SIEMENS

BUZ 78

SIPMOS ® Power Transistor

- N channel
- Enhancement mode
- Avalanche-rated

VPT05155
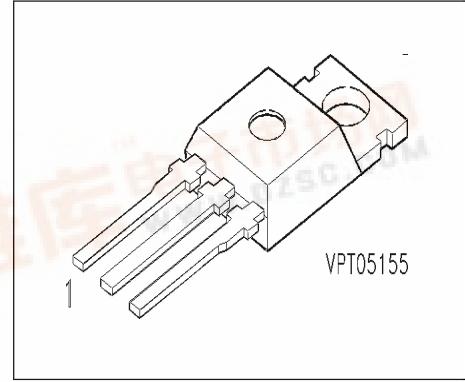
	Pin 1	Pin 2	Pin 3
	G	D	S

Type	V_{DS}	I_D	$R_{DS(on)}$	Package	Ordering Code
BUZ 78	800 V	1.5 A	8 Ω	TO-220 AB	C67078-S1318-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current T_C = 25 °C	I_D	1.5	A
Pulsed drain current T_C = 25 °C	I_{Dpuls}	6	
Avalanche current,limited by T_{jmax}	I_{AR}	1.5	
Avalanche energy,periodic limited by T_{jmax}	E_{AR}	5	mJ
Avalanche energy, single pulse I_D = 1.5 A, V_{DD} = 50 V, R_{GS} = 25 Ω L = 142 mH, T_j = 25 °C	E_{AS}	170	
Gate source voltage	V_{GS}	± 20	V
Power dissipation T_C = 25 °C	P_{tot}	40	W
Operating temperature	T_j	-55 ... + 150	°C
Storage temperature	T_{stg}	-55 ... + 150	
Thermal resistance, chip case	R_{thJC}	≤ 3.1	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	

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

Parameter	Symbol	Values			Unit
		min.	**typ.**	**max.**	
Static Characteristics					
Drain- source breakdown voltage	$V_{(BR)DSS}$				V
$V_{GS} = 0$ V, $I_D = 0.25$ mA, $T_j = 25$ °C		800	-	-	
Gate threshold voltage	$V_{GS(th)}$				
$V_{GS} = V_{DS}$, $I_D = 1$ mA		2.1	3	4	
Zero gate voltage drain current	I_{DSS}				µA
$V_{DS} = 800$ V, $V_{GS} = 0$ V, $T_j = 25$ °C		-	0.1	1	
$V_{DS} = 800$ V, $V_{GS} = 0$ V, $T_j = 125$ °C		-	10	100	
Gate-source leakage current	I_{GSS}				nA
$V_{GS} = 20$ V, $V_{DS} = 0$ V		-	10	100	
Drain-Source on-resistance	$R_{DS(on)}$				Ω
$V_{GS} = 10$ V, $I_D = 1$ A		-	6.5	8	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$, $I_D = 1$ A	g_{fs}	1	1.35	-	S
Input capacitance $V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1$ MHz	C_{iss}	-	320	430	pF
Output capacitance $V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1$ MHz	C_{oss}	-	40	60	
Reverse transfer capacitance $V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1$ MHz	C_{rss}	-	20	30	
Turn-on delay time $V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 1.7$ A $R_{GS} = 50\ \Omega$	$t_{d(on)}$	-	8	12	ns
Rise time $V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 1.7$ A $R_{GS} = 50\ \Omega$	t_r	-	40	60	
Turn-off delay time $V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 1.7$ A $R_{GS} = 50\ \Omega$	$t_{d(off)}$	-	45	60	
Fall time $V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 1.7$ A $R_{GS} = 50\ \Omega$	t_f	-	25	35	

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	-	-	1.5	A
Inverse diode direct current,pulsed T_C = 25 °C	I_{SM}	-	-	6	
Inverse diode forward voltage V_{GS} = 0 V, I_F = 3 A	V_{SD}	-	0.95	1.45	V
Reverse recovery time V_R = 100 V, $I_{F=I_S}$, di_F/dt = 100 A/µs	t_{rr}	-	370	-	ns
Reverse recovery charge V_R = 100 V, $I_{F=I_S}$, di_F/dt = 100 A/µs	Q_{rr}	-	2.1	-	µC

