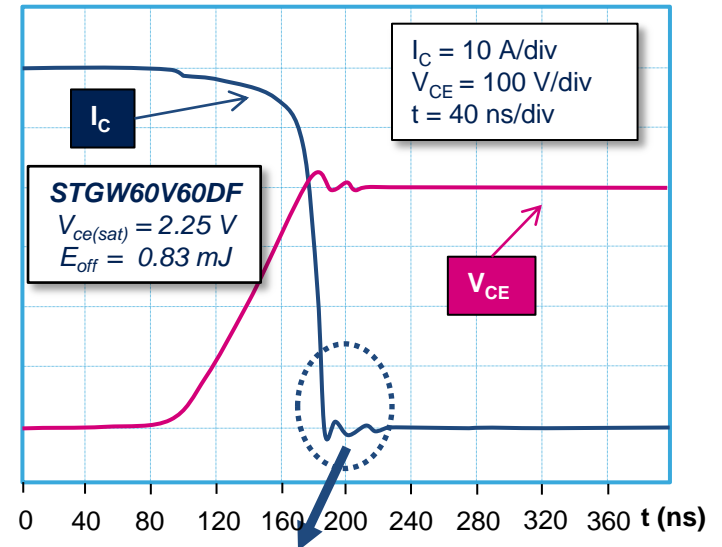


Saturation voltage characteristic



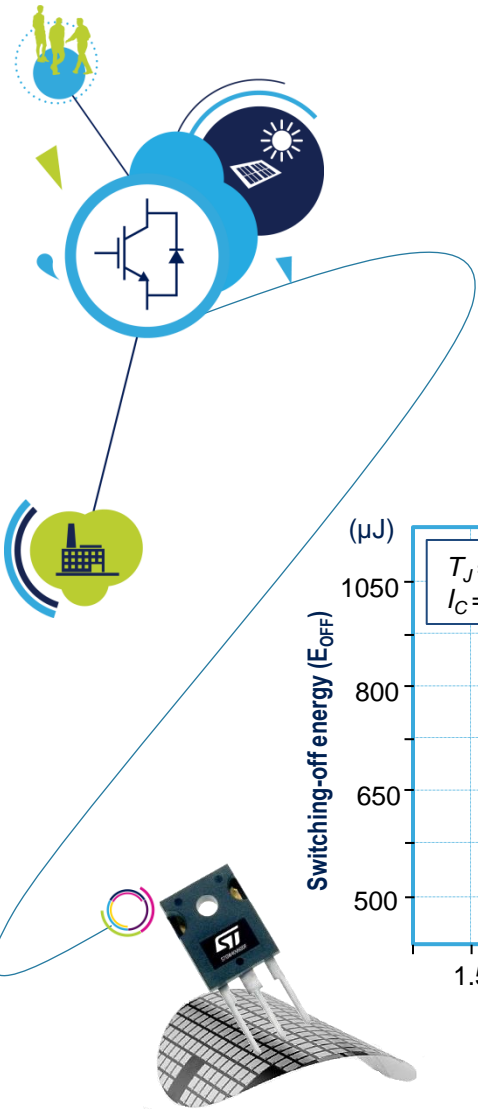
Switching-off waveforms

$V_{CC} = 400V$, $R_G = 5\Omega$, $I_C = I_{CN}$, $T = 150^\circ C$

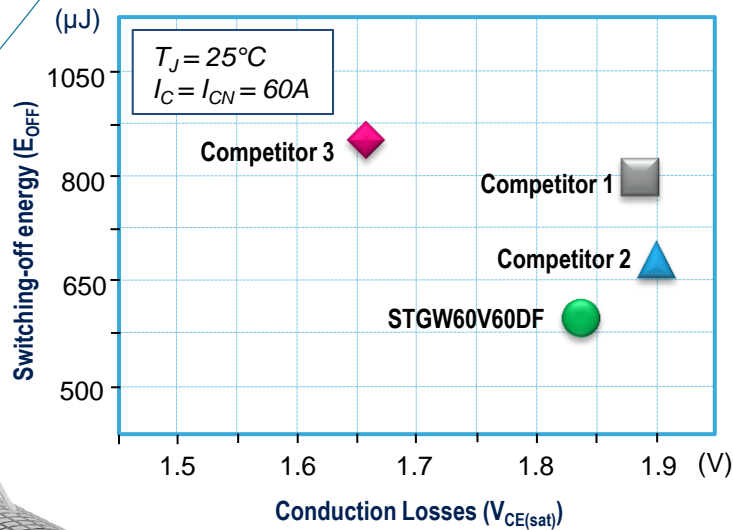


**Tail-less switching-off ...
... MOSFET "like" switching-off behavior**

