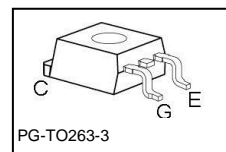
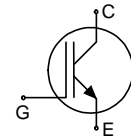


Low Loss IGBT : IGBT in TRENCHSTOP™ and Fieldstop technology



### Features:

- Very low  $V_{CE(sat)}$  1.5V (typ.)
- Maximum Junction Temperature 175°C
- Short circuit withstand time 5 $\mu$ s
- Designed for frequency inverters for washing machines, fans, pumps and vacuum cleaners
- TRENCHSTOP™ technology for 600V applications offers :
  - very tight parameter distribution
  - high ruggedness, temperature stable behavior
- NPT technology offers easy parallel switching capability due to positive temperature coefficient in  $V_{CE(sat)}$
- Low EMI
- Low Gate Charge
- Qualified according to JEDEC<sup>1</sup> for target applications
- Pb-free lead plating; RoHS compliant
- Complete product spectrum and PSpice Models : <http://www.infineon.com/igbt/>



Type	$V_{CE}$	$I_C$	$V_{CE(sat), T_j=25^\circ C}$	$T_{j,max}$	Marking Code	Package
IGB10N60T	600V	10A	1.5V	175°C	G10T60	PG-TO263-3

### Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage, $T_j \geq 25^\circ C$	$V_{CE}$	600	V
DC collector current, limited by $T_{j,max}$			
$T_C = 25^\circ C$	$I_C$	24	A
$T_C = 100^\circ C$		18	
Pulsed collector current, $t_p$ limited by $T_{j,max}$	$I_{C,puls}$	30	
Turn off safe operating area, $V_{CE} = 600V$ , $T_j = 175^\circ C$ , $t_p = 1\mu s$	-	30	
Gate-emitter voltage	$V_{GE}$	$\pm 20$	V
Short circuit withstand time <sup>2)</sup>			
$V_{GE} = 15V$ , $V_{CC} \leq 400V$ , $T_j \leq 150^\circ C$	$t_{SC}$	5	$\mu s$
Power dissipation $T_C = 25^\circ C$	$P_{tot}$	110	W
Operating junction temperature	$T_j$	-40...+175	°C
Storage temperature	$T_{stg}$	-55...+150	
Soldering temperature (reflow soldering, MSL1)		260	

<sup>1</sup> J-STD-020 and JESD-022

<sup>2)</sup> Allowed number of short circuits: <1000; time between short circuits: >1s.

### Thermal Resistance

Parameter	Symbol	Conditions	Max. Value	Unit
<b>Characteristic</b>				
IGBT thermal resistance, junction – case	$R_{thJC}$		1.35	KW
Thermal resistance, junction – ambient	$R_{thJA}$	Footprint 6cm <sup>2</sup> Cu	65 40	

### Electrical Characteristic, at $T_j = 25\text{ °C}$ , unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
<b>Static Characteristic</b>						
Collector-emitter breakdown voltage	$V_{(BR)CES}$	$V_{GE}=0V, I_C=0.2mA$	600	-	-	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	$V_{GE} = 15V, I_C=10A$ $T_j=25\text{ °C}$ $T_j=175\text{ °C}$	- -	1.5 1.8	2.05 -	
Gate-emitter threshold voltage	$V_{GE(th)}$	$I_C=0.3mA, V_{CE}=V_{GE}$	4.1	4.6	5.7	
Zero gate voltage collector current	$I_{CES}$	$V_{CE}=600V, V_{GE}=0V$ $T_j=25\text{ °C}$ $T_j=175\text{ °C}$	- -	- -	40 1000	μA
Gate-emitter leakage current	$I_{GES}$	$V_{CE}=0V, V_{GE}=20V$	-	-	100	
Transconductance	$g_{fs}$	$V_{CE}=20V, I_C=10A$	-	6	-	S
Integrated gate resistor	$R_{Gint}$		none			Ω

### Dynamic Characteristic

Input capacitance	$C_{iss}$	$V_{CE}=25V, V_{GE}=0V, f=1MHz$	-	551	-	pF
Output capacitance	$C_{oss}$		-	40	-	
Reverse transfer capacitance	$C_{rss}$		-	17	-	
Gate charge	$Q_{Gate}$	$V_{CC}=480V, I_C=10A, V_{GE}=15V$	-	62	-	nC
Internal emitter inductance measured 5mm (0.197 in.) from case	$L_E$		-	7	-	nH
Short circuit collector current <sup>1)</sup>	$I_{C(SC)}$	$V_{GE}=15V, t_{SC} \leq 5\mu s, V_{CC} = 400V, T_j = 25\text{ °C}$	-	100	-	A

### Switching Characteristic, Inductive Load, at $T_j=25\text{ °C}$

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
<b>IGBT Characteristic</b>						
Turn-on delay time	$t_{d(on)}$	$T_j=25\text{ °C},$	-	12	-	ns

<sup>1)</sup> Allowed number of short circuits: <1000; time between short circuits: >1s.