SIPMOS ® Power Transistor

• P channel

• Enhancement mode

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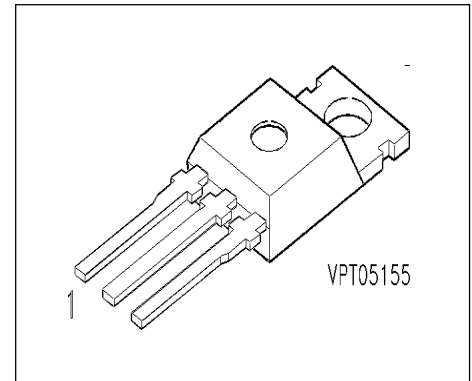
Pin 1	Pin 2	Pin 3
G	D	S

Type	V_{DS}	I_D	$R_{DS(on)}$	Package	Ordering Code
BUZ 173	-200 V	-3.6 A	1.5 Ω	TO-220 AB	C67078-S1452-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current $T_C = 30$ °C	I_D	-3.6	A
Pulsed drain current $T_C = 25$ °C	I_{Dpuls}	-14	
Avalanche energy, single pulse $I_D = -3.6$ A, $V_{DD} = -25$ V, $R_{GS} = 25$ Ω $L = 23$ mH, $T_j = 25$ °C	E_{AS}	200	mJ
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_{GS} = 0 V, I_D = -0.25 mA, T_j = 25 °C	$V_{(BR)DSS}$	-200	-	-	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} = -200 V, V_{GS} = 0 V, T_j = 25 °C V_{DS} = -200 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 = -2.3 A	$R_{DS(on)}$	-	1.2	1.5	Ω

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$, $I_D = -2.3$ A	g_{fs}	1.1	2.2	-	S
Input capacitance $V_{GS} = 0$ V, $V_{DS} = -25$ V, $f = 1$ MHz	C_{iss}	-	750	1150	pF
Output capacitance $V_{GS} = 0$ V, $V_{DS} = -25$ V, $f = 1$ MHz	C_{oss}	-	125	190	
Reverse transfer capacitance $V_{GS} = 0$ V, $V_{DS} = -25$ V, $f = 1$ MHz	C_{rss}	-	40	60	
Turn-on delay time $V_{DD} = -30$ V, $V_{GS} = -10$ V, $I_D = -2.6$ A $R_{GS} = 50\ \Omega$	$t_{d(on)}$	-	20	30	ns
Rise time $V_{DD} = -30$ V, $V_{GS} = -10$ V, $I_D = -2.6$ A $R_{GS} = 50\ \Omega$	t_r	-	60	95	
Turn-off delay time $V_{DD} = -30$ V, $V_{GS} = -10$ V, $I_D = -2.6$ A $R_{GS} = 50\ \Omega$	$t_{d(off)}$	-	70	90	
Fall time $V_{DD} = -30$ V, $V_{GS} = -10$ V, $I_D = -2.6$ A $R_{GS} = 50\ \Omega$	t_f	-	55	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	-	-	-3.6	A
Inverse diode direct current, pulsed T_C = 25 °C	I_{SM}	-	-	-14	
Inverse diode forward voltage V_{GS} = 0 V, I_F = -7.2 A	V_{SD}	-	-1	-1.3	V
Reverse recovery time V_R = -30 V, $I_F=I_S$, di_F/dt = 100 A/µs	t_{rr}	-	200	-	ns
Reverse recovery charge V_R = -30 V, $I_F=I_S$, di_F/dt = 100 A/µs	Q_{rr}	-	0.75	-	µC

Power dissipation

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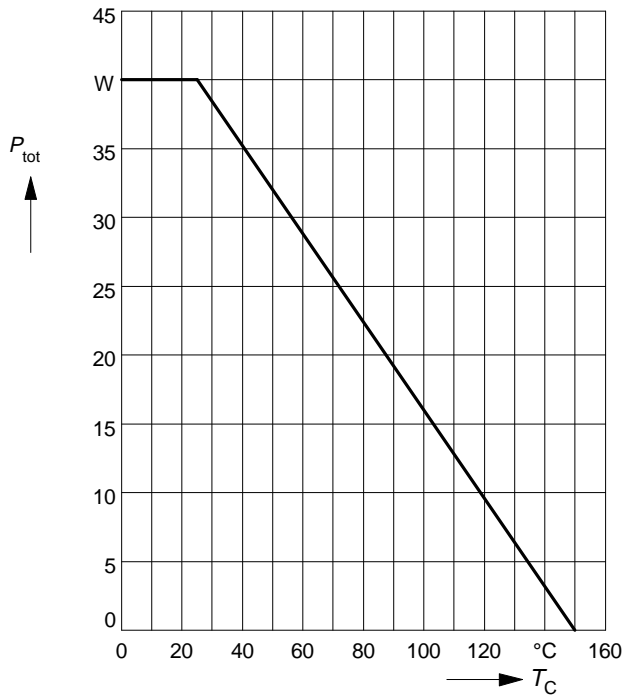
Drain current