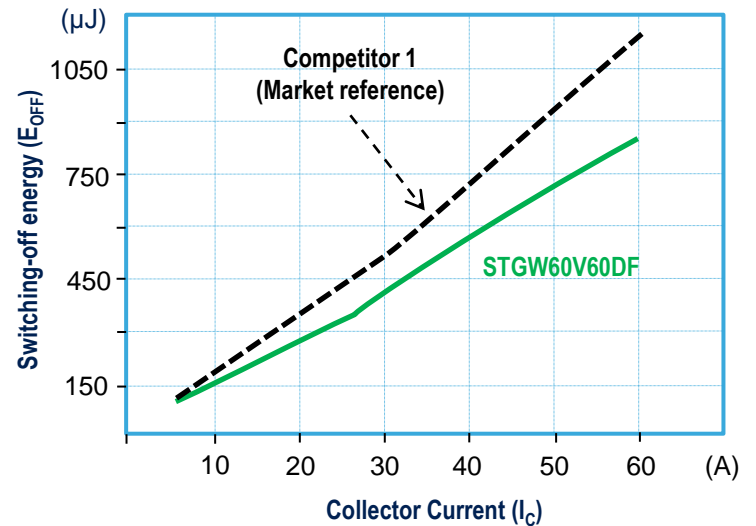
V series benchmarking (1/2)



$V_{CE(sat)}$ vs. E_{off} Trade-off diagram



E_{off} vs. I_C @ $T_J=150$ C

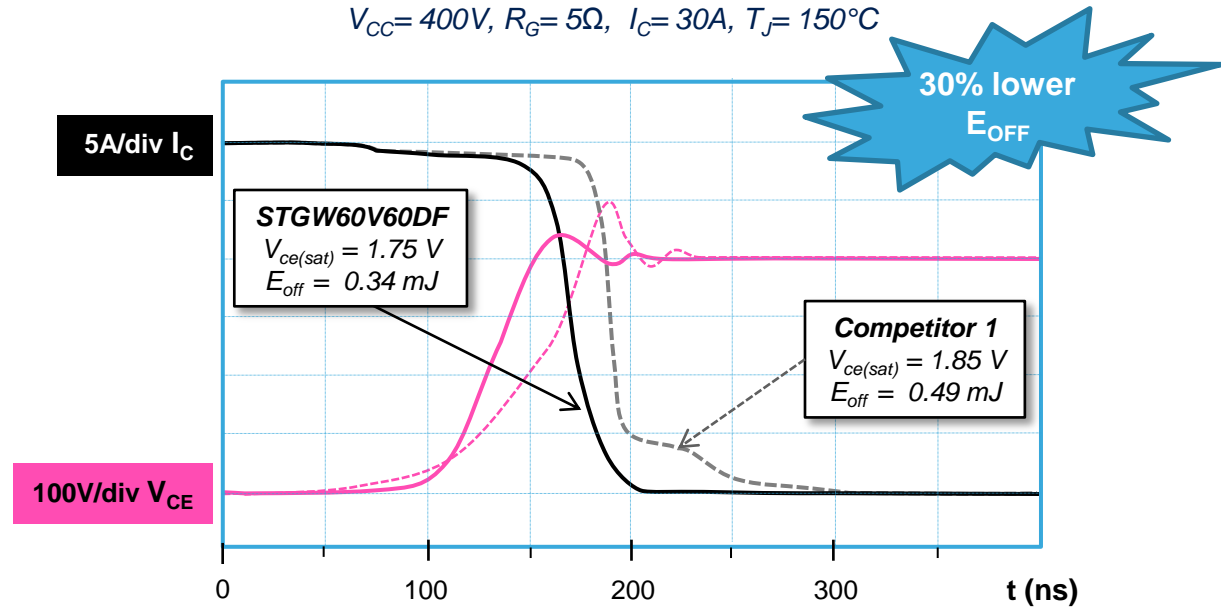


“V” series shows the lowest E_{off} in the market

V series benchmarking (2/2)

