

# 600V “V Series” IGBTs

Shaping More Efficient and  
Reliable Power Switching

600V “V Series”  
IGBTs



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## Shaping More Efficient and Reliable Power Switching

### ST's NEW 600V IGBTs

ST's new 600V IGBTs - “V series” (very high speed), based on an advanced proprietary trench gate field-stop structure, has the world's lowest turn off energy.

This revolutionary series also guarantees a max junction temperature  $T_{j(max)}$  of 175°C, increasing device reliability and lifetime. Featuring tail-less turn off waveforms and co-packing a very fast freewheeling diode tailored for very low  $E_{on}$ , the new V series offers several benefits in high switching frequency applications demanding superior efficiency, such as welding, solar inverters, induction heating, UPS, PFC and SMPS. The series' current rating ranges from 20 to 80A, with safe parallel operation for even higher power requirements.



#### Energy saving

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



#### Power scalability

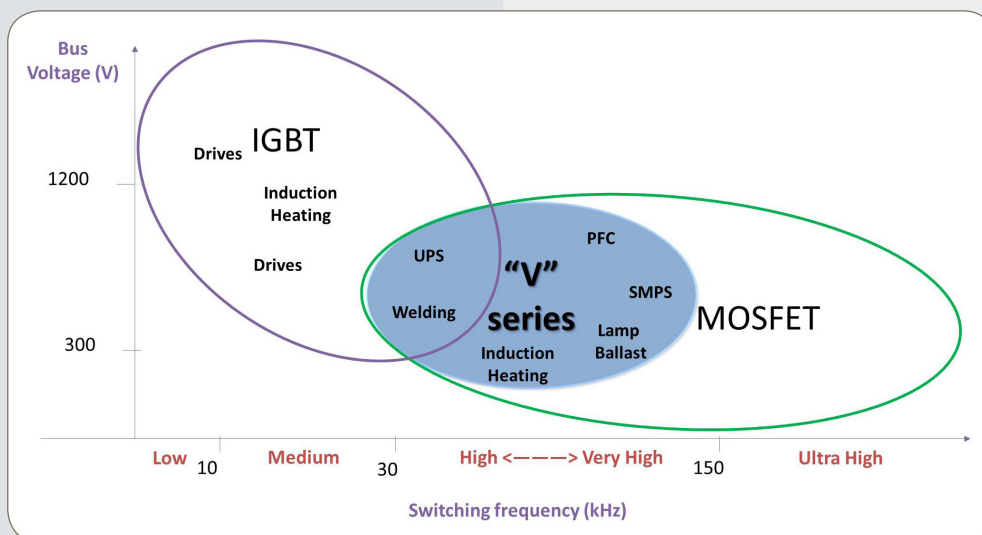
*Both the positive  $V_{CE(sat)}$  derating and the linear switching losses increasing with temperature yield safer paralleling operation*



#### Robustness and reliability

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

The new “V” family 600V IGBT redefines products in the market, offering the desired trade-off in performance for both hard-switching and soft-switching applications. MOSFET-like dynamic performance during the switch off, earning the “V” family the nickname of “tail-less”, produces the key points designers are looking for.



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

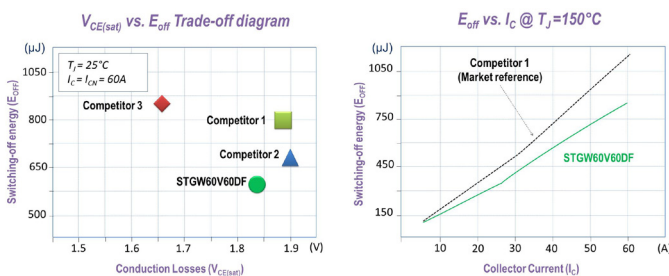
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### Key Features

- Extremely low turn-off energy combined with a low conduction losses, the new IGBT “V” series is well tuned to increase efficiency of high frequency converters
- Positive  $V_{CE(sat)}$  temperature coefficient allows safer paralleling operation
- Robustness and reliability:  $T_j=175^\circ\text{C}$  of the max junction temperature  $T_{j(max)}$ , ensures a longer lifetime
- Very high speed switching series
- Low saturation voltage:  
 $V_{CE(sat)} = 1.85\text{V (typ.) @ } I_C = I_{CN}$
- Low thermal resistance
- Co-packed tailored diode
- UL recognized TO-220F package



