SIPMOS ® Power Transistor

• P channel

• Enhancement mode

• Avalanche rated

VPT05155
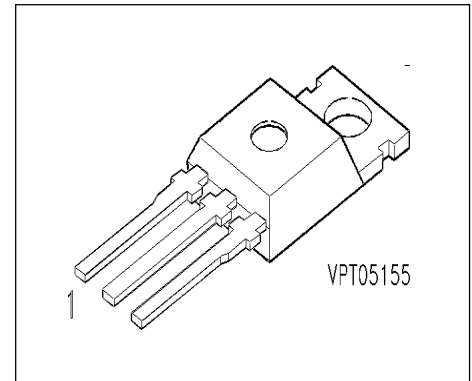
	Pin 1	Pin 2	Pin 3
	G	D	S

Type	V_{DS}	I_D	$R_{DS(on)}$	Package	Ordering Code
BUZ 172	-100 V	-5.5 A	0.6 Ω	TO-220 AB	C67078-S1451-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current T_C = 37 °C	I_D	-5.5	A
Pulsed drain current T_C = 25 °C	I_{Dpuls}	-22	
Avalanche energy, single pulse I_D = -5.5 A, V_{DD} = -25 V, R_{GS} = 25 Ω L = 8.4 mH, T_j = 25 °C	E_{AS}	170	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	$V_{(BR)DSS}$	-100	-	-	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} = -100 V, V_{GS} = 0 V, T_j = 25 °C V_{DS} = -100 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 = -3.7 A	$R_{DS(on)}$	-	0.4	0.6	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 = -3.7 A	g_{fs}	1	2	-	S
Input capacitance V_{GS} = 0 V, V_{DS} = -25 V, f = 1 MHz	C_{iss}	-	800	1200	pF
Output capacitance V_{GS} = 0 V, V_{DS} = -25 V, f = 1 MHz	C_{oss}	-	220	330	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = -25 V, f = 1 MHz	C_{rss}	-	90	140	
Turn-on delay time V_{DD} = -30 V, V_{GS} = -10 V, I_D = -2.8 A R_{GS} = 50 Ω	$t_{d(on)}$	-	20	30	ns
Rise time V_{DD} = -30 V, V_{GS} = -10 V, I_D = -2.8 A R_{GS} = 50 Ω	t_r	-	120	180	
Turn-off delay time V_{DD} = -30 V, V_{GS} = -10 V, I_D = -2.8 A R_{GS} = 50 Ω	$t_{d(off)}$	-	70	90	
Fall time V_{DD} = -30 V, V_{GS} = -10 V, I_D = -2.8 A R_{GS} = 50 Ω	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	-	-	-5.5	A
Inverse diode direct current,pulsed T_C = 25 °C	I_{SM}	-	-	-22	
Inverse diode forward voltage V_{GS} = 0 V, I_F = -11 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

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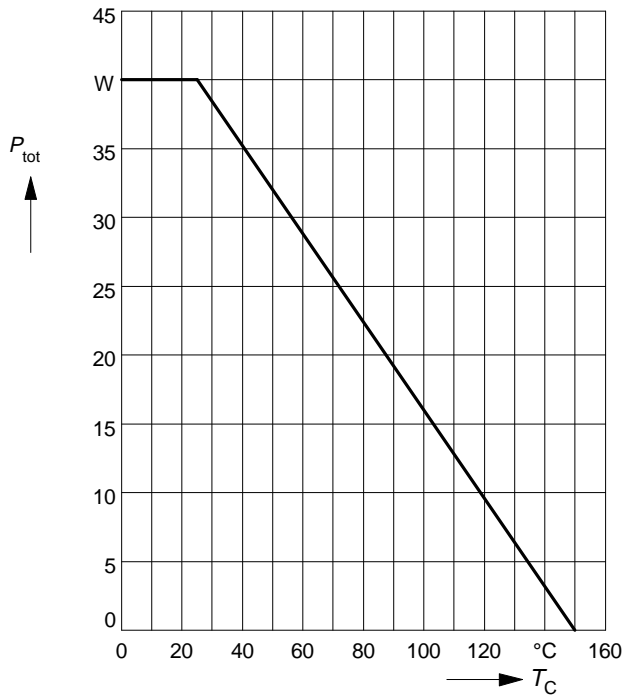
Drain current