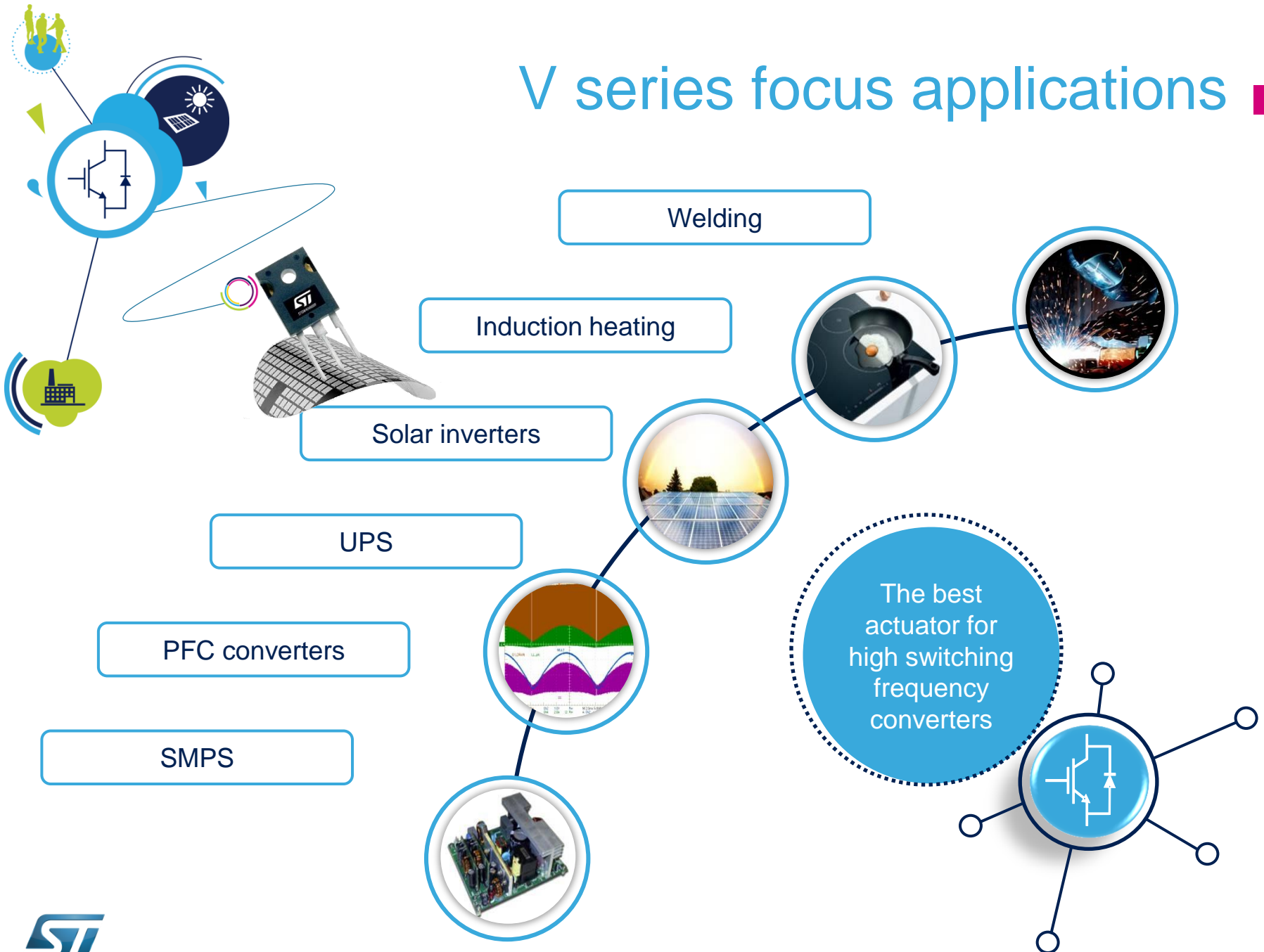
Switching-off : STGW60V60DF vs. Competitor 1