Power dissipation

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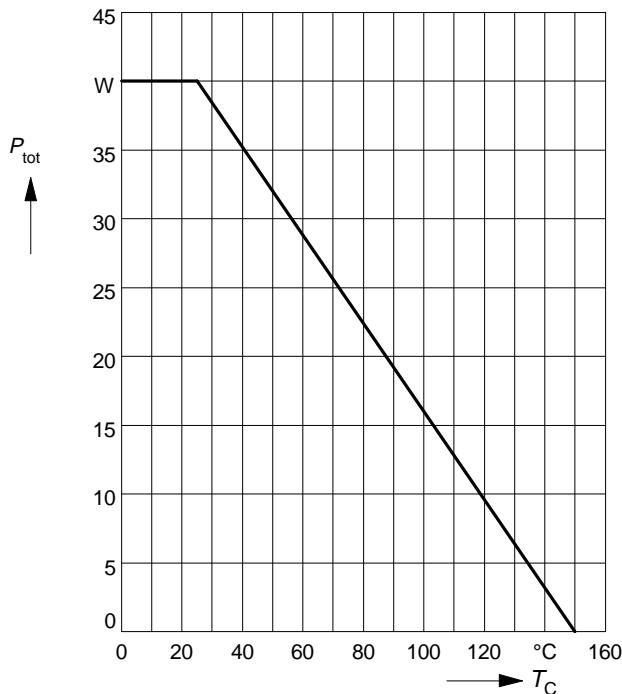
Drain current

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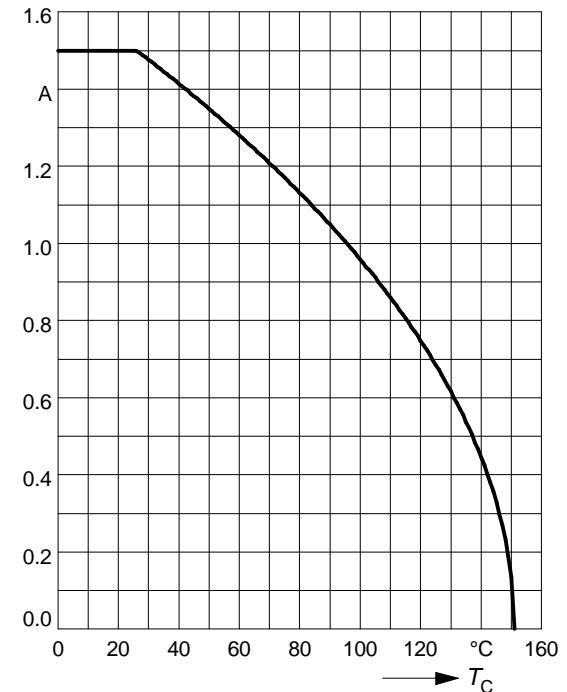
Safe operating area

$I_D = f(V_{DS})$
parameter: $D = 0.01$, $T_C = 25°C$
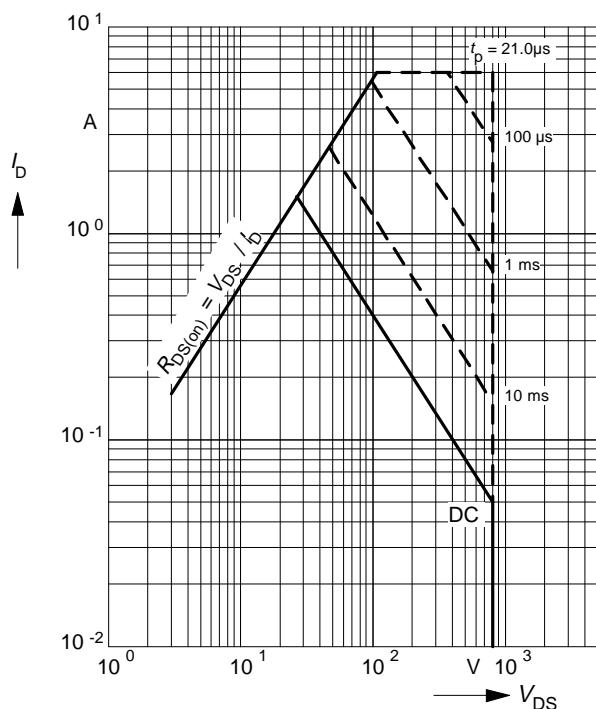
Transient thermal impedance

