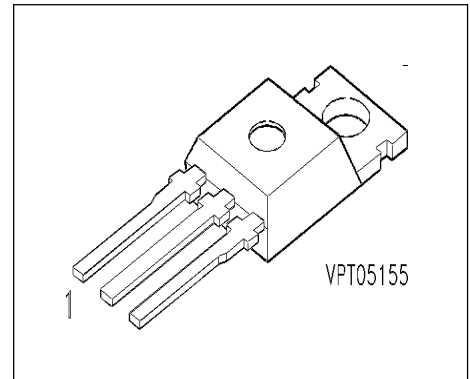


SIPMOS[®] Power Transistor

- 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 $T_C = 30\text{ }^{\circ}\text{C}$	I_D	-3.6	A
Pulsed drain current $T_C = 25\text{ }^{\circ}\text{C}$	I_{Dpuls}	-14	
Avalanche energy, single pulse $I_D = -3.6\text{ A}$, $V_{DD} = -25\text{ V}$, $R_{GS} = 25\text{ }\Omega$ $L = 23\text{ mH}$, $T_j = 25\text{ }^{\circ}\text{C}$	E_{AS}	200	mJ
Gate source voltage	V_{GS}	± 20	V
Power dissipation $T_C = 25\text{ }^{\circ}\text{C}$	P_{tot}	40	W
Operating temperature	T_j	-55 ... + 150	$^{\circ}\text{C}$
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 $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain- source breakdown voltage $V_{GS} = 0\text{ V}$, $I_D = -0.25\text{ mA}$, $T_j = 25\text{ }^{\circ}\text{C}$	$V_{(BR)DSS}$	-200	-	-	V
Gate threshold voltage $V_{GS}=V_{DS}$, $I_D = 1\text{ mA}$	$V_{GS(th)}$	-2.1	-3	-4	
Zero gate voltage drain current $V_{DS} = -200\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 25\text{ }^{\circ}\text{C}$ $V_{DS} = -200\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 125\text{ }^{\circ}\text{C}$	I_{DSS}	- -	-0.1 -10	-1 -100	μA
Gate-source leakage current $V_{GS} = -20\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	-	-10	-100	nA
Drain-Source on-resistance $V_{GS} = -10\text{ V}$, $I_D = -2.3\text{ A}$	$R_{DS(on)}$	-	1.2	1.5	Ω

Electrical Characteristics, at $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Dynamic Characteristics