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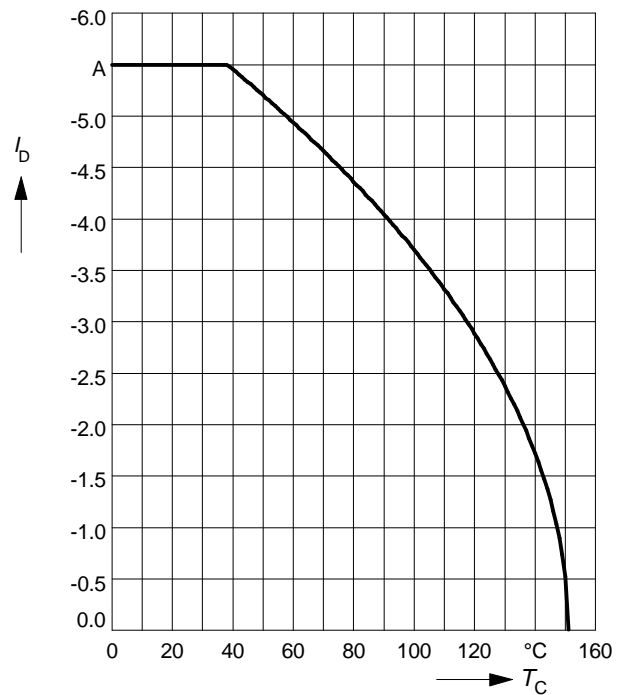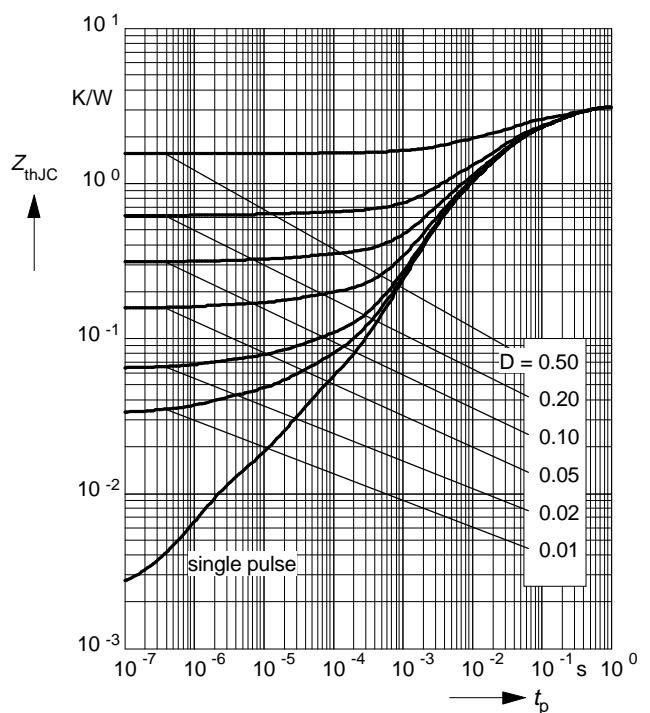

Safe operating area

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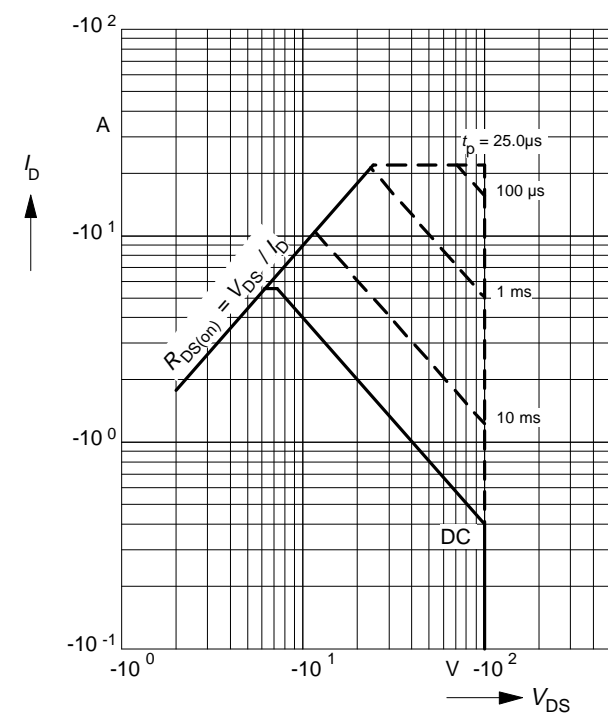
Transient thermal impedance