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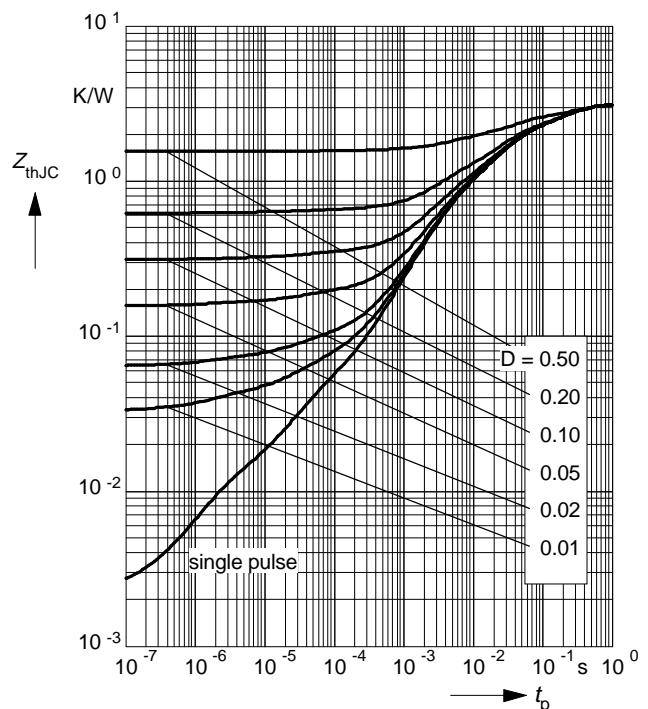
Typ. output characteristics

$I_D = f(V_{DS})$

parameter: $t_p = 80$ µs
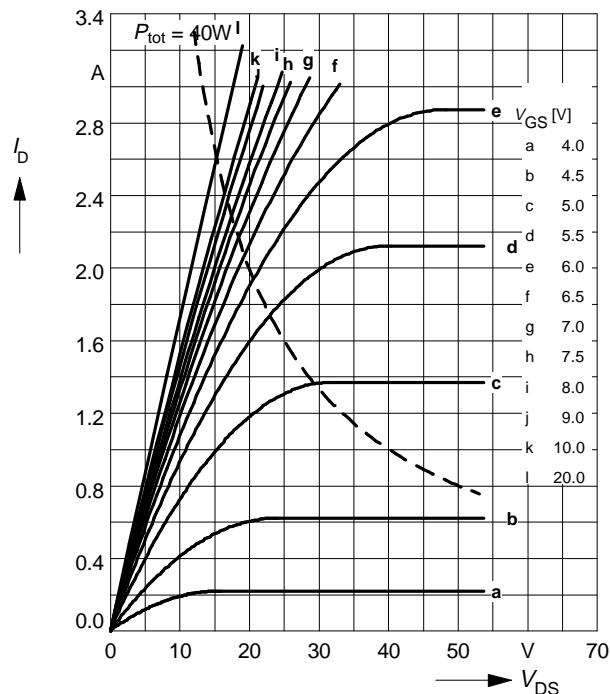
## Typ. drain-source on-resistance