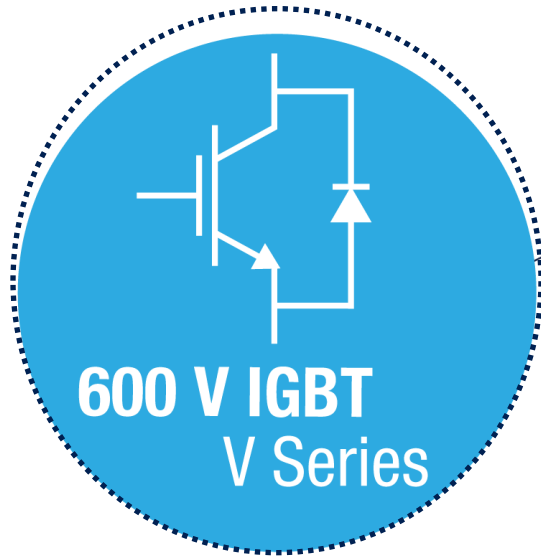
$V_{CC} = 400V, R_G = 5\Omega, I_C = 30A, T_J = 150^\circ C$



“V” series shows the lowest E_{off} in the market

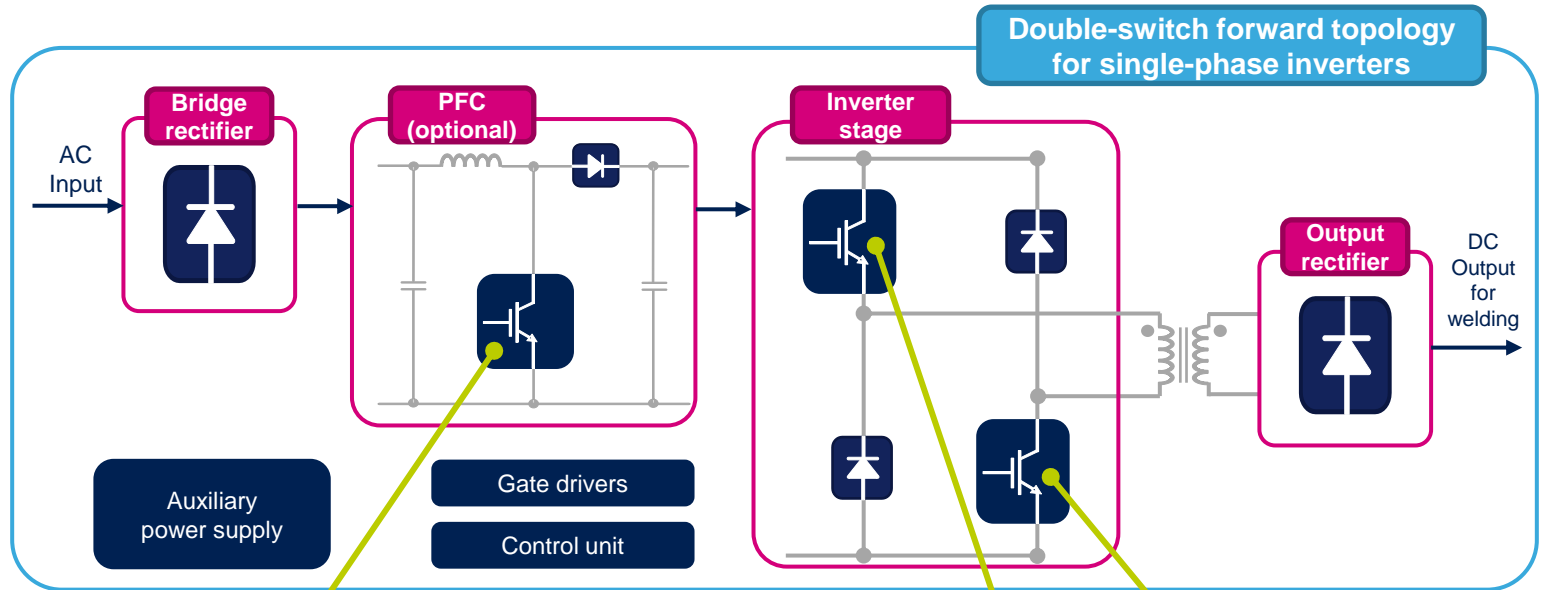
V series focus applications





Focus on
main applications

