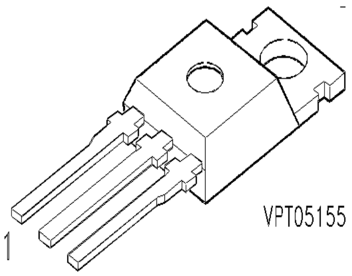
IGBT

Preliminary data

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



Pin 1	Pin 2	Pin 3
G	C	E

Type	V_{CE}	I_C	Package	Ordering Code
BUP 200	1200V	3.6A	TO-220 AB	Q67078-A4400-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Collector-emitter voltage	V_{CE}	1200	V
Collector-gate voltage	V_{CGR}		
R_{GE} = 20 kΩ		1200	
Gate-emitter voltage	V_{GE}	± 20	
DC collector current	I_C		A
T_C = 25 °C		3.6	
T_C = 90 °C		2.4	
Pulsed collector current, t_p = 1 ms	I_{Cpuls}		
T_C = 25 °C		7.2	
T_C = 90 °C		4.8	
Avalanche energy, single pulse	E_{AS}		mJ
I_C = 1.5 A, V_{CC} = 50 V, R_{GE} = 25 Ω			
L = 3.3 mH, T_j = 25 °C		3.5	
Power dissipation	P_{tot}		W
T_C = 25 °C		50	
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

IGBT thermal resistance, chip case	R_{thJC}	≤ 3.1	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 = 0.1 mA		4.5	5.5	6.5	
Collector-emitter saturation voltage	$V_{CE(sat)}$				
V_{GE} = 15 V, I_C = 1.5 A, T_j = 25 °C		-	2.8	3.3	
V_{GE} = 15 V, I_C = 1.5 A, T_j = 125 °C		-	3.8	4.3	
V_{GE} = 15 V, I_C = 1.5 A, T_j = 150 °C		-	4	4.5	
Zero gate voltage collector current	I_{CES}				µA
V_{CE} = 1000 V, V_{GE} = 0 V, T_j = 25 °C		-	1	25	
V_{CE} = 1000 V, V_{GE} = 0 V, T_j = 125 °C		-	-	100	
Gate-emitter leakage current	I_{GES}				nA
V_{GE} = 20 V, V_{CE} = 0 V		-	0.1	100	
AC Characteristics					
Transconductance	g_{fs}				S
V_{CE} = 20 V, I_C = 1.5 A		-	0.6	-	
Input capacitance	C_{iss}				pF
V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		-	225	320	
Output capacitance	C_{oss}				
V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		-	25	40	
Reverse transfer capacitance	C_{rss}				
V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		-	13	24	

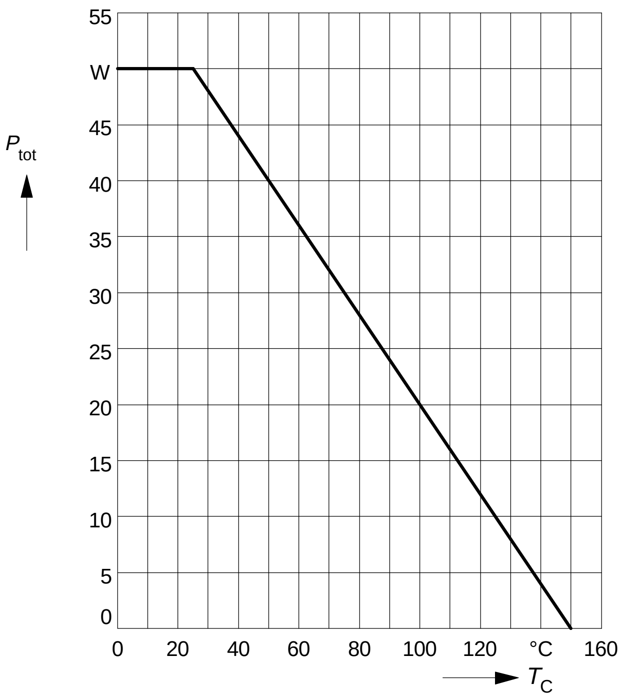
Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