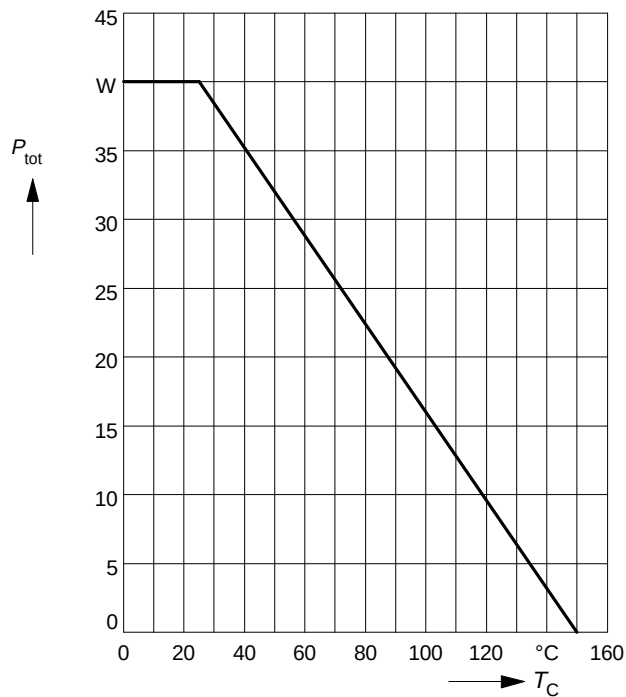
Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$, $I_D = -2.3 \text{ A}$	g_{fs}	1.1	2.2	-	S
Input capacitance $V_{GS} = 0 \text{ V}$, $V_{DS} = -25 \text{ V}$, $f = 1 \text{ MHz}$	C_{iss}	-	750	1150	pF
Output capacitance $V_{GS} = 0 \text{ V}$, $V_{DS} = -25 \text{ V}$, $f = 1 \text{ MHz}$	C_{oss}	-	125	190	
Reverse transfer capacitance $V_{GS} = 0 \text{ V}$, $V_{DS} = -25 \text{ V}$, $f = 1 \text{ MHz}$	C_{rss}	-	40	60	
Turn-on delay time $V_{DD} = -30 \text{ V}$, $V_{GS} = -10 \text{ V}$, $I_D = -2.6 \text{ A}$ $R_{GS} = 50 \Omega$	$t_{d(on)}$	-	20	30	ns
Rise time $V_{DD} = -30 \text{ V}$, $V_{GS} = -10 \text{ V}$, $I_D = -2.6 \text{ A}$ $R_{GS} = 50 \Omega$	t_r	-	60	95	
Turn-off delay time $V_{DD} = -30 \text{ V}$, $V_{GS} = -10 \text{ V}$, $I_D = -2.6 \text{ A}$ $R_{GS} = 50 \Omega$	$t_{d(off)}$	-	70	90	
Fall time $V_{DD} = -30 \text{ V}$, $V_{GS} = -10 \text{ V}$, $I_D = -2.6 \text{ A}$ $R_{GS} = 50 \Omega$	t_f	-	55	75	

Electrical Characteristics, at $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse Diode					
Inverse diode continuous forward current $T_C = 25\text{ }^{\circ}\text{C}$	I_S	-	-	-3.6	A
Inverse diode direct current,pulsed $T_C = 25\text{ }^{\circ}\text{C}$	I_{SM}	-	-	-14	
Inverse diode forward voltage $V_{GS} = 0\text{ V}$, $I_F = -7.2\text{ A}$	V_{SD}	-	-1	-1.3	V
Reverse recovery time $V_R = -30\text{ V}$, $I_F=I_S$, $di_F/dt = 100\text{ A}/\mu\text{s}$	t_{rr}	-	200	-	ns
Reverse recovery charge $V_R = -30\text{ V}$, $I_F=I_S$, $di_F/dt = 100\text{ A}/\mu\text{s}$	Q_{rr}	-	0.75	-	μC

