SIEMENS

BUZ 10 S2

Not for new design

SIPMOS ® Power Transistor

• N channel

• Enhancement mode

• Avalanche-rated
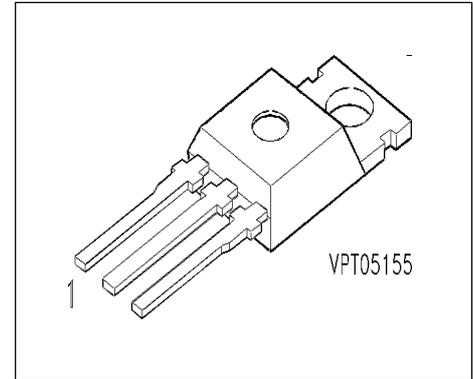
	Pin 1	Pin 2	Pin 3
	G	D	S

Type	V_{DS}	I_D	$R_{DS(on)}$	Package	Ordering Code
BUZ 10 S2	60 V	23 A	0.07 Ω	TO-220 AB	C67078-S1300-A7

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current T_C = 26 °C	I_D	23	A
Pulsed drain current T_C = 25 °C	I_{Dpuls}	92	
Avalanche current, limited by T_{jmax}	I_{AR}	23	
Avalanche energy, periodic limited by T_{jmax}	E_{AR}	1.3	mJ
Avalanche energy, single pulse I_D = 23 A, V_{DD} = 25 V, R_{GS} = 25 Ω L = 15.1 µH, T_j = 25 °C	E_{AS}	8	
Gate source voltage	V_{GS}	± 20	V
Power dissipation T_C = 25 °C	P_{tot}	75	W
Operating temperature	T_j	-55 ... + 150	°C
Storage temperature	T_{stg}	-55 ... + 150	
Thermal resistance, chip case	R_{thJC}	≤ 1.67	K/W
Thermal resistance, chip to ambient	R_{thJA}	≤ 75	
DIN humidity category, DIN 40 040		E	
IEC climatic category, DIN IEC 68-1		55 / 150 / 56	

Semiconductor Group

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07/96

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

Parameter	Symbol	Values			Unit
		min.	**typ.**	**max.**	
Static Characteristics					
Drain- source breakdown voltage $V_{GS} = 0$ V, $I_D = 0.25$ mA, $T_j = 25$ °C	$V_{(BR)DSS}$	60	-	-	V
Gate threshold voltage $V_{GS} = V_{DS}$, $I_D = 1$ mA	$V_{GS(th)}$	2.1	3	4	
Zero gate voltage drain current $V_{DS} = 60$ V, $V_{GS} = 0$ V, $T_j = 25$ °C $V_{DS} = 60$ V, $V_{GS} = 0$ V, $T_j = 125$ °C	I_{DSS}	- -	0.1 10	1 100	µA
Gate-source leakage current $V_{GS} = 20$ V, $V_{DS} = 0$ V	I_{GSS}	-	10	100	nA
Drain-Source on-resistance $V_{GS} = 10$ V, $I_D = 14$ A	$R_{DS(on)}$	-	0.05	0.07	Ω

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$, $I_D = 14$ A	g_{fs}	7	13	-	S
Input capacitance $V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1$ MHz	C_{iss}	-	650	820	pF
Output capacitance $V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1$ MHz	C_{oss}	-	300	450	
Reverse transfer capacitance $V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1$ MHz	C_{rss}	-	110	170	
Turn-on delay time $V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 3$ A $R_{GS} = 50 \ \Omega$	$t_{d(on)}$	-	20	35	ns
Rise time $V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 3$ A $R_{GS} = 50 \ \Omega$	t_r	-	40	65	
Turn-off delay time $V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 3$ A $R_{GS} = 50 \ \Omega$	$t_{d(off)}$	-	80	110	
Fall time $V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 3$ A $R_{GS} = 50 \ \Omega$	t_f	-	60	75	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse Diode					
Inverse diode continuous forward current T_C = 25 °C	I_S	-	-	23	A
Inverse diode direct current,pulsed T_C = 25 °C	I_{SM}	-	-	92	
Inverse diode forward voltage V_{GS} = 0 V, I_F = 46 A	V_{SD}	-	1.5	1.9	V
Reverse recovery time V_R = 30 V, I_F=I_S, di_F/dt = 100 A/µs	t_{rr}	-	60	-	ns
Reverse recovery charge V_R = 30 V, I_F=I_S, di_F/dt = 100 A/µs	Q_{rr}	-	0.1	-	µC