Parameter	**Symbol**	**Values**			**Unit**
		min.	**typ.**	**max.**	
Switching Characteristics, Inductive Load at T_j = 125 °C					
Turn-on delay time V_{CC} = 600 V, V_{GE} = 15 V, I_C = 1.5 A R_{Gon} = 100 Ω	$t_{d(on)}$	-	30	50	ns
Rise time V_{CC} = 600 V, V_{GE} = 15 V, I_C = 1.5 A R_{Gon} = 100 Ω	t_r	-	20	30	
Turn-off delay time V_{CC} = 600 V, V_{GE} = -15 V, I_C = 1.5 A R_{Goff} = 100 Ω	$t_{d(off)}$	-	170	250	
Fall time V_{CC} = 600 V, V_{GE} = -15 V, I_C = 1.5 A R_{Goff} = 100 Ω	t_f	-	15	25	
Total turn-off loss energy V_{CC} = 600 V, V_{GE} = -15 V, I_C = 1.5 A R_{Goff} = 100 Ω	E_{off}	-	0.25	-	mWs

Power dissipation

$P_{tot} = f(T_C)$

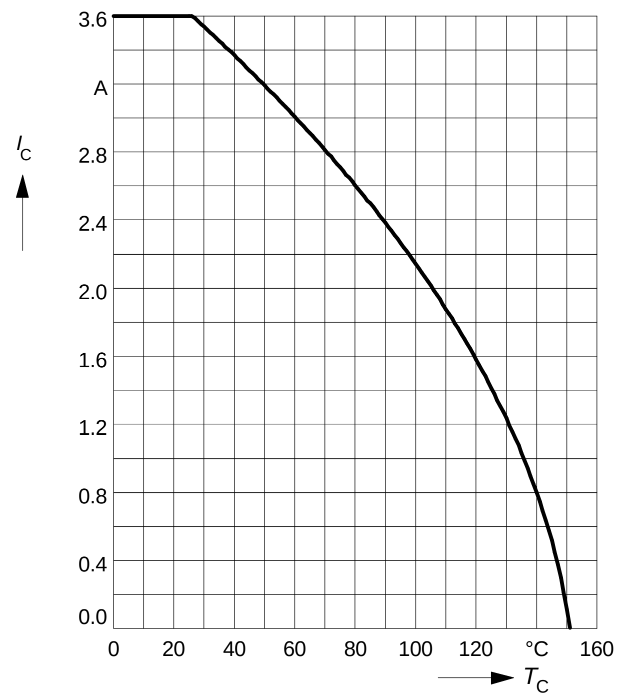
parameter: $T_j \leq 150$ °C



Collector current

$I_C = f(T_C)$

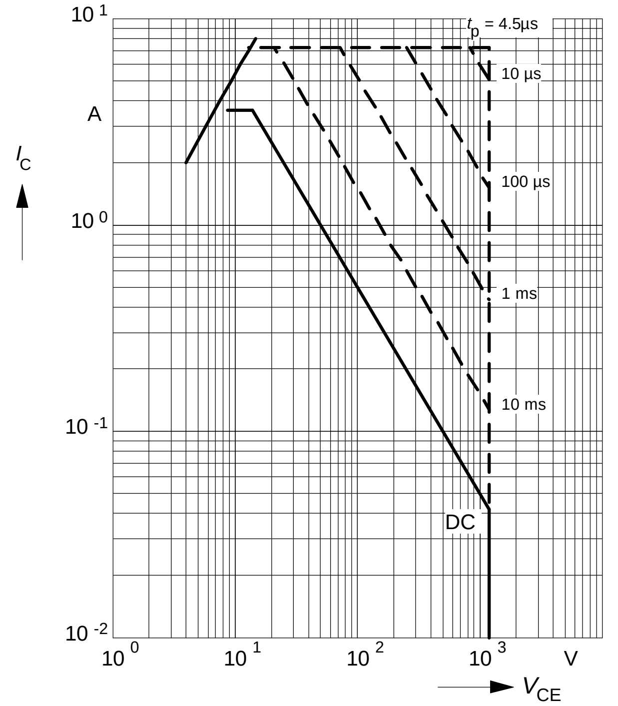
parameter: $V_{GE} \geq 15$ V , $T_j \leq 150$ °C