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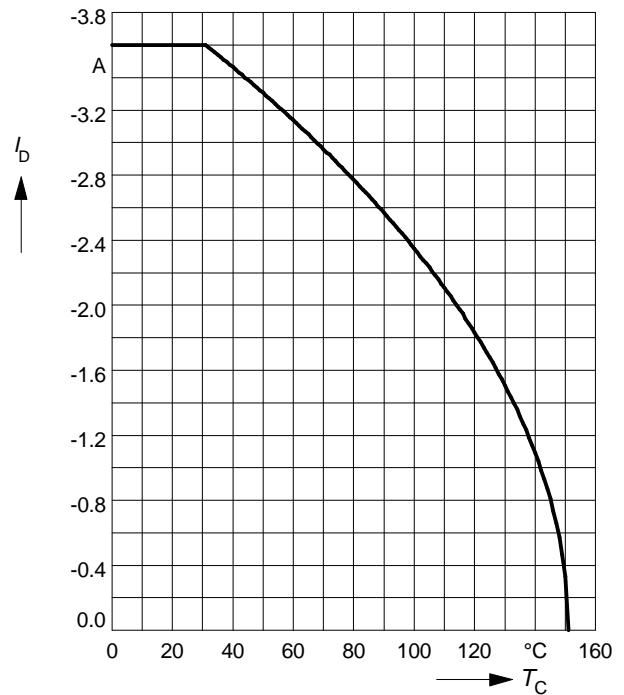
Safe operating area

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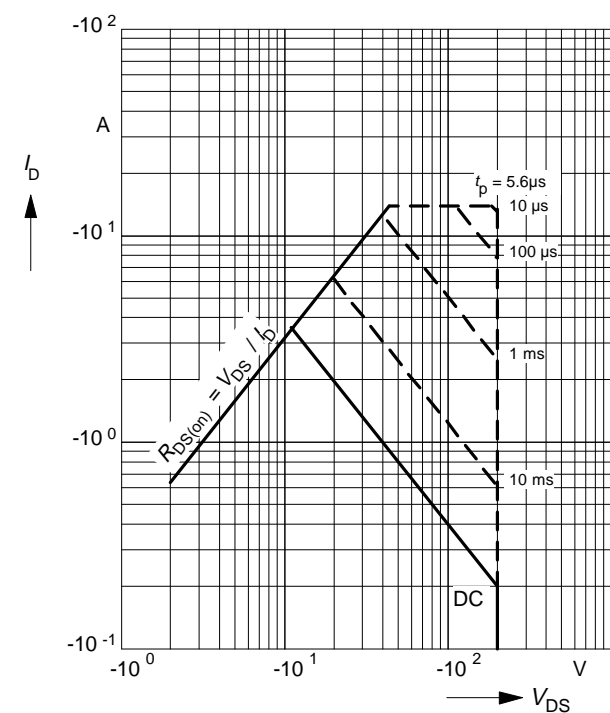
Transient thermal impedance