Welding: double-switch forward topology



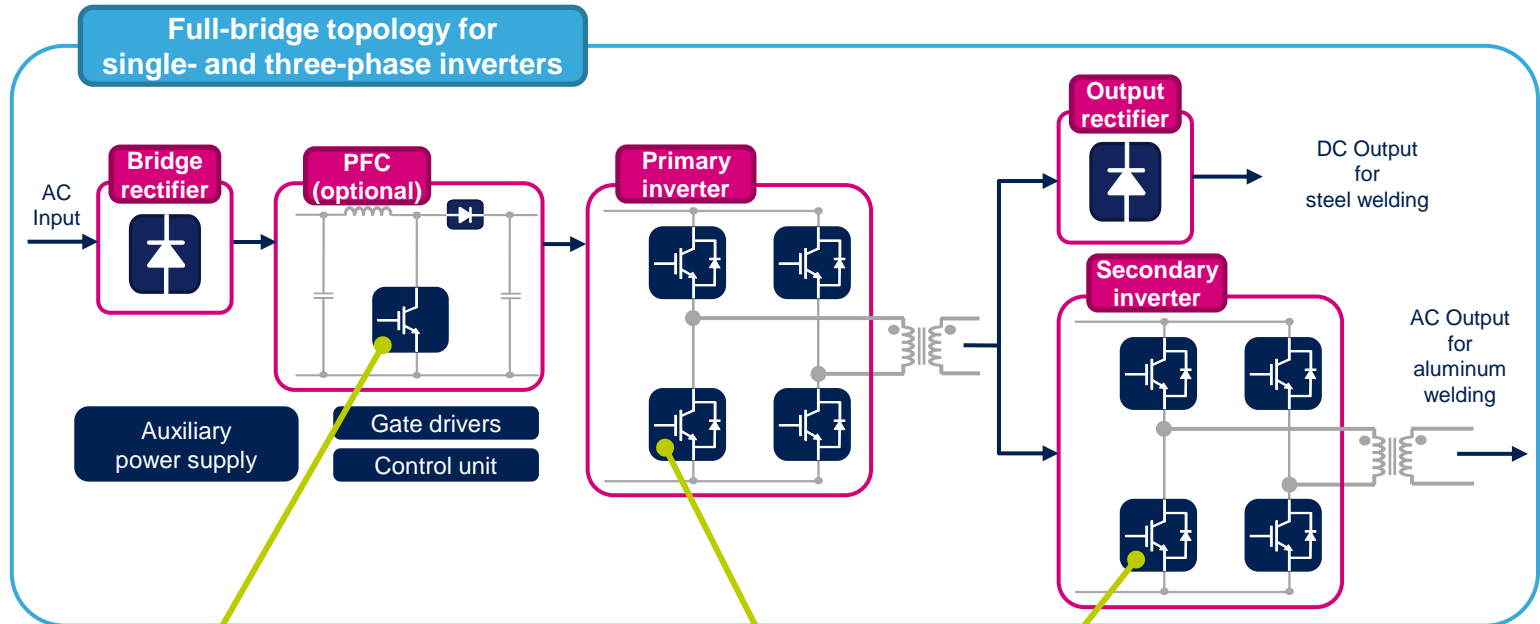
IGBT for PFC stage

- 600 V trench gate field stop
- STGW20V60F
- STGW30V60F
- STGW40V60F

IGBT for inverter stage

- 600 V trench gate field stop
- STGW20V60F
- STGW30V60F