Safe operating area

$I_C = f(V_{CE})$

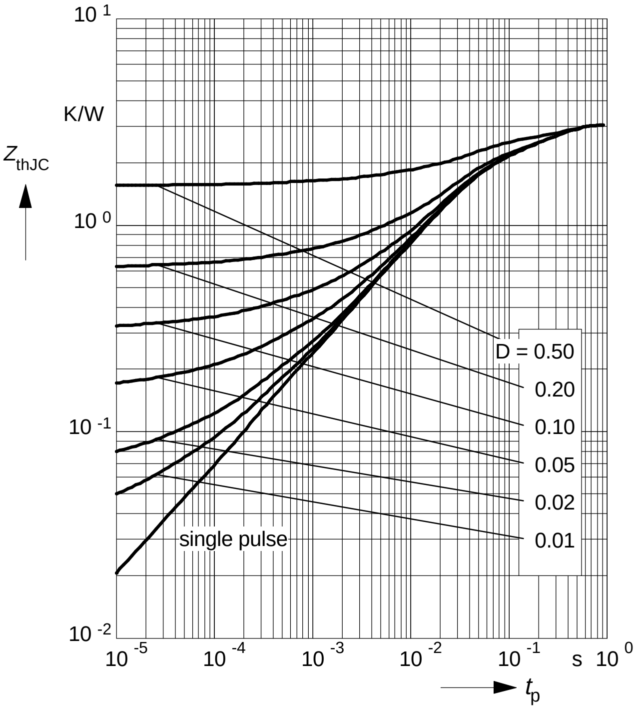
parameter: $D = 0$, $T_C = 25$°C , $T_j \leq 150$ °C