$R_{DS\ (on)} = f(I_D)$

parameter: V_{GS}
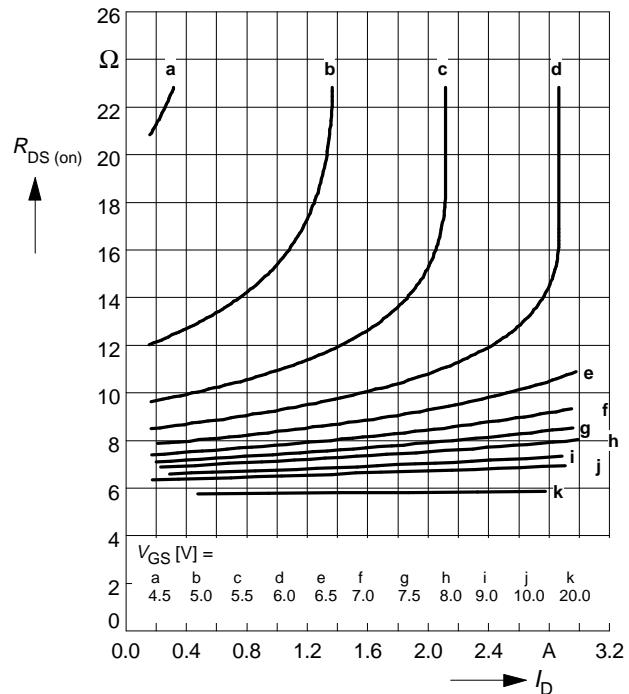
Typ. transfer characteristics $I_D = f(V_{GS})$

parameter: $t_p = 80$ µs

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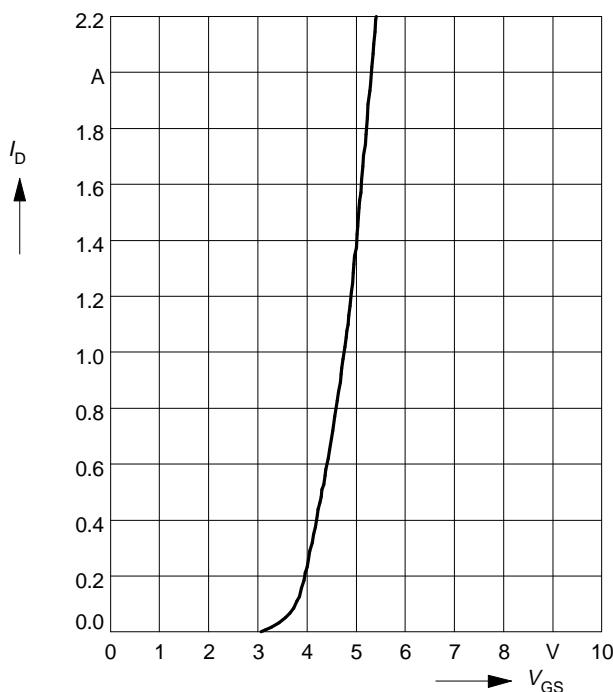
Typ. forward transconductance $g_{fs} = f(I_D)$

parameter: $t_p = 80$ µs,

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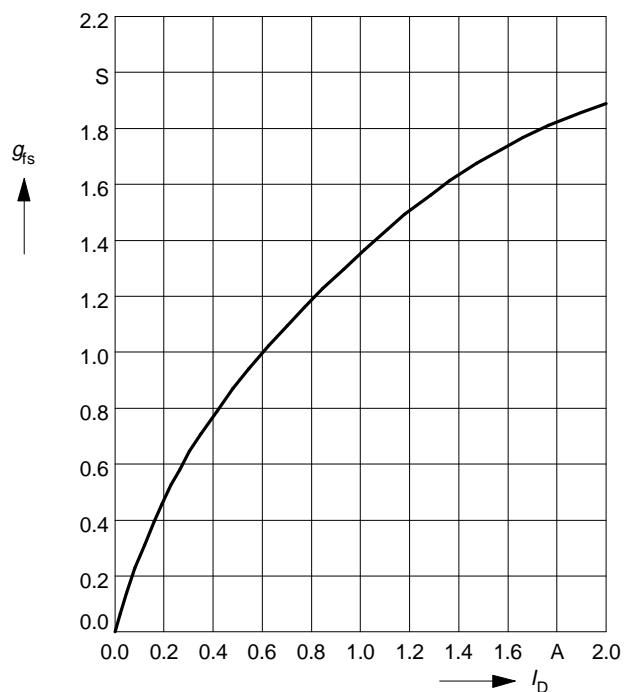
Drain-source on-resistance