Power dissipation

$P_{tot} = f(T_C)$
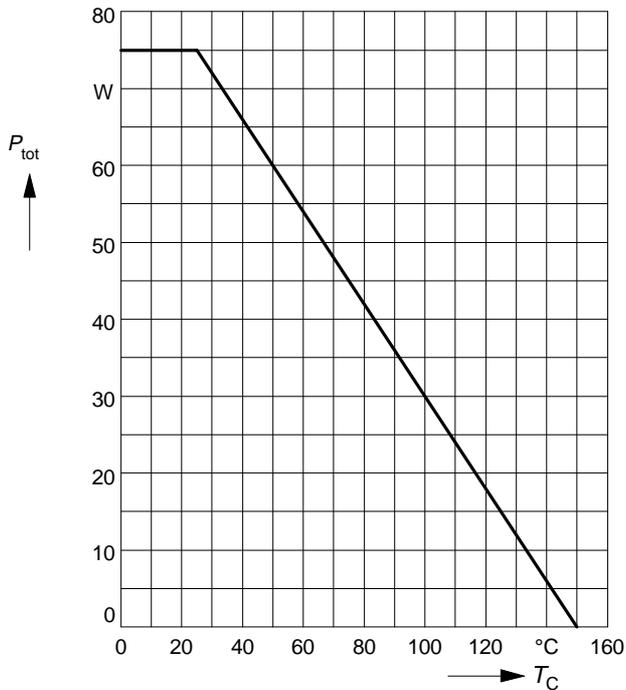
Drain current

$I_D = f(T_C)$
parameter: $V_{GS} \geq 10$ V
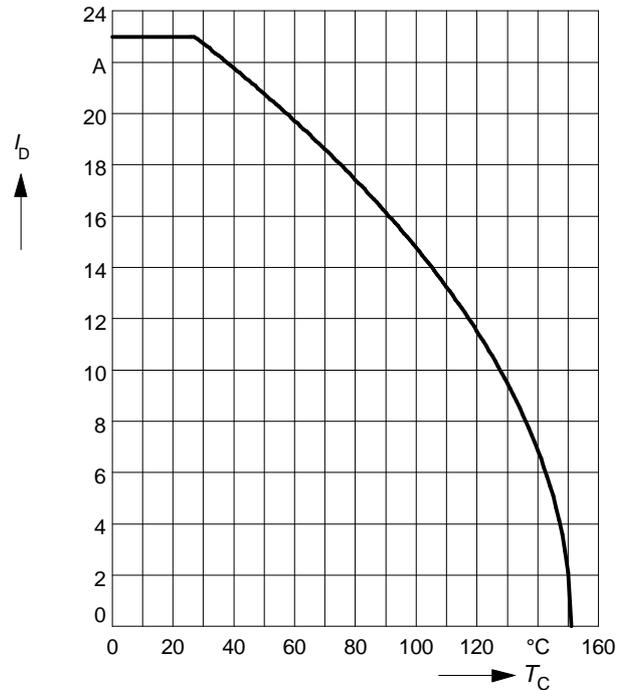
Safe operating area

$I_D = f(V_{DS})$
parameter: $D = 0$, $T_C = 25°C$
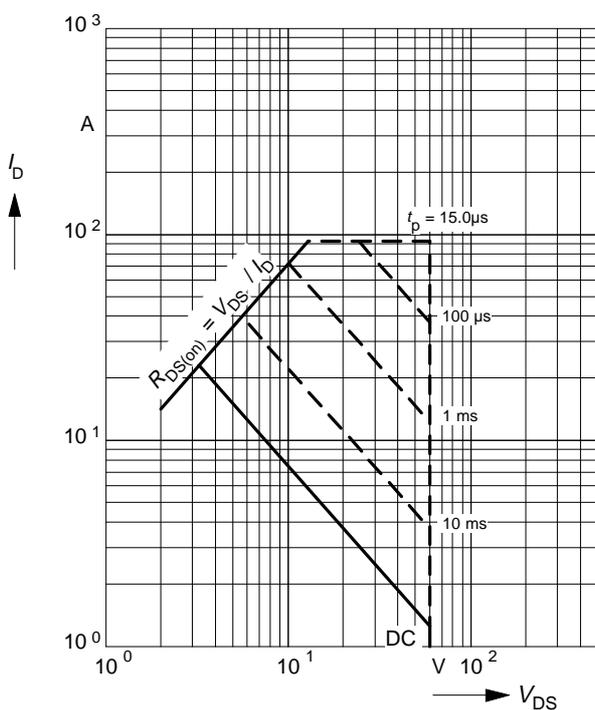
Transient thermal impedance

