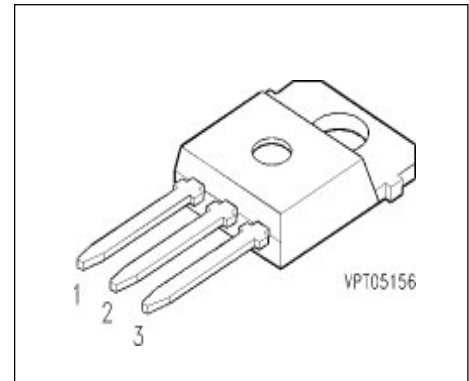## IGBT

Preliminary data

- High switching speed
- Low tail current
- Latch-up free
- Avalanche rated
- Low forward voltage drop

Remark: The TO-218 AB case doesn't solve the standards VDE 0110 and UL 508 for creeping distance

	Pin 1	Pin 2	Pin 3
	G	C	E

Type	V_{CE}	I_C	Package	Ordering Code
BUP 309	1700V	25A	TO-218 AB	Q67078-A4204-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Collector-emitter voltage	V_{CE}	1700	V
Collector-gate voltage $R_{GE} = 20 \text{ k}\Omega$	V_{CGR}	1700	
Gate-emitter voltage	V_{GE}	± 20	
DC collector current $T_C = 25 \text{ °C}$ $T_C = 90 \text{ °C}$	I_C	25 16	A
Pulsed collector current, $t_p = 1$ ms $T_C = 25 \text{ °C}$ $T_C = 90 \text{ °C}$	I_{Cpuls}	50 32	
Avalanche energy, single pulse $I_C = 15$ A, $V_{CC} = 50$ V, $R_{GE} = 25 \ \Omega$ $L = 200 \ \mu H$, $T_j = 25 \text{ °C}$	E_{AS}	23	mJ
Power dissipation $T_C = 25 \text{ °C}$	P_{tot}	310	W
Chip or operating temperature	T_j	-55 ... + 150	°C
Storage temperature	T_{stg}	-55 ... + 150	

Maximum Ratings

Parameter	Symbol	Values	Unit
DIN humidity category, DIN 40 040	-	E	-
IEC climatic category, DIN IEC 68-1	-	55 / 150 / 56	

Thermal Resistance

Parameter	Symbol	Values	Unit
Thermal resistance, chip case	R_{thJC}	≤ 0.4	K/W

Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Gate threshold voltage	$V_{GE(th)}$				V
$V_{GE} = V_{CE}$, I_C = 1 mA		4.5	5.5	6.5	
Collector-emitter saturation voltage	$V_{CE(sat)}$				
V_{GE} = 15 V, I_C = 15 A, T_j = 25 °C		-	3.5	4.2	
V_{GE} = 15 V, I_C = 15 A, T_j = 125 °C		-	-	-	
V_{GE} = 15 V, I_C = 15 A, T_j = 150 °C		-	4.5	-	
Zero gate voltage collector current	I_{CES}				µA
V_{CE} = 1700 V, V_{GE} = 0 V, T_j = 25 °C		-	1	250	
V_{CE} = 1700 V, V_{GE} = 0 V, T_j = 125 °C		-	-	1000	
Gate-emitter leakage current	I_{GES}				nA
V_{GE} = 20 V, V_{CE} = 0 V		-	-	100	
AC Characteristics					
Transconductance	g_{fs}				S
V_{CE} = 20 V, I_C = 15 A		-	-	-	
Input capacitance	C_{iss}				pF
V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		-	2000	2700	
Output capacitance	C_{oss}				
V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		-	160	240	
Reverse transfer capacitance	C_{rss}				
V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		-	65	100	

Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Switching Characteristics, Inductive Load at T_j = 125 °C

Parameter	Symbol	min.	typ.	max.	Unit
Turn-on delay time V_{CC} = 1200 V, V_{GE} = 15 V, I_C = 15 A R_{Gon} = 33 Ω	$t_{d(on)}$	-	-	-	ns
Rise time V_{CC} = 1200 V, V_{GE} = 15 V, I_C = 15 A R_{Gon} = 33 Ω	t_r	-	-	-	
Turn-off delay time V_{CC} = 1200 V, V_{GE} = -15 V, I_C = 15 A R_{Goff} = 33 Ω	$t_{d(off)}$	-	150	230	
Fall time V_{CC} = 1200 V, V_{GE} = -15 V, I_C = 15 A R_{Goff} = 33 Ω	t_f	-	50	80	