$R_{DS (on)} = f(T_j)$
parameter: $I_D = 1$ A, $V_{GS} = 10$ V
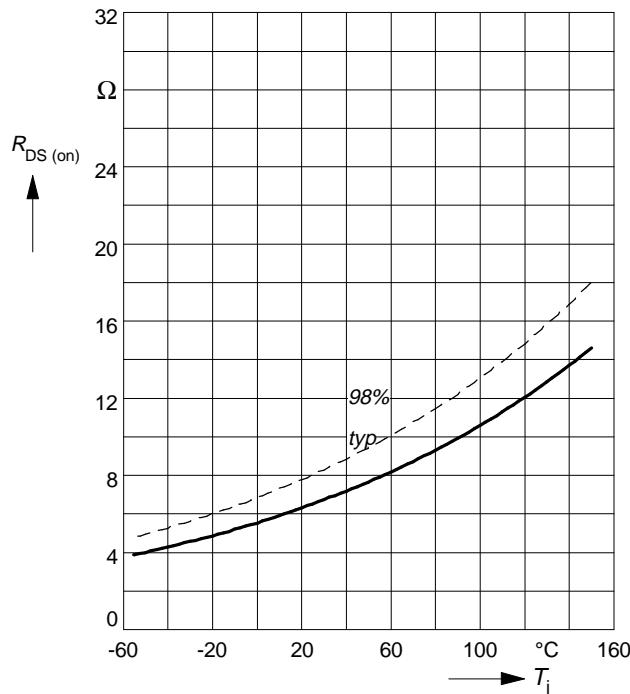

Gate threshold voltage

$V_{GS (th)} = f(T_j)$
parameter: $V_{GS} = V_{DS}$, $I_D = 1$ mA
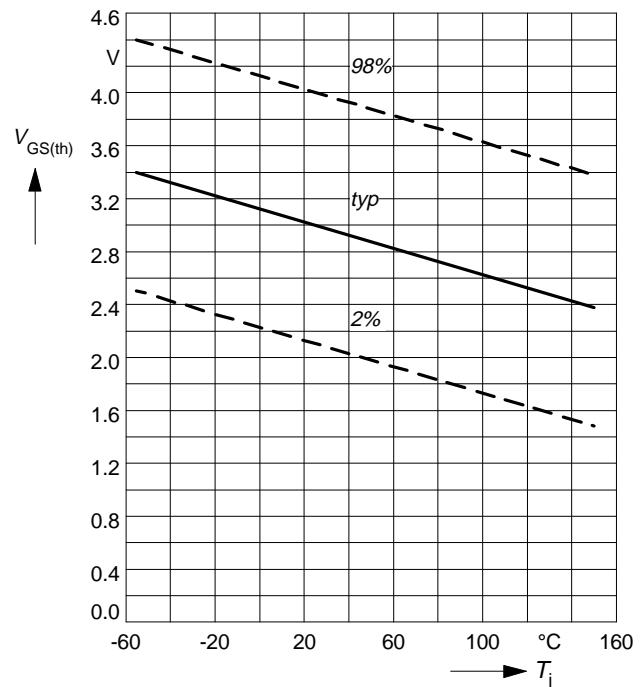
Typ. capacitances

$C = f(V_{DS})$
parameter: $V_{GS} = 0$V, $f = 1$MHz
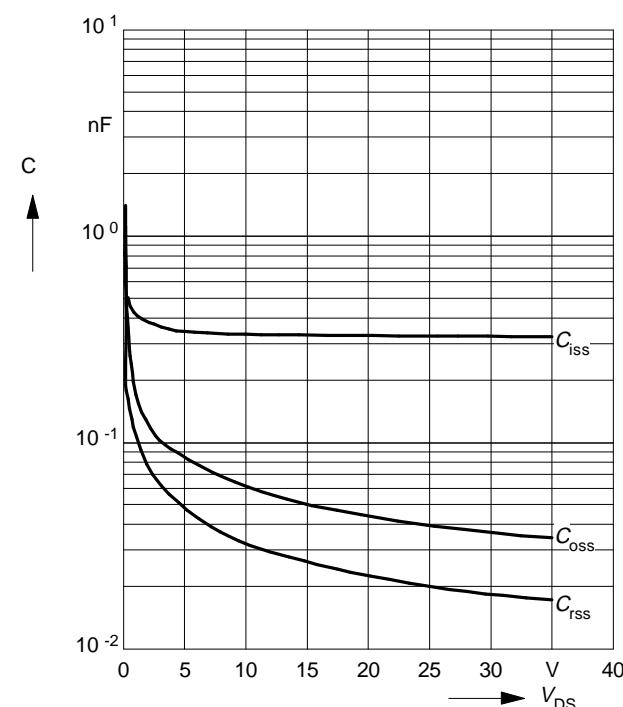