$Z_{th\ JC} = f(t_p)$
parameter: $D = t_p / T$
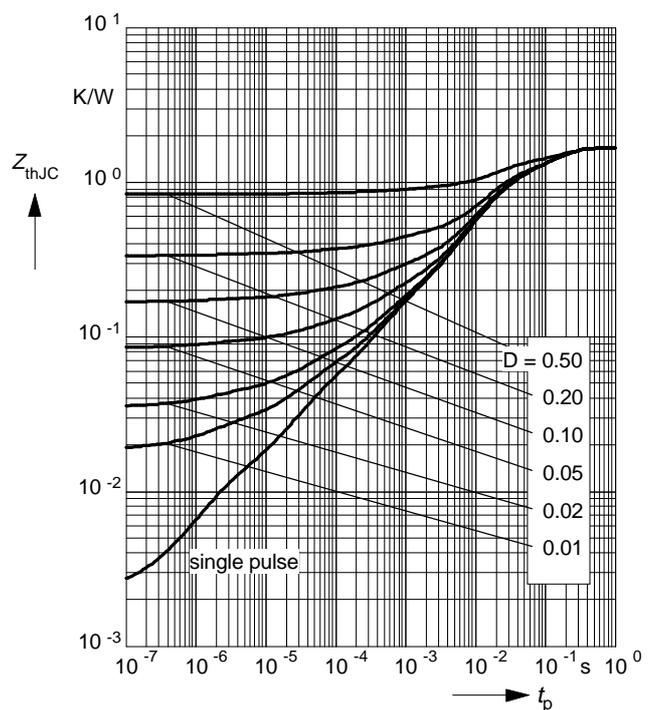
Typ. output characteristics

$I_D = f(V_{DS})$
parameter: $t_p = 80\ \mu s$
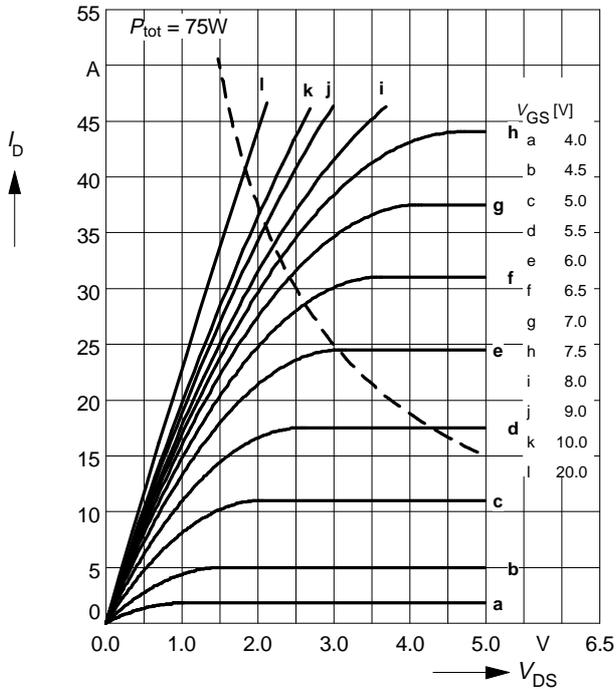
## Typ. drain-source on-resistance