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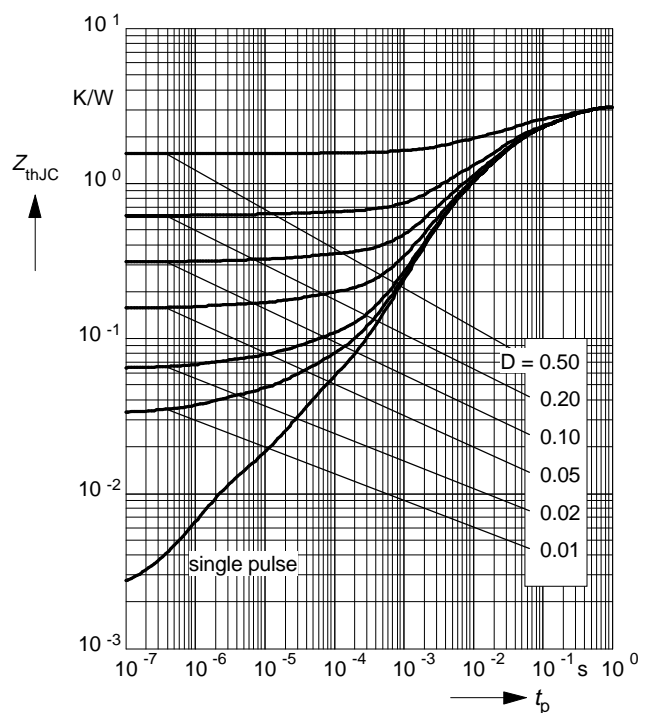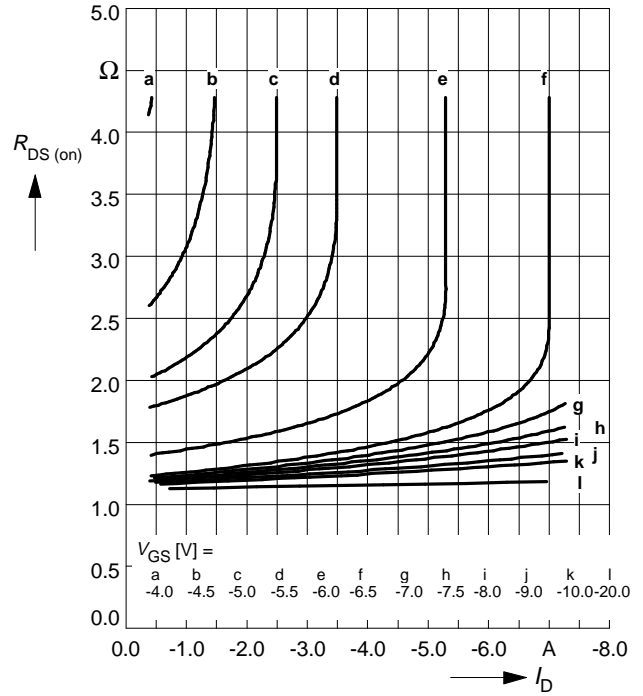
Typ. output characteristics

$I_D = f(V_{DS})$
parameter: $t_p = 80$ µs
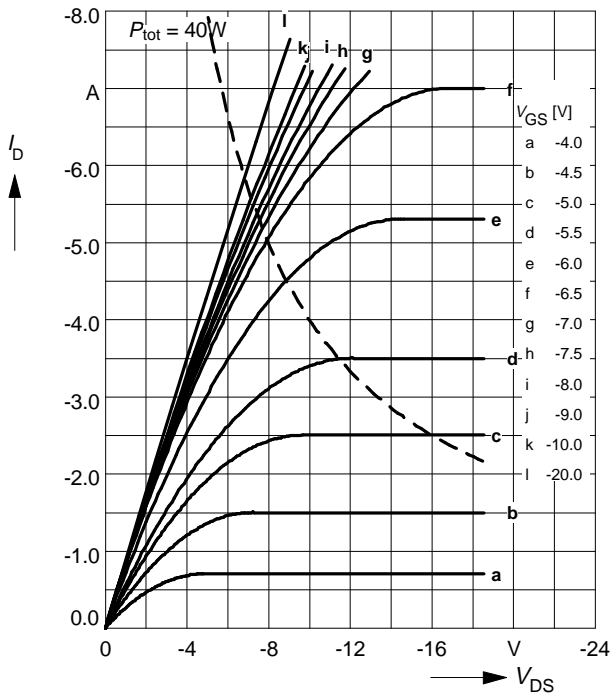
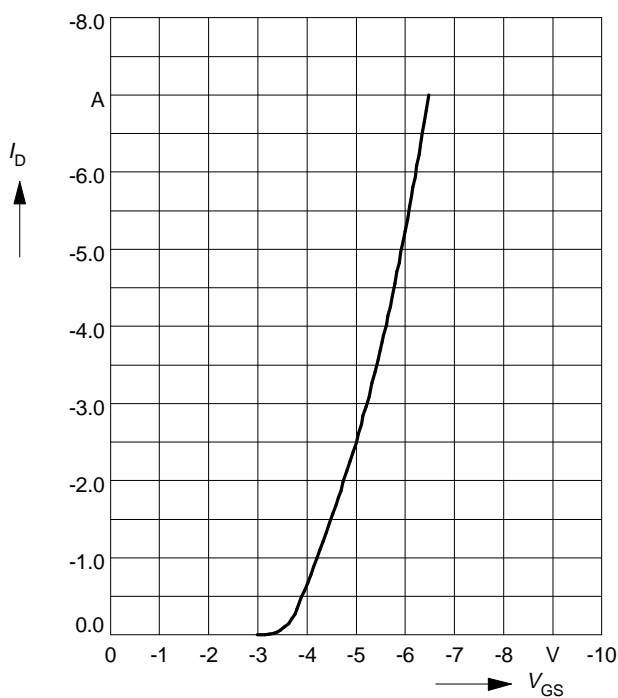**Typ. drain-source on-resistance**