Power dissipation

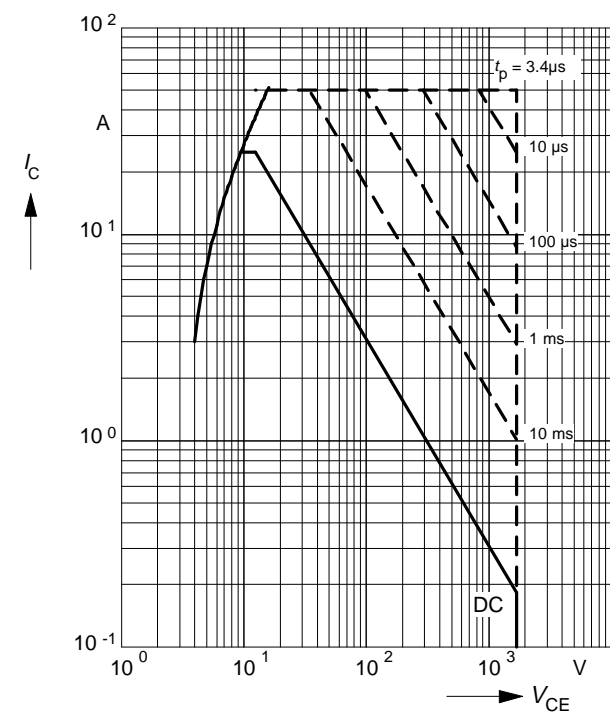$P_{tot} = f(T_C)$
parameter: $T_j \leq 150\ °C$
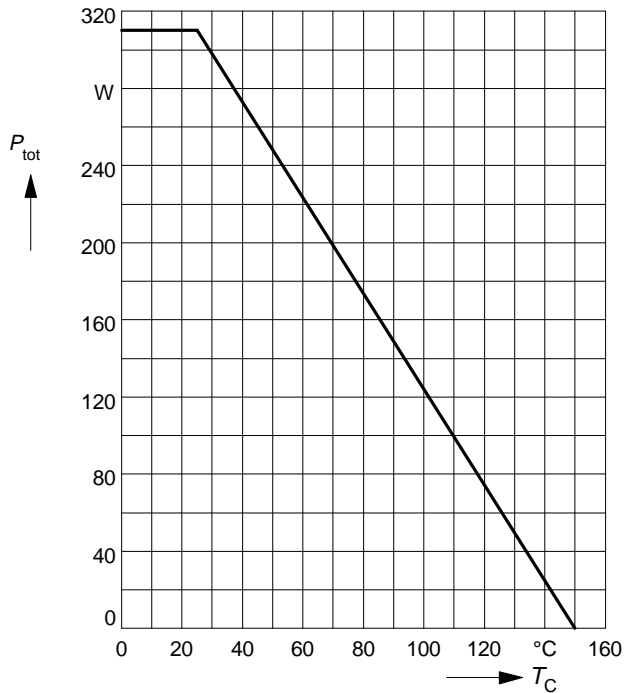
Collector current