$R_{DS\,(on)} = f(I_D)$
parameter: V_{GS}
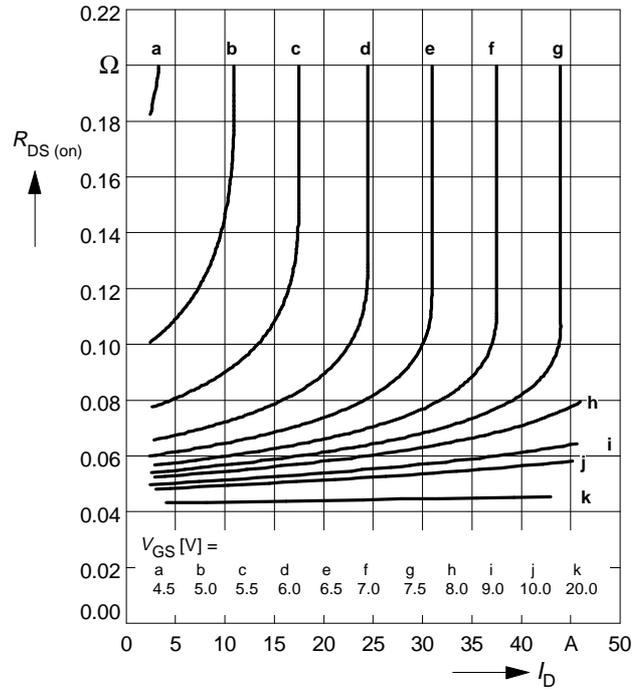
Typ. transfer characteristics $I_D = f(V_{GS})$

parameter: $t_p = 80\ \mu s$

$V_{DS} \geq 2\ x\ I_D\ x\ R_{DS(on)max}$
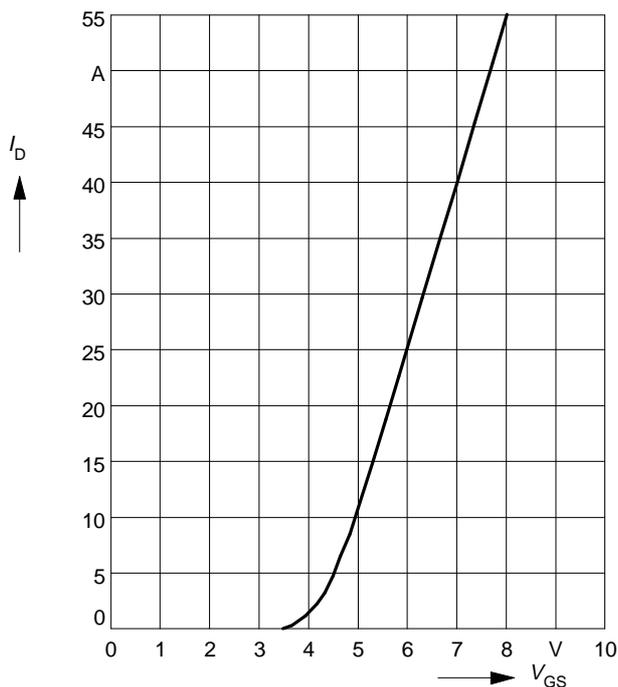
Typ. forward transconductance $g_{fs} = f(I_D)$

parameter: $t_p = 80\ \mu s$,

$V_{DS} \geq 2\ x\ I_D\ x\ R_{DS(on)max}$
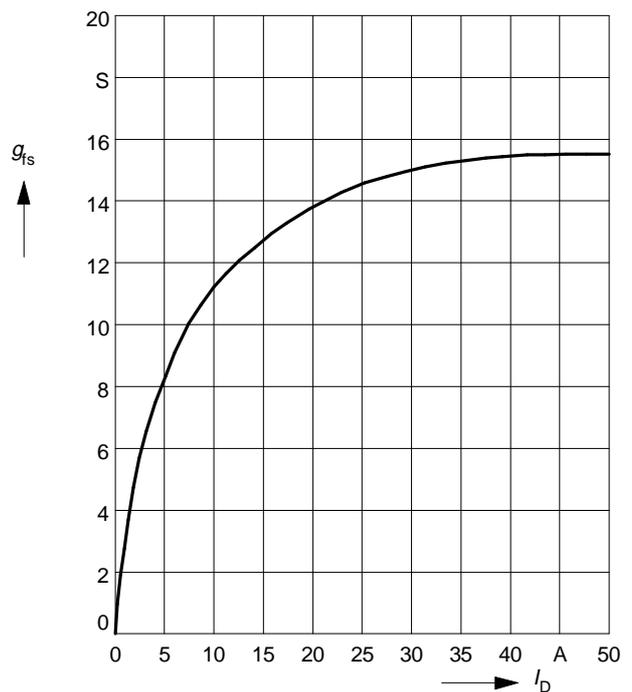
Drain-source on-resistance

