# Ultra-fast (W series) HF IGBTs







#### **STMicroelectronics**

## New planar technology concept results in a tighter variation of switching energy ( $E_{OFF}$ ) versus temperature

The new family of ultra-fast (W series) 600 V HF IGBTs improves the power efficiency in high-frequency equipment by minimizing turn-off energy losses mainly at frequencies up to 100 kHz.

The new series, which includes 35 A (STGWx35HF60WDx) and 45 A (STGWx45HF60WDx) devices, facilitates parallel connection for higher power levels as a result of the V<sub>CE(sat)</sub> classification. It also achieves up to 10% better performance in conduction and switching losses, and lower spread of dynamic parameters, even at high temperature compared to the previous generation products.

### Key featuresHigh operation

- High operating frequency (over 100 kHz)
- Improved switch-off energy spread versus increasing temperature
- Lower on-voltage drop
- Classified V<sub>CE(sat)</sub>
- Anti-parallel diode tailored to the application

#### **Kev benefits**

- E<sub>OFF</sub> max value guaranteed at spec both for 25 °C and 150 °C
- Lower static power losses
- Easy parallel connection (refer to AN3161)
- Lower E<sub>ON</sub> losses

#### **Targeted applications**

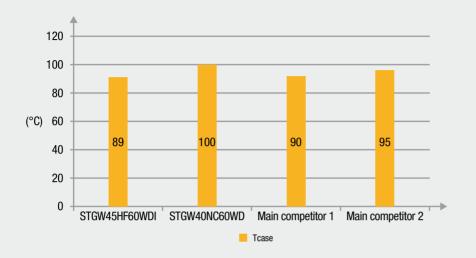
- Welding
- Induction heating
- Solar inverters
- UPS
- PFC
- Resonant converters



Both the innovative double-drift process and the advanced planar strip layout give the HF W series IGBTs extremely fast turn-off times with a minimal tail current, as well as stable behavior over temperature allowing the application to provide high efficiencies.



#### Application benchmark: half-bridge resonant induction cooker



#### Test specifications/conditions:

Input power = 3 kW, switching frequency = 26 kHz, plate current = 33  $A_{RMS}$ ,  $T_{amb} = 23 \, ^{\circ}C$ ,  $C_{snubbing} = 15 \, nF$  for each device, PF  $\approx$  0.5 (from the inverter side)

A co-packaged anti-parallel diode, provided with a double option (ultra-fast or low drop soft recovery), optimizes the overall performance in both hard switching (welding, UPS, photovoltaic, SMPS) and soft switching (induction heating, resonant converters) applications.

The devices are offered in both industry-standard TO-247 and long-lead TO-247 (higher power dissipation) packages.



STEVAL-ISW001V1: 2.5 kW double switch forward, 130 A arc welding MMA demonstration board based on the STGW35HF60WD

#### **Ultra-fast HF IGBTs (W series)**

Part number	V <sub>CES</sub> (V)	I <sub>c</sub> @ 100 °C (A)	$V_{CE(sat)}$ ( $V_{GE} = 15 \text{ V}, T_j = 125 \text{ °C}$ )		F @ T 405 00 (v. l)	D (M)	Dookses
			typ (V)	@ I <sub>c</sub> (A)	$E_{OFF} @ T_j = 125 °C (\mu J)$	P <sub>τοτ</sub> (W)	Package
STGW35HF60WD	600	35	1.65	20	350	200	T0-247
STGW45HF60WD	600	45	1.65	30	550	250	T0-247
STGW35HF60WDI	600	35	1.65	20	350	200	T0-247
STGWA35HF60WDI	600	40	1.65	20	350	260	T0-247 LL
STGW45HF60WDI	600	45	1.65	30	550	250	T0-247
STGWA45HF60WDI	600	50	1.65	30	550	310	T0-247 LL



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 IKFW40N65ES5XKSA1

 IKFW60N65ES5XKSA1
 IMBG120R090M1HXTMA1
 IMBG120R220M1HXTMA1
 XD15H120CX1
 XD25H120CX0
 XP15PJS120CL1B1

 IGW30N60H3FKSA1
 STGWA8M120DF3
 IGW08T120FKSA1
 IGW75N60H3FKSA1
 HGTG40N60B3
 FGH60N60SMD\_F085

 FGH75T65UPD
 STGWA15H120F2
 IKA10N60TXKSA1
 IHW20N120R5XKSA1
 RJH60D2DPP-M0#T2
 IKP20N60TXKSA1

 IHW20N65R5XKSA1
 IDW40E65D2FKSA1