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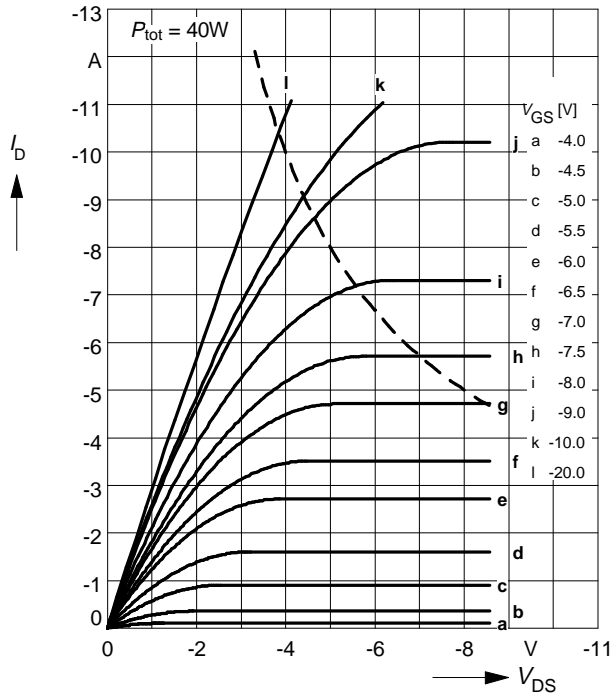
Typ. output characteristics

$I_D = f(V_{DS})$
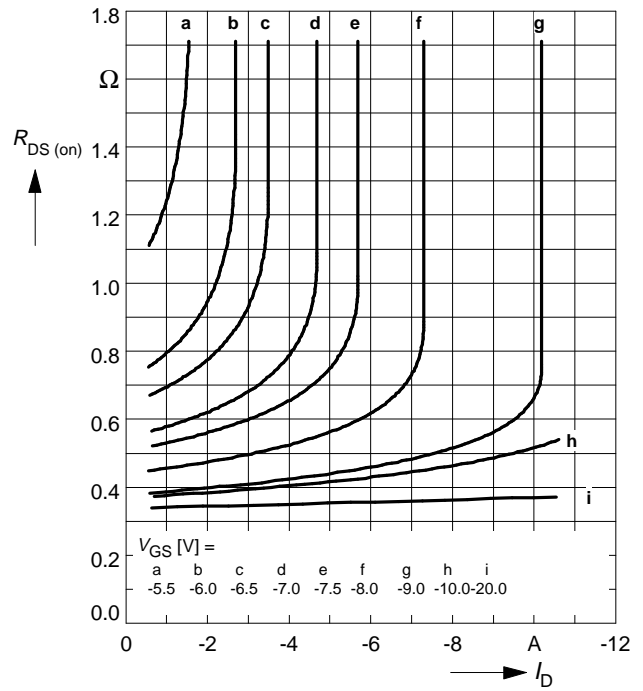parameter: $t_p = 80\ \mu s$

V_{GS} [V]
a -4.0
b -4.5
c -5.0
d -5.5
e -6.0
f -6.5
g -7.0
h -7.5
i -8.0
j -9.0
k -10.0
l -20.0

$P_{tot} = 40W$

Typ. drain-source on-resistance

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

V_{GS} [V] =								
a	b	c	d	e	f	g	h	i
-5.5	-6.0	-6.5	-7.0	-7.5	-8.0	-9.0	-10.0	-20.0