Power dissipation

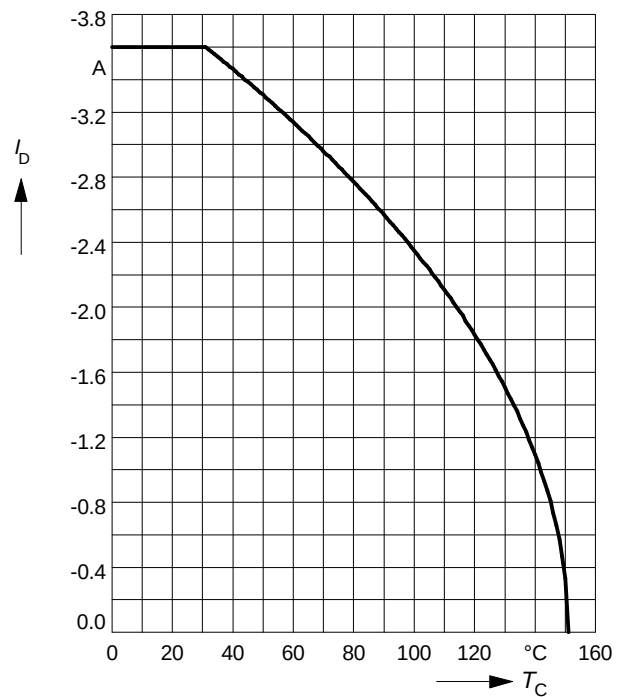
$$P_{\text{tot}} = f(T_C)$$



Drain current

$$I_D = f(T_C)$$

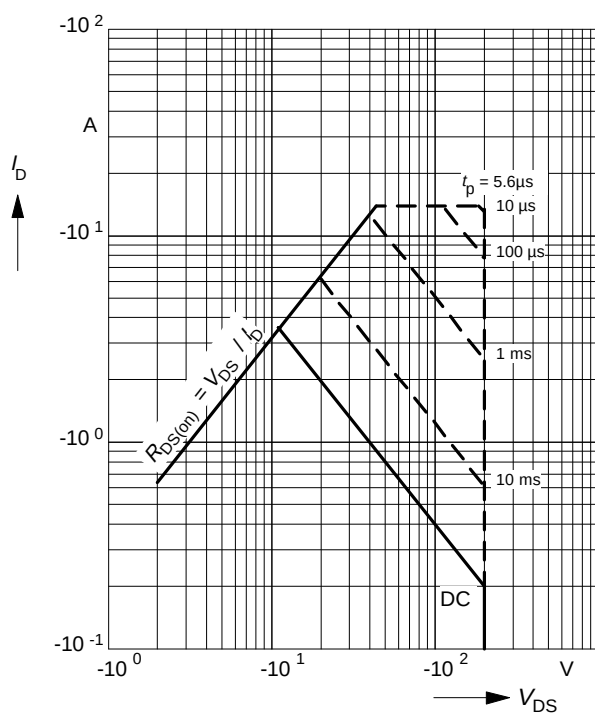
parameter: $V_{\text{GS}} \geq -10 \text{ V}$



Safe operating area

$$I_D = f(V_{\text{DS}})$$

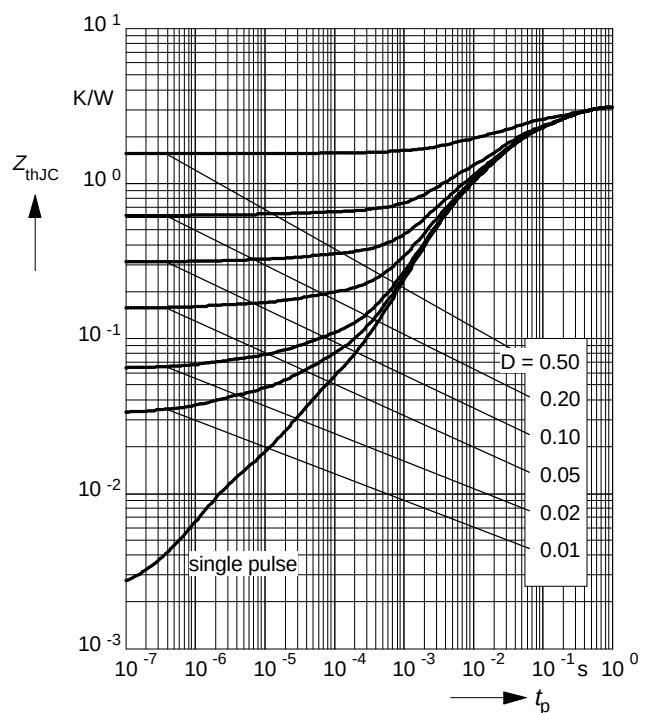
parameter: $D = 0.01$, $T_C = 25^\circ\text{C}$