$R_{DS\,(on)} = f(T_j)$

parameter: $I_D = 14\ A$, $V_{GS} = 10\ V$
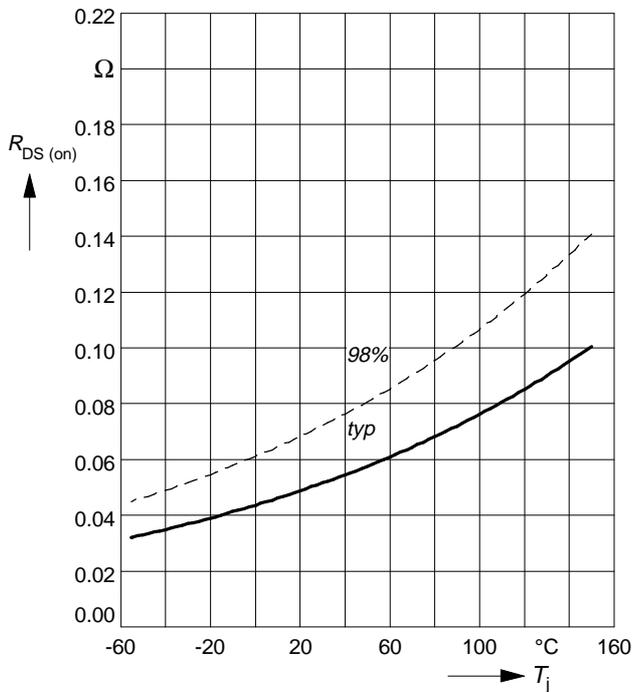

Gate threshold voltage

$V_{GS\,(th)} = f(T_j)$

parameter: $V_{GS} = V_{DS}$, $I_D = 1\ mA$
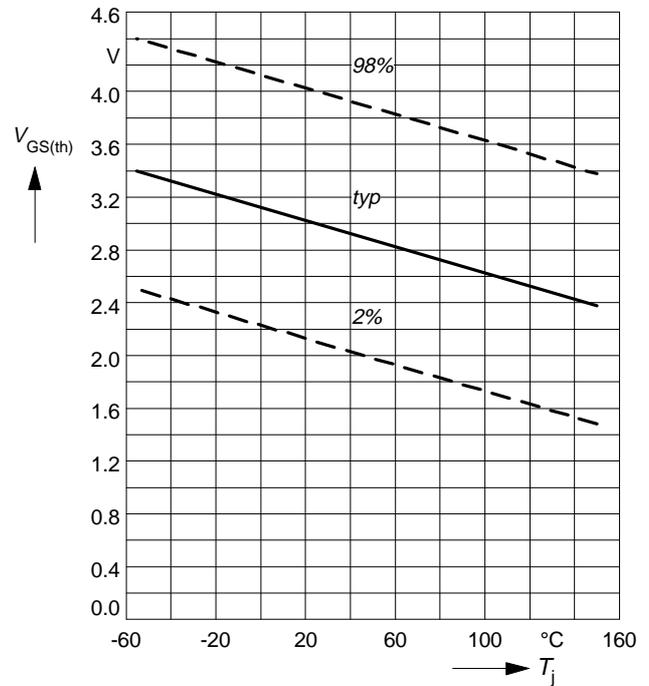
Typ. capacitances

$C = f(V_{DS})$

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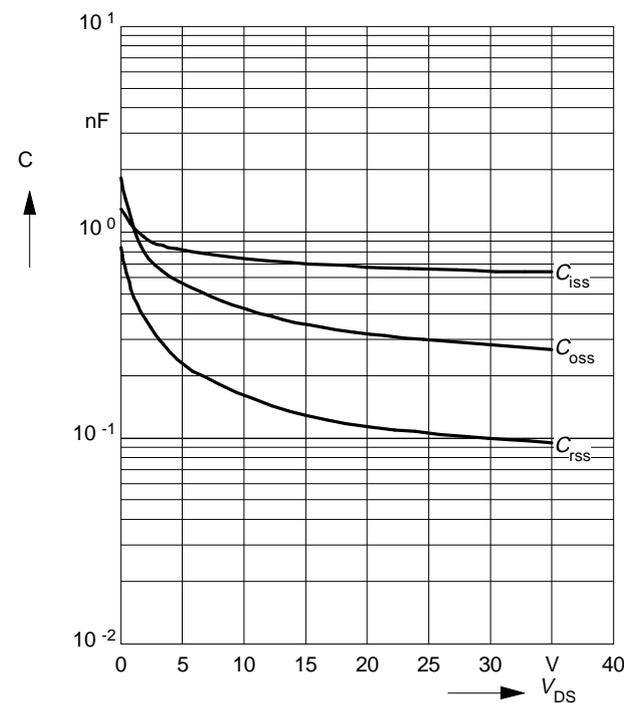