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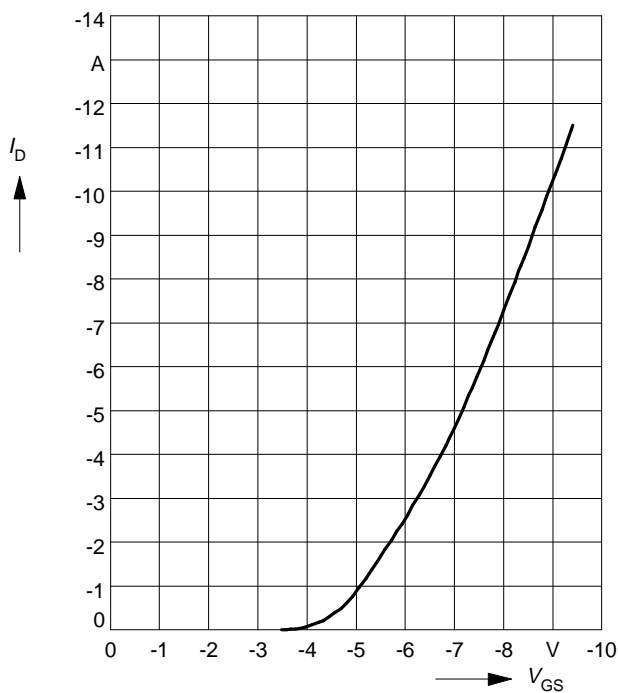
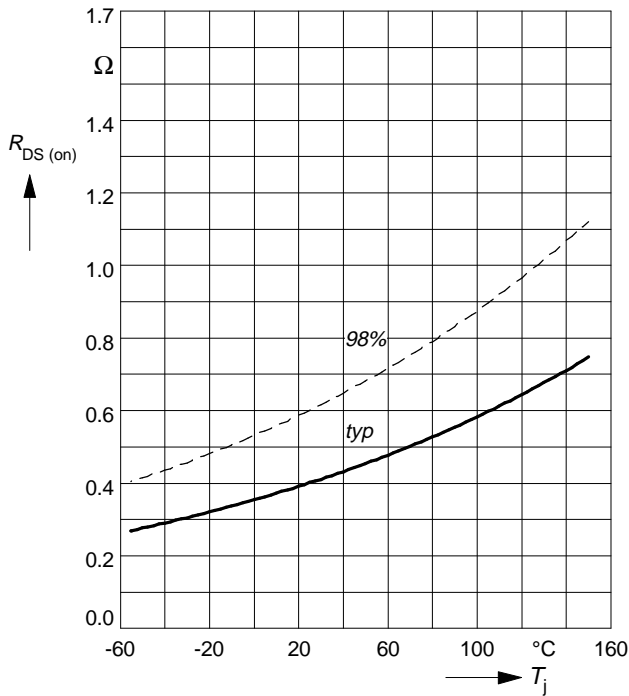## Typ. forward transconductance $g_{fs} = f(I_D)$
parameter: $t_p = 80\ \mu s$,
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$
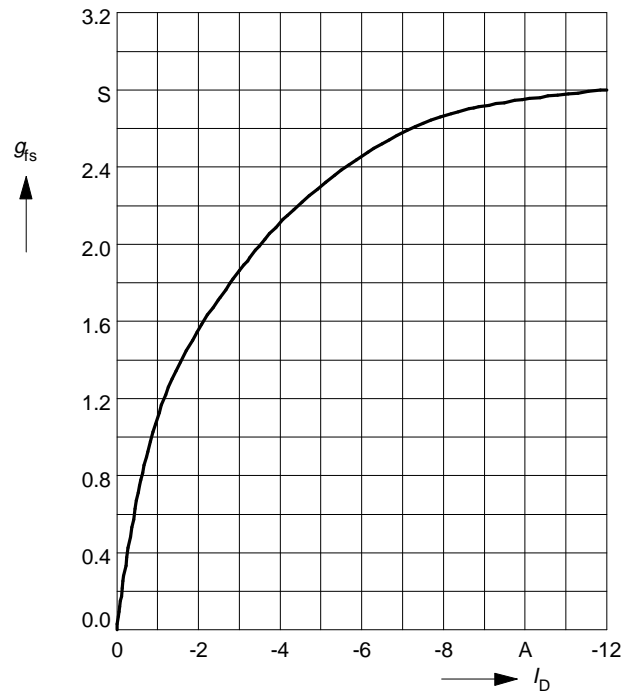
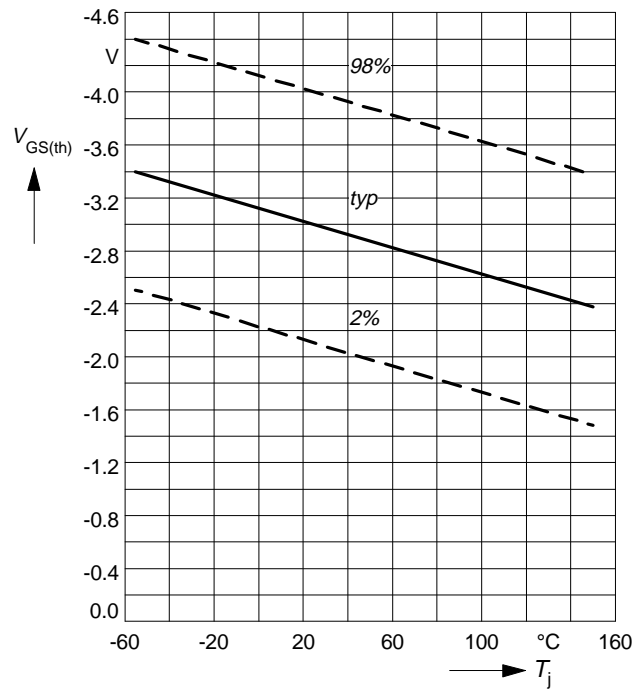## Drain-source on-resistance