Forward characteristics of reverse diode

$I_F = f(V_{SD})$
parameter: T_j, $t_p = 80$ µs
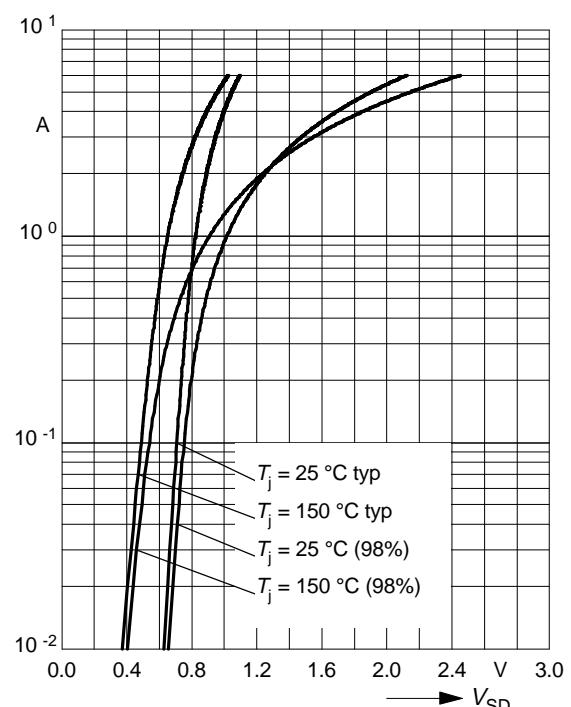
Avalanche energy $E_{AS} = f(T_j)$

parameter: I_D = 1.5 A, V_{DD} = 50 V

R_{GS} = 25 Ω, L = 142 mH
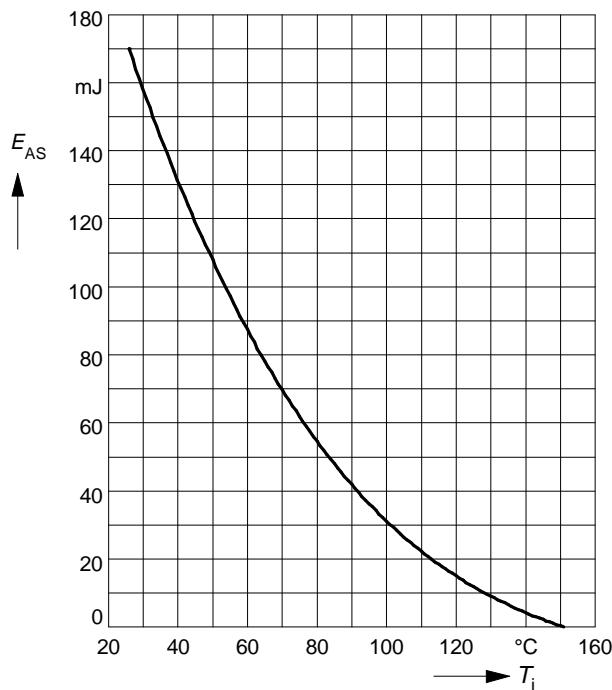
**Typ. gate charge**