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

Typ. transfer characteristics $I_D = f(V_{GS})$
parameter: $t_p = 80$ µs
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$

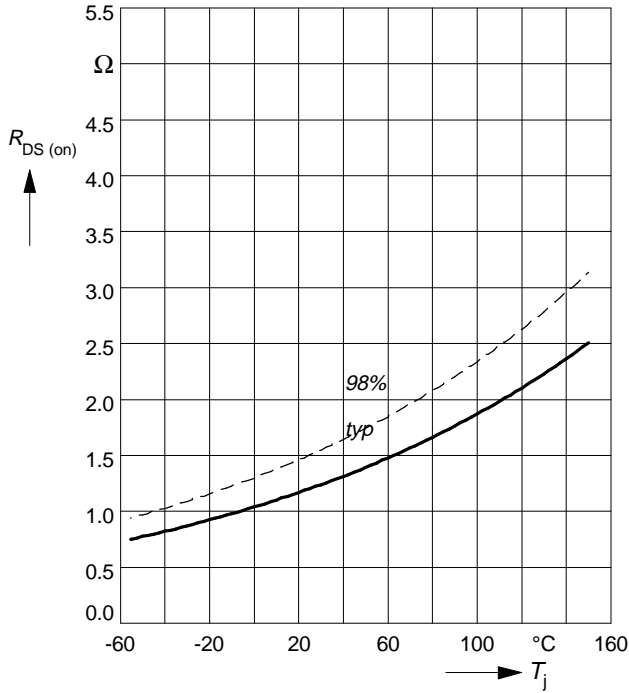**Typ. forward transconductance** $g_{fs} = f(I_D)$
parameter: $t_p = 80$ µs,
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$
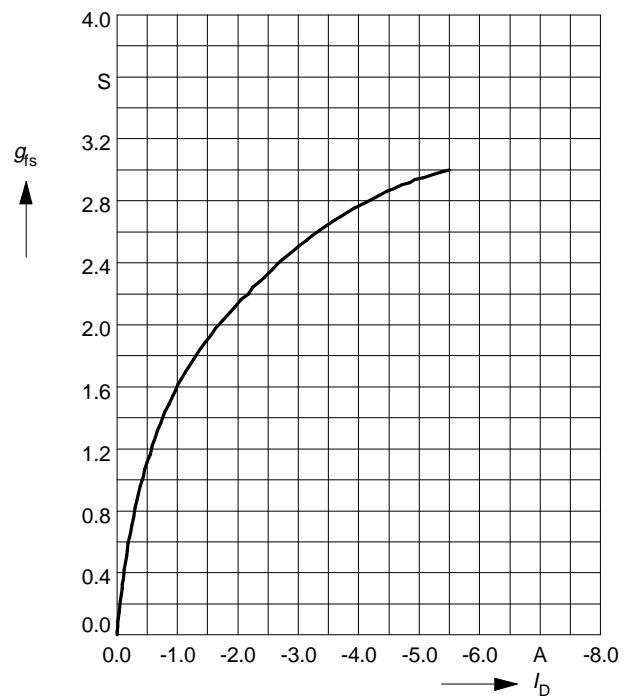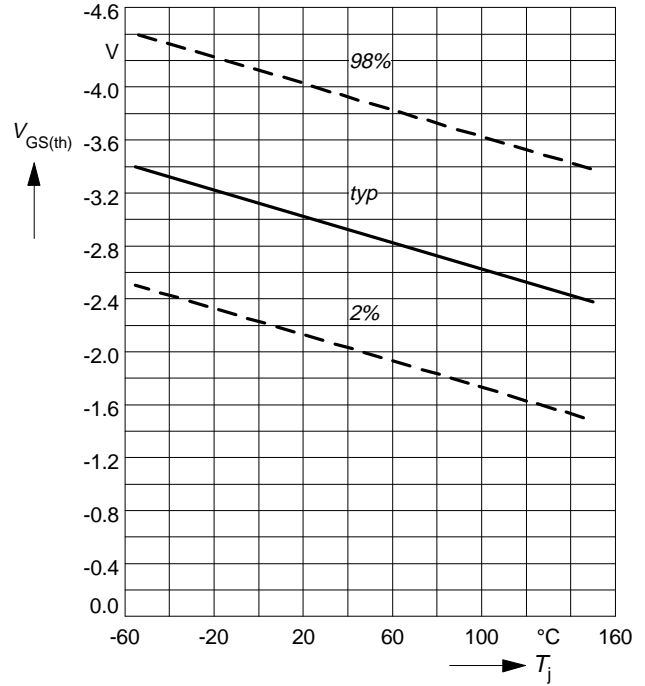
Drain-source on-resistance