Forward characteristics of reverse diode

$I_F = f(V_{SD})$

parameter: T_j, $t_p = 80\ \mu s$
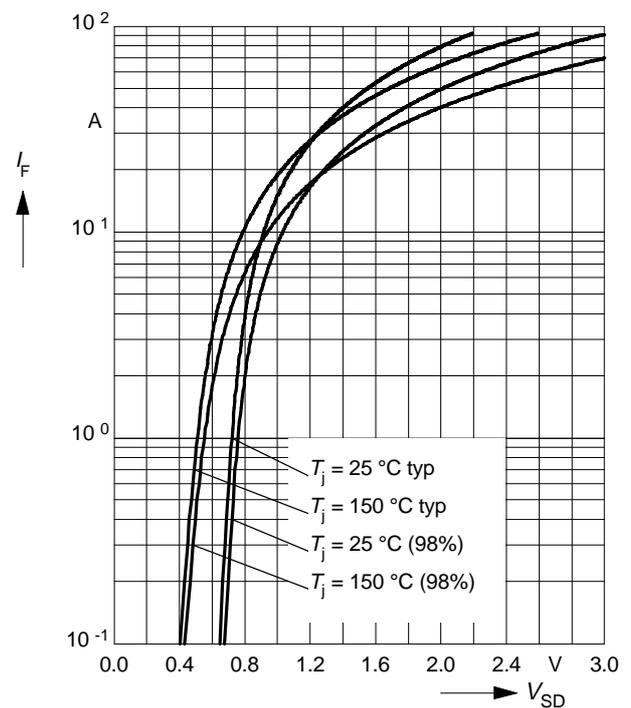
**Avalanche energy** $E_{AS} = f(T_j)$
parameter: $I_D = 23$ A, $V_{DD} = 25$ V
$R_{GS} = 25$ Ω, $L = 15.1$ μH
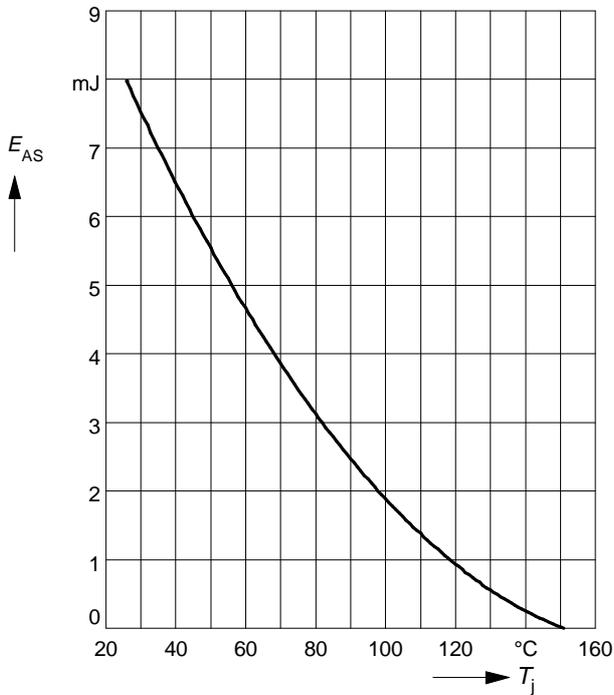
**Typ. gate charge**
$V_{GS} = f(Q_{Gate})$
parameter: $I_{D\,puls} = 38$ A
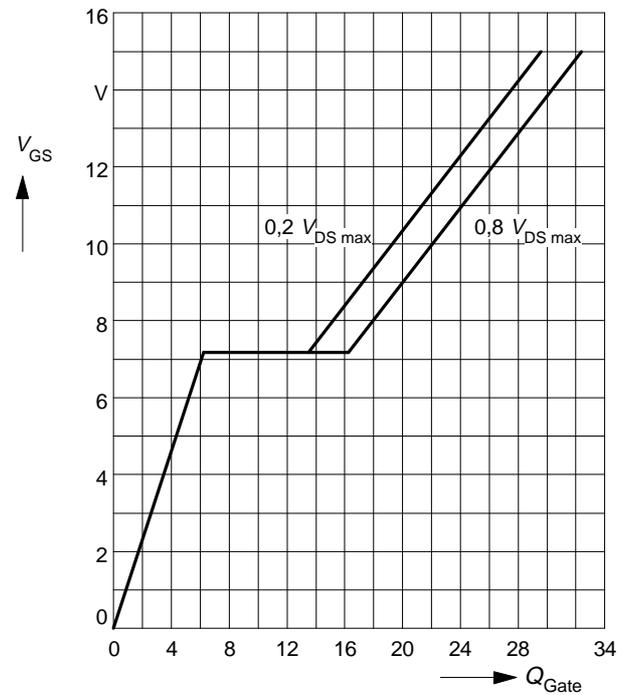
**Drain-source breakdown voltage**
$V_{(BR)DSS} = f(T_j)$
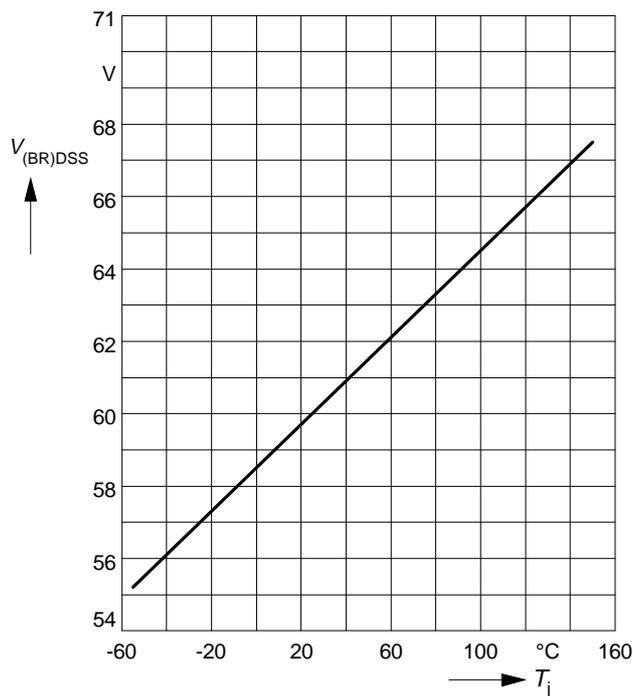
Package Outlines