$R_{DS\,(on)} = f(T_j)$
parameter: $I_D = -3.7\,A$, $V_{GS} = -10\,V$

Gate threshold voltage

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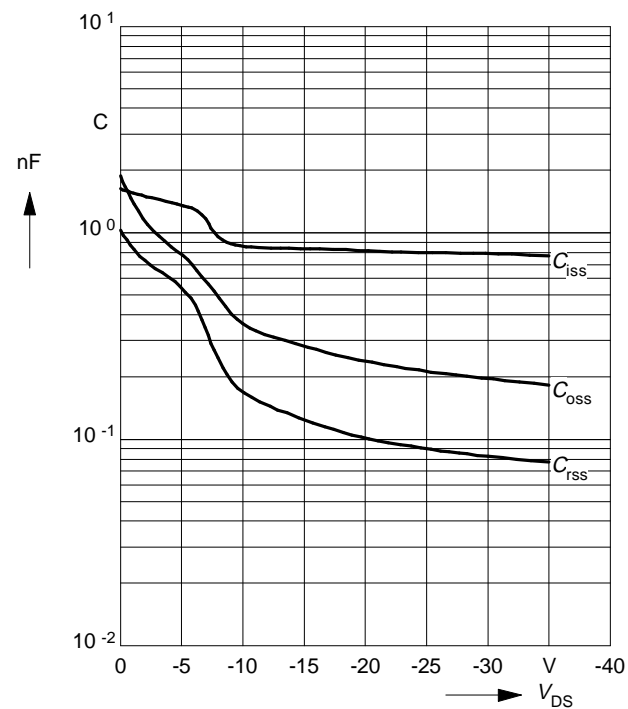parameter: $V_{GS} = V_{DS}$, $I_D = 1\,mA$

Typ. capacitances

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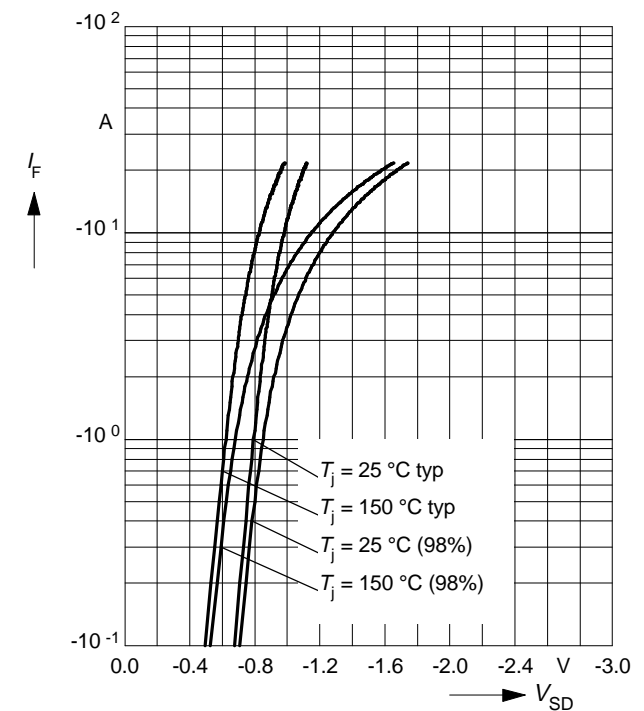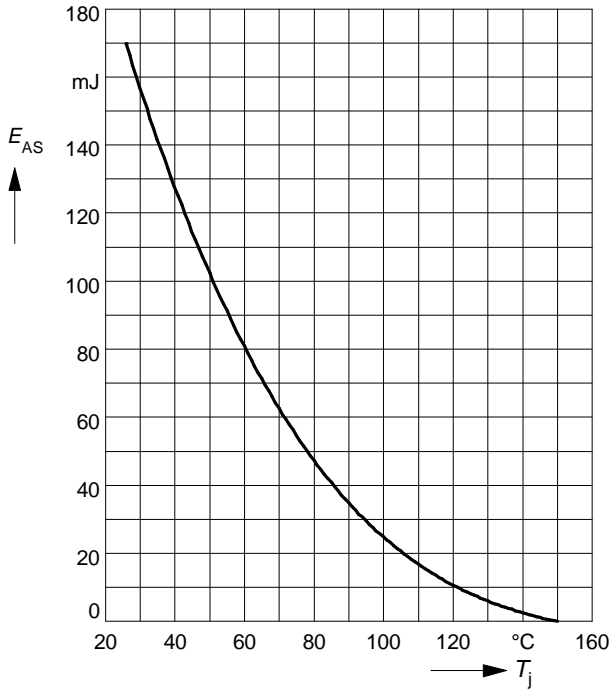parameter: $V_{GS} = 0V$, $f = 1MHz$