$R_{DS\,(on)} = f(T_j)$
parameter: $I_D = -2.3\,A$, $V_{GS} = -10\,V$
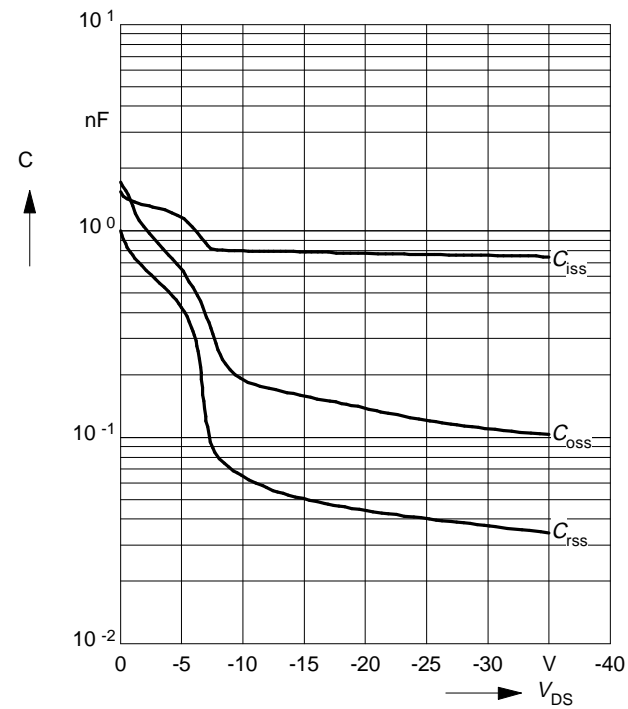
Gate threshold voltage

$V_{GS\,(th)} = f(T_j)$
parameter: $V_{GS} = V_{DS}$, $I_D = 1\,mA$
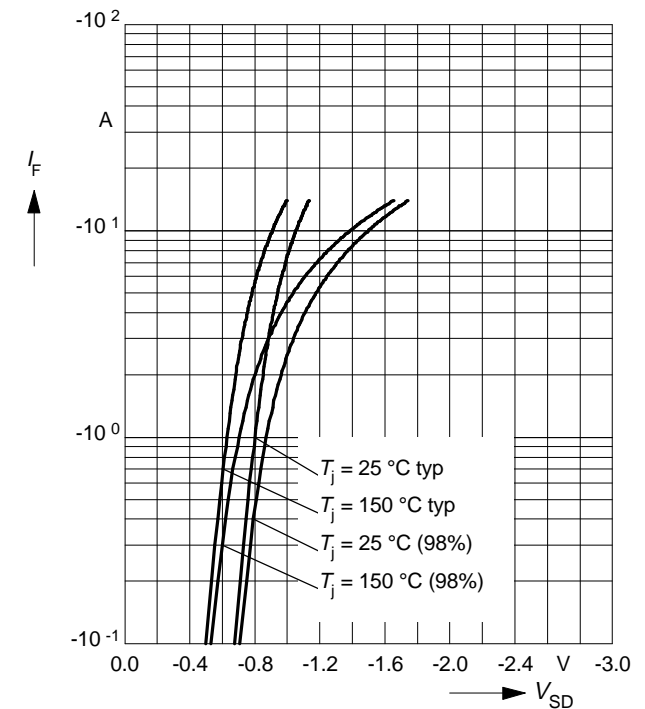
Typ. capacitances
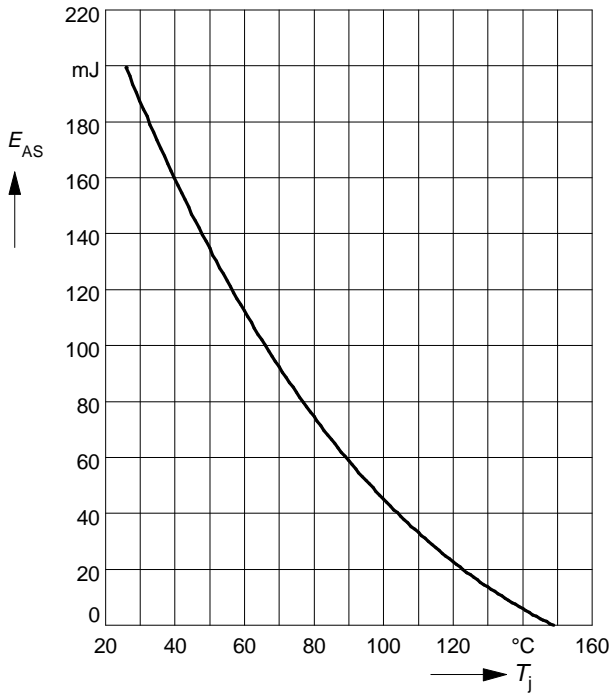
$C = f(V_{DS})$
parameter: $V_{GS} = 0V$, $f = 1MHz$