- STGW40V60F

Welding: full-bridge topology



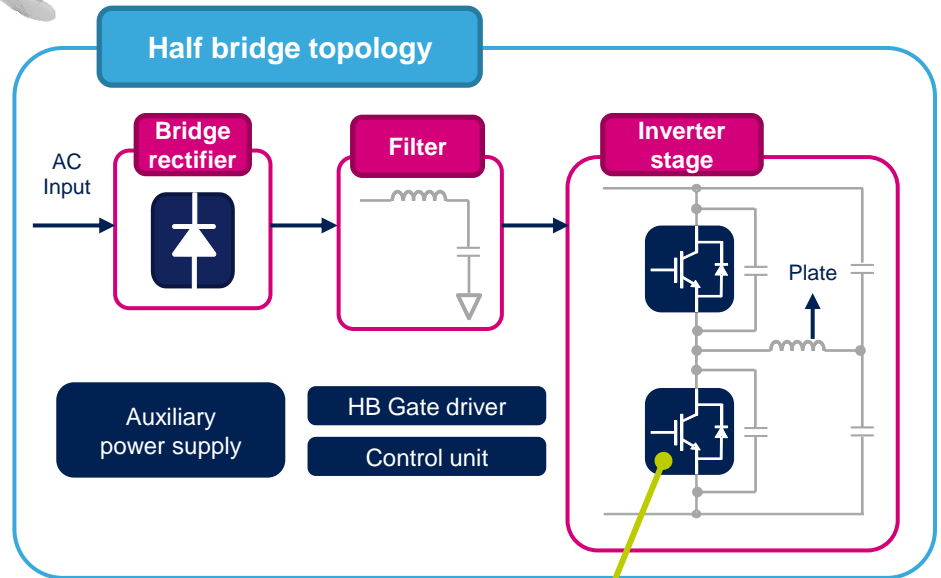
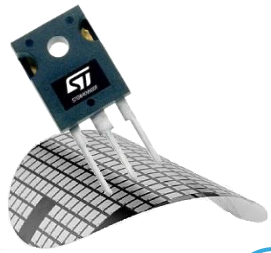
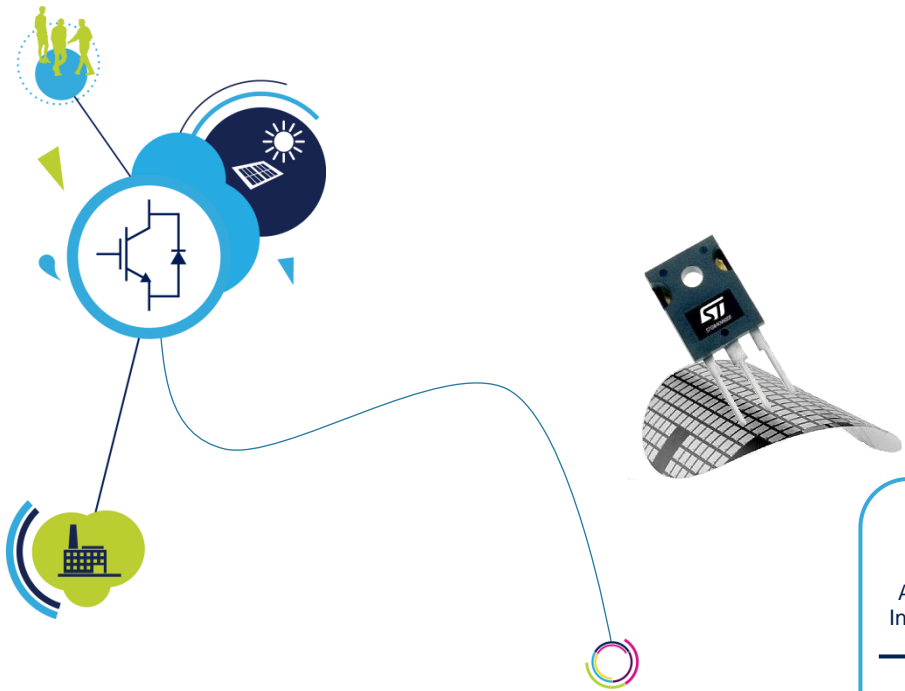
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IGBT for inverter stage