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

parameter: $I_{D\,puls}$ = 3 A
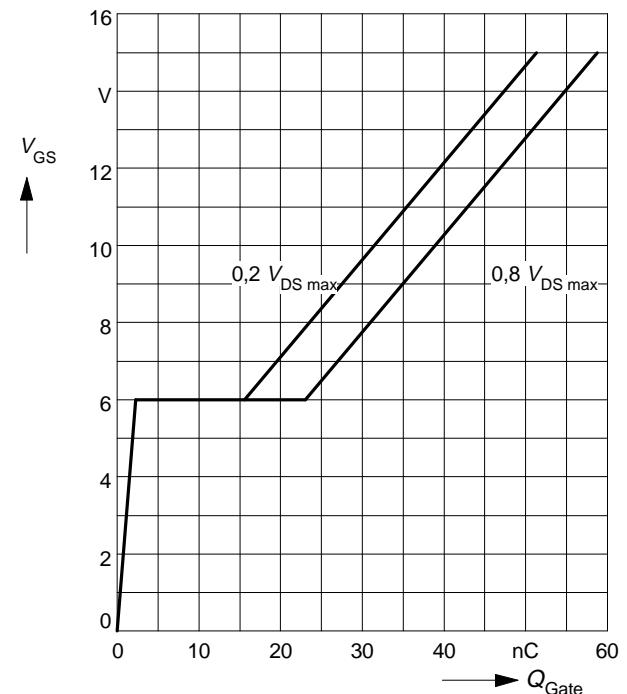
Drain-source breakdown voltage

$V_{(BR)DSS} = f(T_j)$
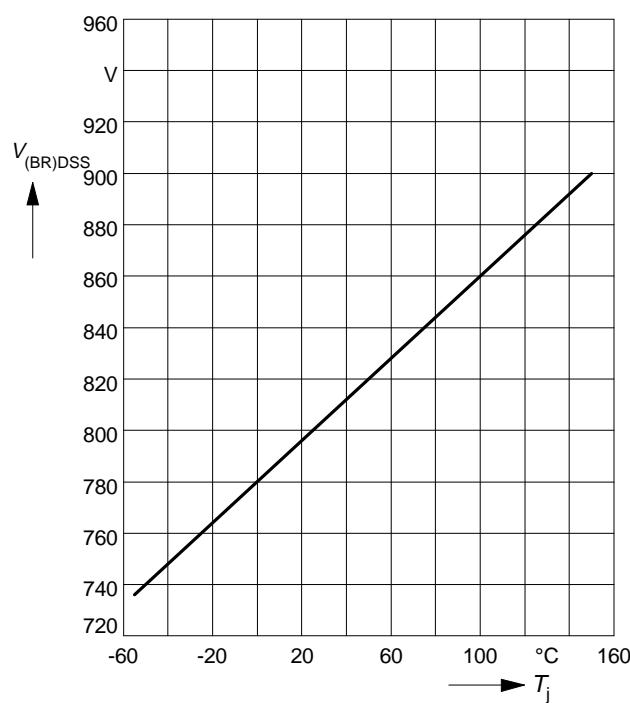
Package Outlines

TO-220 AB

Dimension in mm

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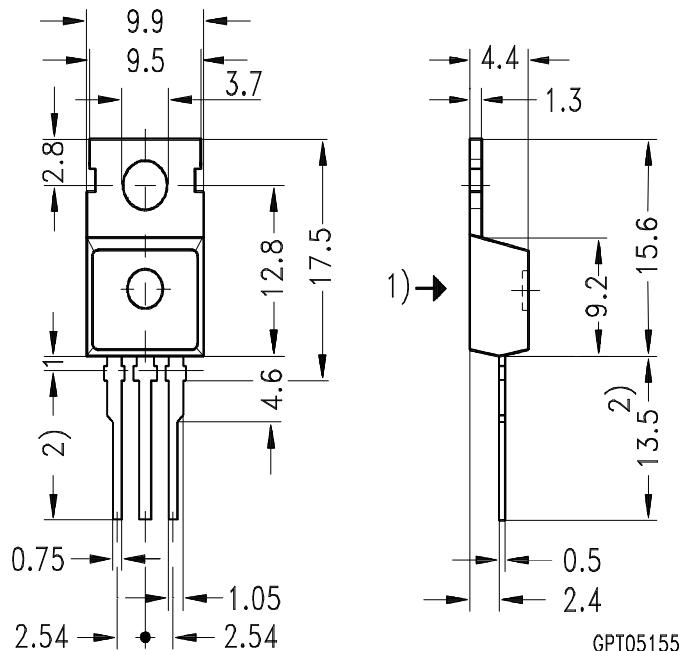
1) punch direction, burr max. 0.04
2) dip tinning
3) max. 14.5 by dip tinning press burr max. 0.05