Forward characteristics of reverse diode

$I_F = f(V_{SD})$
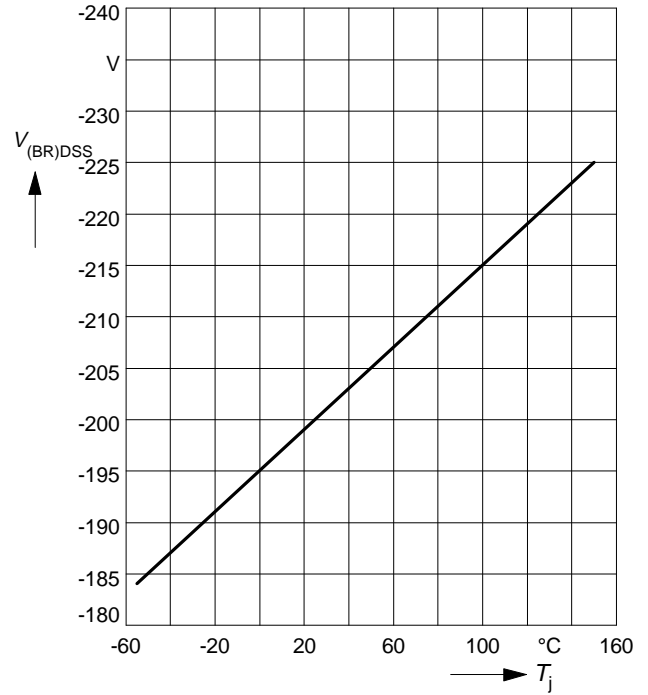parameter: T_j, $t_p = 80\,\mu s$

Avalanche energy $E_{AS} = f(T_j)$
parameter: I_D = -3.6 A, V_{DD} = -25 V
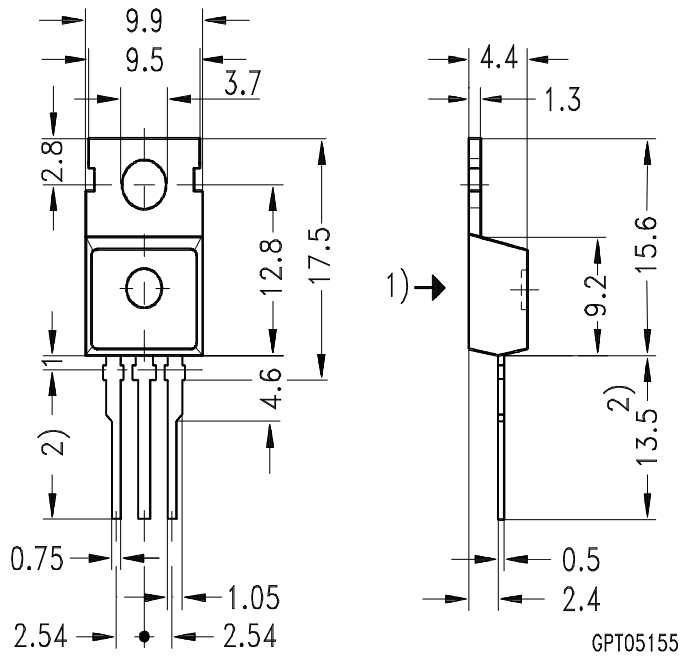R_{GS} = 25 Ω, L = 23 mH

Drain-source breakdown voltage
$V_{(BR)DSS} = f(T_j)$

07/96

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