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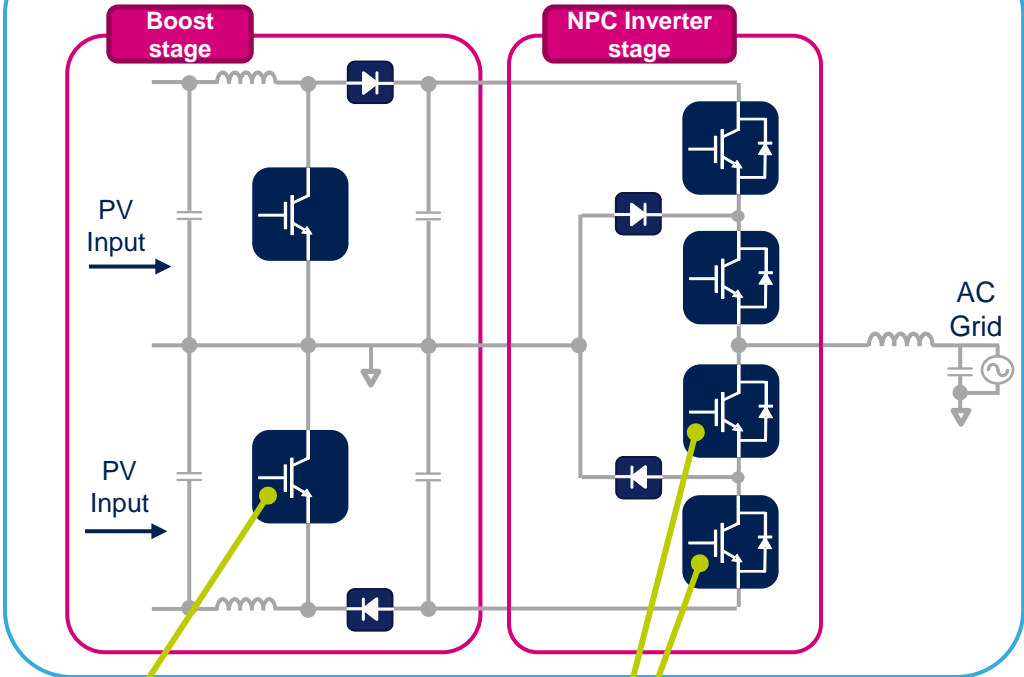
Induction heating



- IGBT for inverter stage**
- 600 V trench gate field stop
 - STGW40V60DLF
 - STGW60V60DLF



3-Level topology for inverters with reactive power control

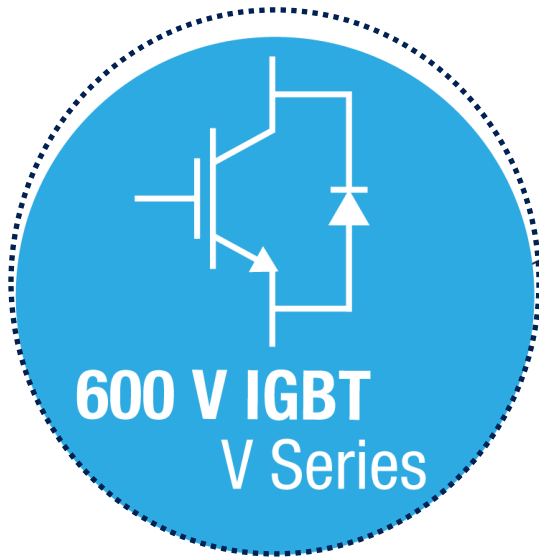


IGBT for boost stage

- 600 V trench gate field stop
 - STGW30V60F
 - STGW40V60F
 - STGW60V60F
 - STGW80V60F

IGBT for inverter stage

- 600 V trench gate field stop
 - STGW30V60DF
 - STGW40V60DF
 - STGW60V60DF
 - STGW80V60DF



www.st.com/igbt