Transient thermal impedance IGBT

$Z_{th\,JC} = f(t_p)$

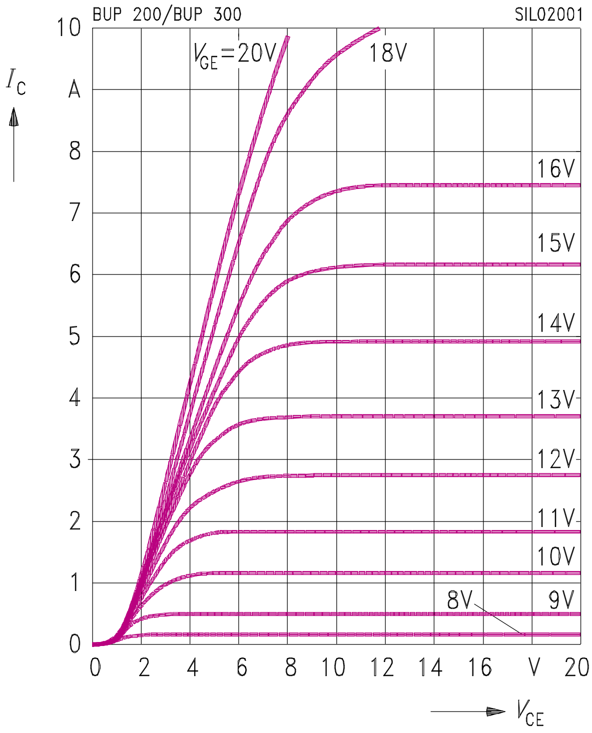
parameter: $D = t_p / T$



Typ. output characteristics

$I_C = f(V_{CE})$

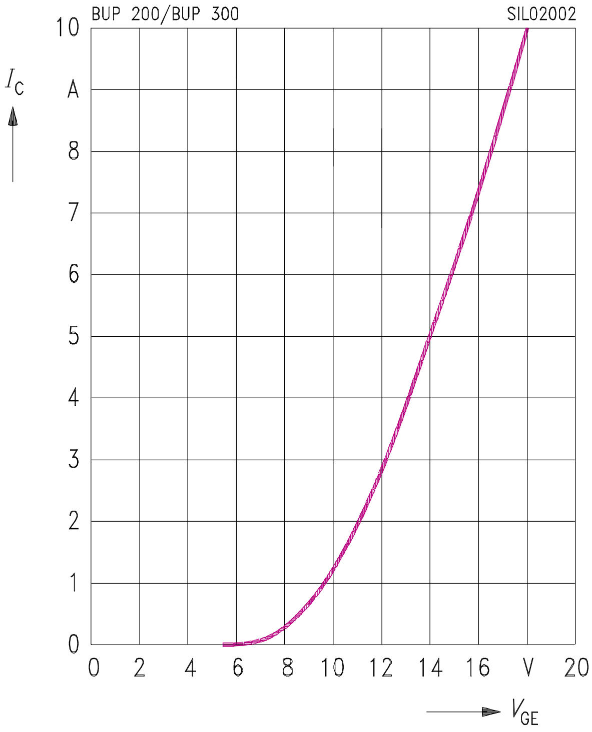
parameter: t_p = 80 µs, T_j = 125 °C



Typ. transfer characteristics

$I_C = f(V_{GE})$

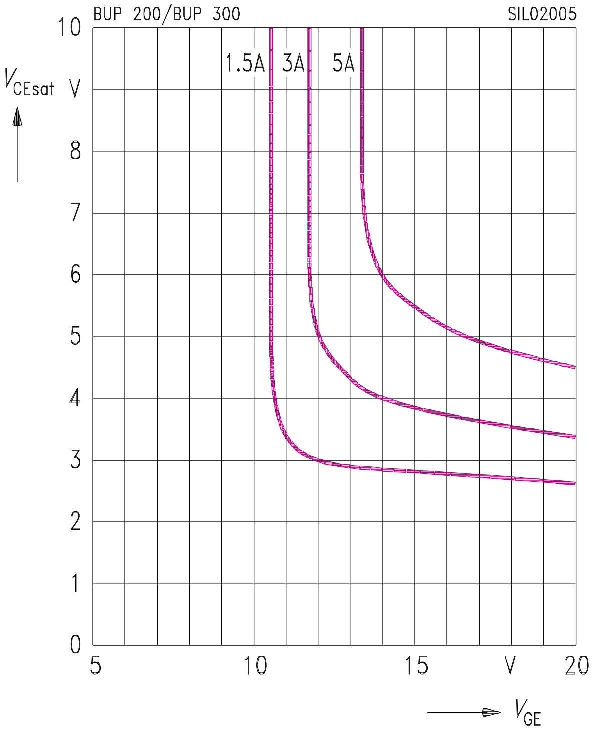
parameter: t_P = 80 µs, V_{CE} = 20 V, T_j = 25 °C