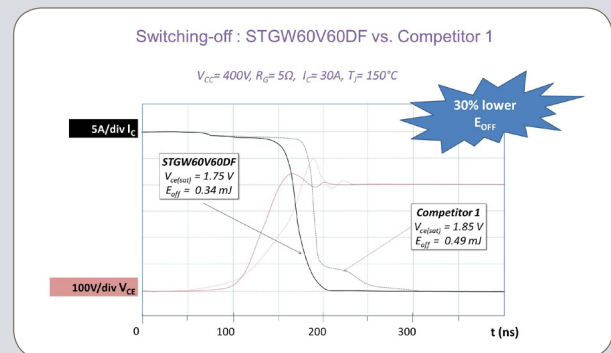
“V” series devices have the lowest  $E_{off}$  available

### Advantages of the “V” Series IGBT:

- The lowest total switching losses in the market
- Tail-less switching during off
- Tight parameters distribution & derating with temperature
- $175^\circ\text{C}$  temperature rating

### Target Applications

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



Improved switching reduces  $E_{off}$

### Available Packages

- TO-247
- Max247
- TO-3P
- TO-3PF
- TO-220
- TO-220FP
- D<sup>2</sup>PAK

# Available Devices

August 2013

Part Number	Package	$BV_{CES}$ (V)	$I_{CN}^{1)}$ (A)	$V_{CE(sat)}^{2)}$ (V)	$E_{off}^{3)}$ (μJ)	$E_{on}$ (μJ)	Diode Option
STGB20V60DF	D <sup>2</sup> PAK	600	20	1.8	130	200	Very Fast
STGB20V60F	D <sup>2</sup> PAK	600	20	1.8	130	200	-
STGP20V60DF	TO-220	600	20	1.8	130	200	Very Fast
STGP20V60F	TO-220	600	20	1.8	130	200	-
STGF20V60DF	TO-220FP	600	20	1.8	130	200	Very Fast
STGB30V60DF	D <sup>2</sup> PAK	600	30	1.85	233	383	Very Fast
STGB30V60F	D <sup>2</sup> PAK	600	30	1.85	233	383	-
STGB20V60F	TO-220	600	30	1.85	233	383	Very Fast
STGP20V60DF	TO-220	600	30	1.85	233	383	-
STGP20V60DF	TO-220FP	600	30	1.85	233	383	Very Fast
STGB40V60F	D <sup>2</sup> PAK	600	40	1.8	411	456	-
STGP40V60F	TO-220	600	40	1.8	411	456	-
STGW20V60DF	TO-247	600	20	1.8	130	200	Very Fast
STGW20V60F	TO-247	600	20	1.8	130	200	-
STGW30V60DF	TO-247	600	30	1.85	233	383	Very Fast
STGW30V60F	TO-247	600	30	1.85	233	383	-
STGW40V60DLF	TO-247	600	40	1.8	130 <sup>a)</sup>	-	Low Drop
STGW40V60F	TO-247	600	40	1.8	411	456	-
STGW40V60DF	TO-247	600	40	1.8	411	456	Very Fast
STGW60V60DLF	TO-247	600	60	1.85	270 <sup>a)</sup>	-	Low Drop
STGW60V60F	TO-247	600	60	1.85	550	750	-
STGW60V60DF	TO-247	600	60	1.85	550	750	Very Fast
STGW80V60DF	TO-247	600	80	1.85	850	980	Very Fast
STGY80V60DF	Max247	600	80	1.85	850	980	Very Fast
STGWT20V60DF	TO-3P	600	20	1.8	130	200	Very Fast
STGFW20V60DF	TO-3PF	600	20	1.8	130	200	Very Fast
STGWT30V60DF	TO-3P	600	30	1.85	233	383	Very Fast
STGFW30V60DF	TO-3PF	600	30	1.85	233	383	Very Fast
STGWT40V60DLF	TO-3P	600	40	1.8	130 <sup>a)</sup>	-	Low Drop
STGWT40V60DF	TO-3P	600	40	1.8	411	456	Very Fast
STGWF40V60DF	TO-3PF	600	40	1.8	411	456	Very Fast
STGWT60V60DF	TO-3P	600	60	1.85	550	750	Very Fast
STGWT60V60DLF	TO-3P	600	60	1.85	270 <sup>a)</sup>	-	Low Drop
STGWT80V60DF	TO-3P	600	80	1.85	850	980	Very Fast

1)  $I_{CN}$ : IGBT nominal collector current @  $T_j=100^{\circ}\text{C}$

2)  $V_{CE(sat)}$ : typical conduction losses @  $I_{CN}$ ,  $T_j=25^{\circ}\text{C}$

3)  $E_{off}$ : switching-off energy losses @  $I_{CN}$ ,  $T_j=25^{\circ}\text{C}$

with inductive load @  $V_{CC}=400\text{V}$

a) with capacitive load @  $V_{CC}=320\text{V}$ ,  $C_{snub}=20\text{nF}$

For more information go to: <http://bit.ly/12kRWvD>



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