$I_C = f(T_C)$
parameter: $V_{GE} \geq 15\ V$, $T_j \leq 150\ °C$
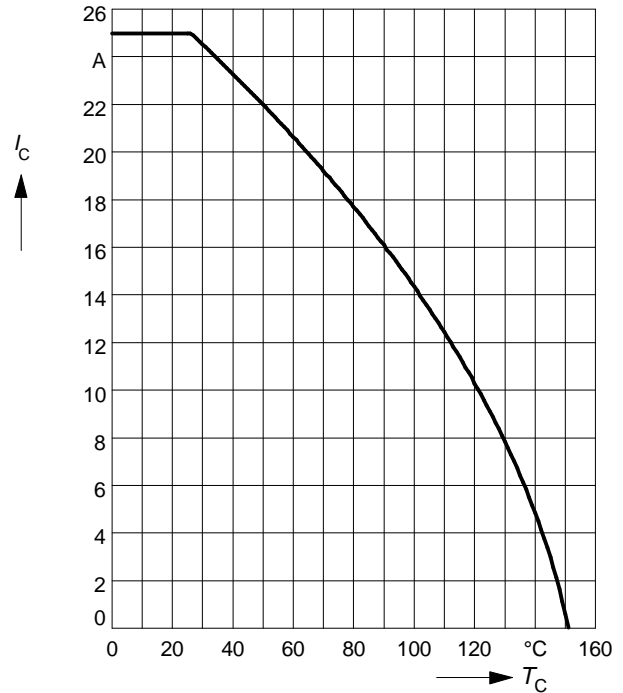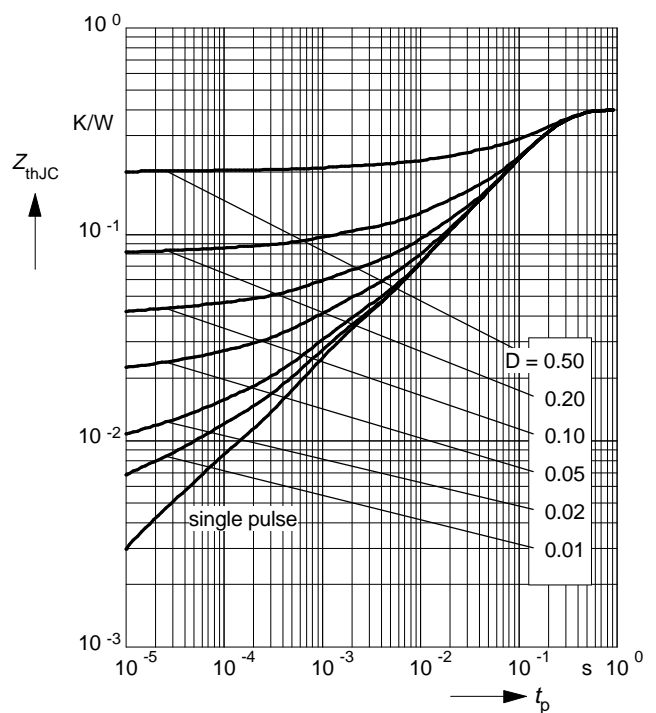

Safe operating area

$I_C = f(V_{CE})$
parameter: $D = 0$, $T_C = 25°C$, $T_j \leq 150\ °C$

Transient thermal impedance   IGBT
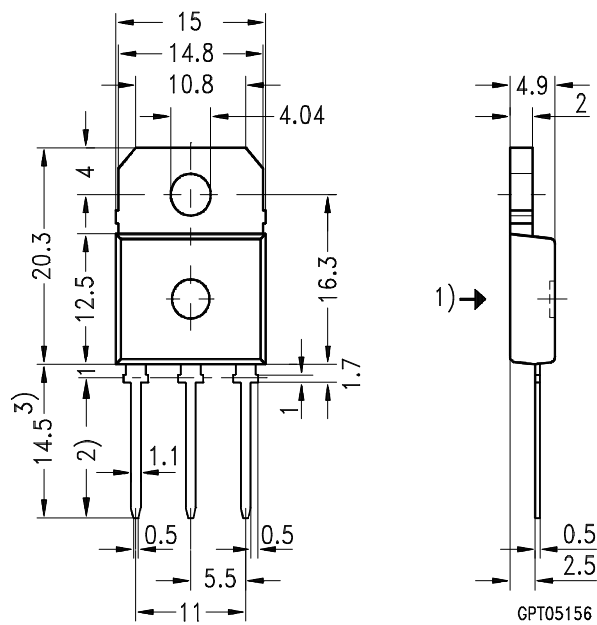
$Z_{th\ JC} = f(t_p)$
parameter: $D = t_p\ /\ T$

Package Outlines

Dimensions in mm

Weight: 8 g

GPT05156

1) punch direction, burr max. 0.04
2) dip tinning
3) max. 15.5 by dip tinning press burr max. 0.05