Typ. saturation characteristics

$V_{CE(sat)} = f(V_{GE})$

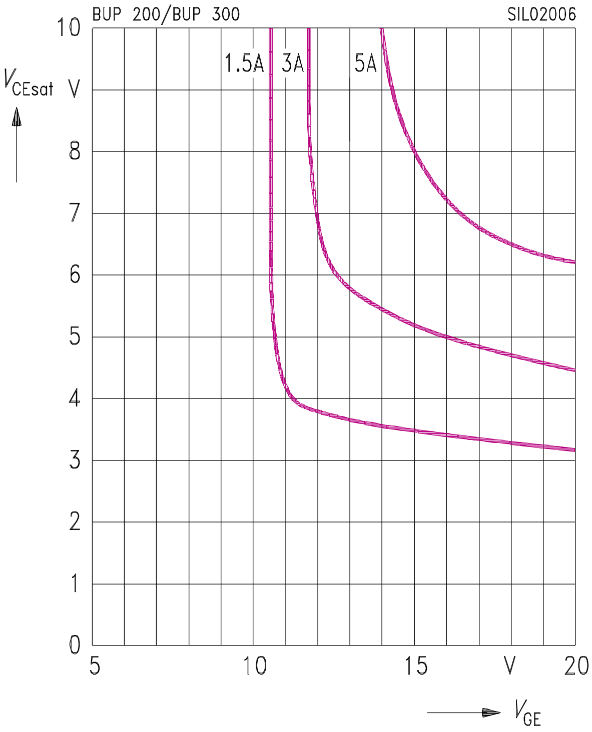
parameter: T_j = 25 °C



Typ. saturation characteristics

$V_{CE(sat)} = f(V_{GE})$

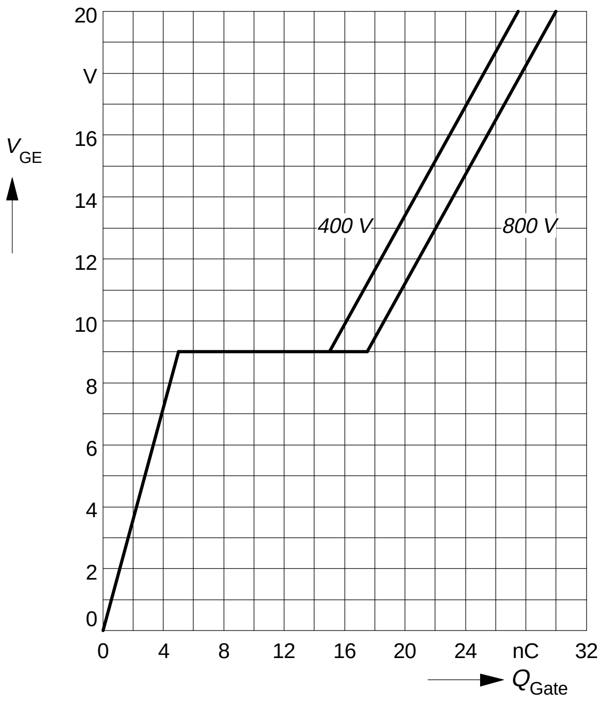
parameter: T_j = 125 °C



Typ. gate charge

$V_{GE} = f(Q_{Gate})$

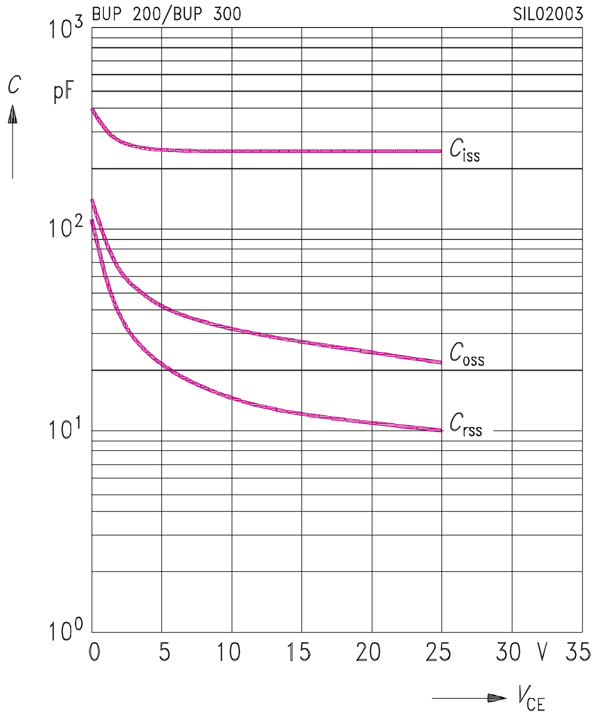
parameter: $I_{C\ puls} = 1$ A



Typ. capacitances

$C = f(V_{CE})$

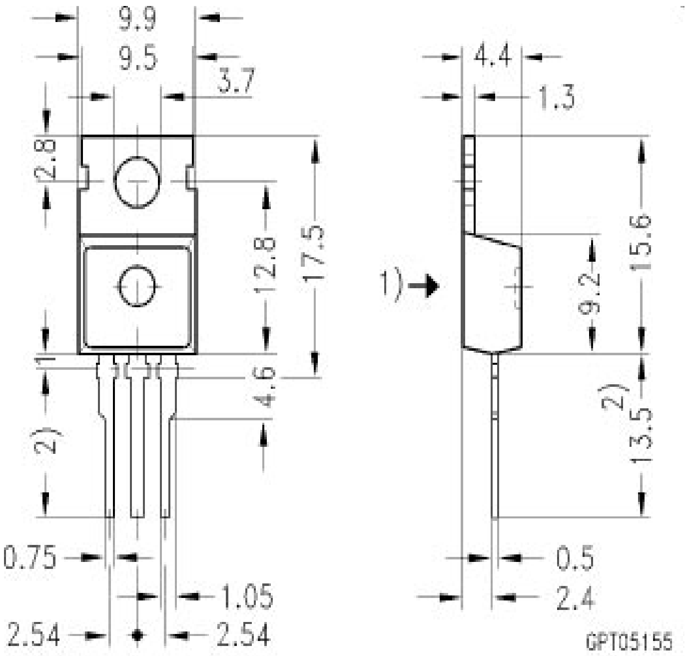
parameter: $V_{GE} = 0$ V, f = 1 MHz



Package Outlines

Dimensions in mm

Weight: 8 g



1) punch direction, burr max. 0.04

2) dip tinning

3) max. 14.5 by dip tinning press burr max. 0.05