Forward characteristics of reverse diode

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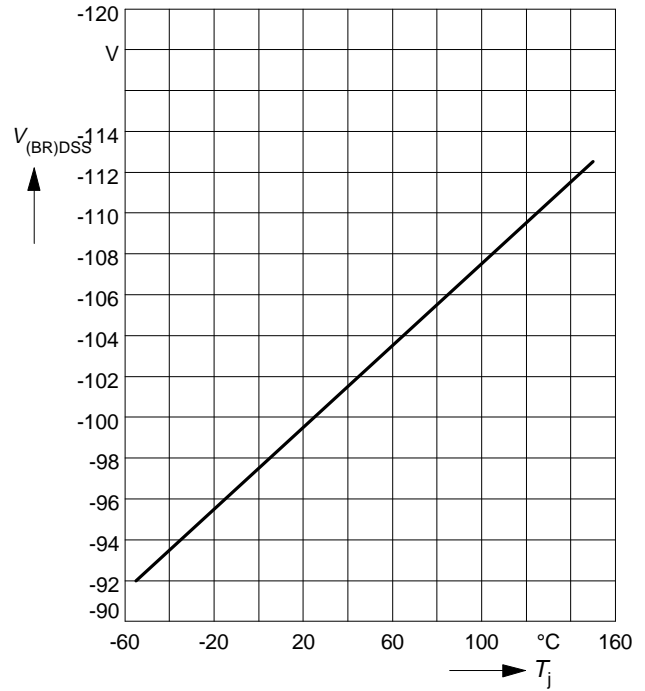parameter: T_j, $t_p = 80\,\mu s$

Avalanche energy $E_{AS} = f(T_j)$
parameter: I_D = -5.5 A, V_{DD} = -25 V
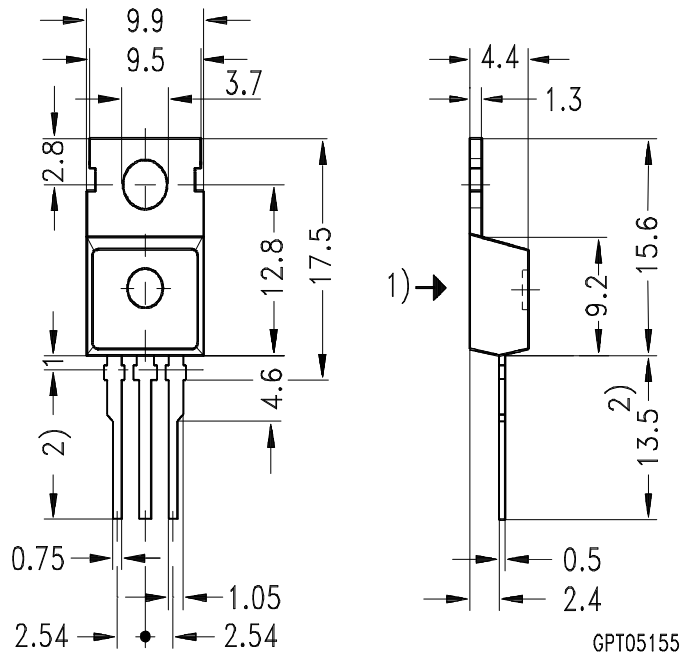R_{GS} = 25 Ω, L = 8.4 mH

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