TO-220 AB

Dimension in mm

GPT05155
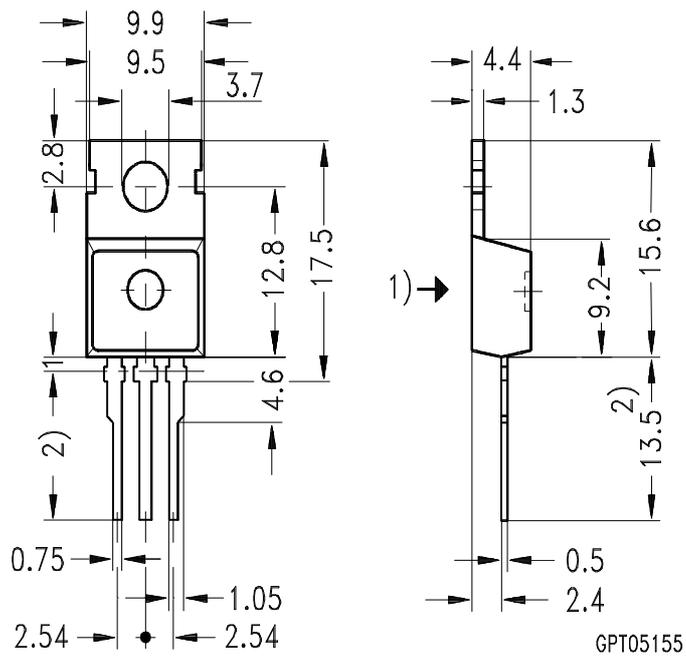
1) punch direction, burr max. 0.04
2) dip tinning
3) max. 14.5 by dip tinning press burr max. 0.05