Transient thermal impedance

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

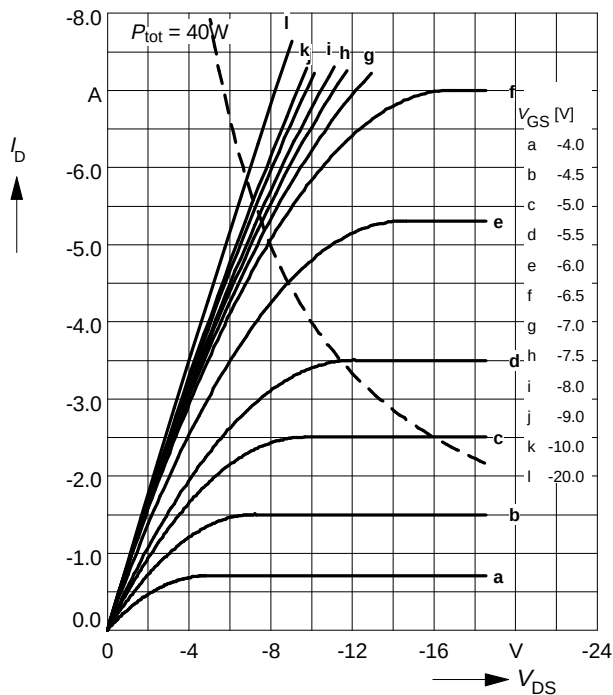
parameter: $D = t_p / T$



Typ. output characteristics

$$I_D = f(V_{DS})$$

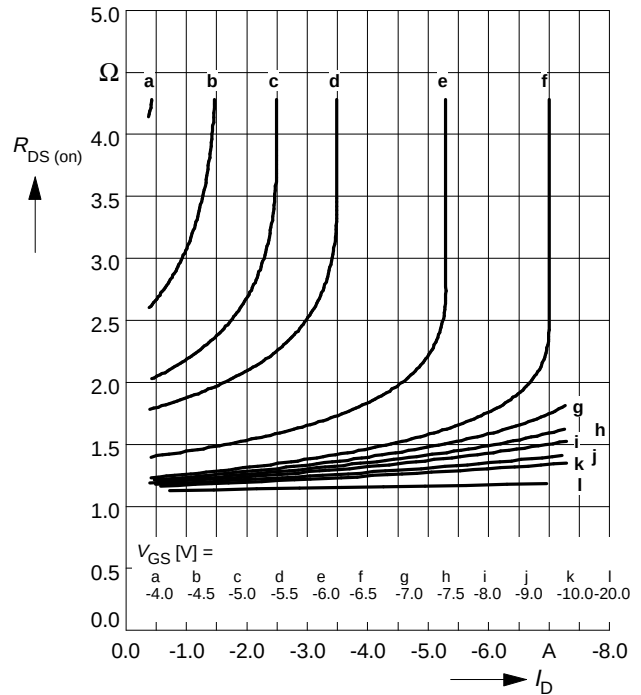
parameter: $t_p = 80 \mu s$



Typ. drain-source on-resistance

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

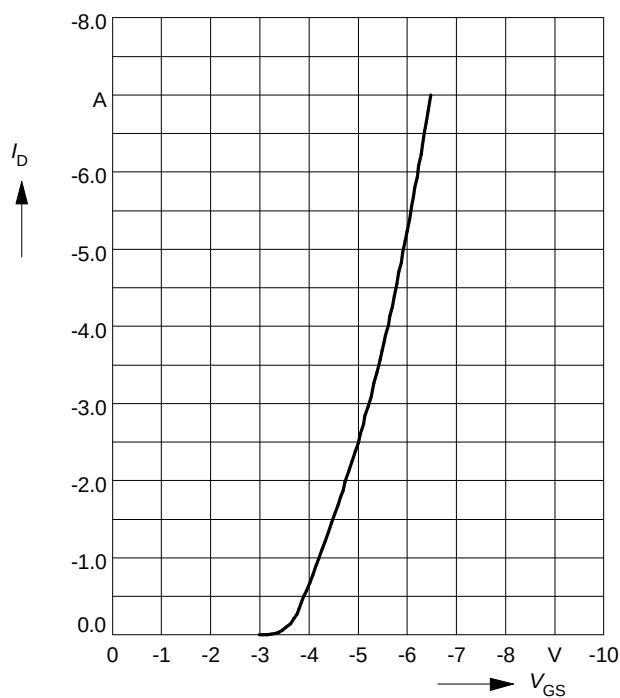
parameter: V_{GS}



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

parameter: $t_p = 80 \mu s$

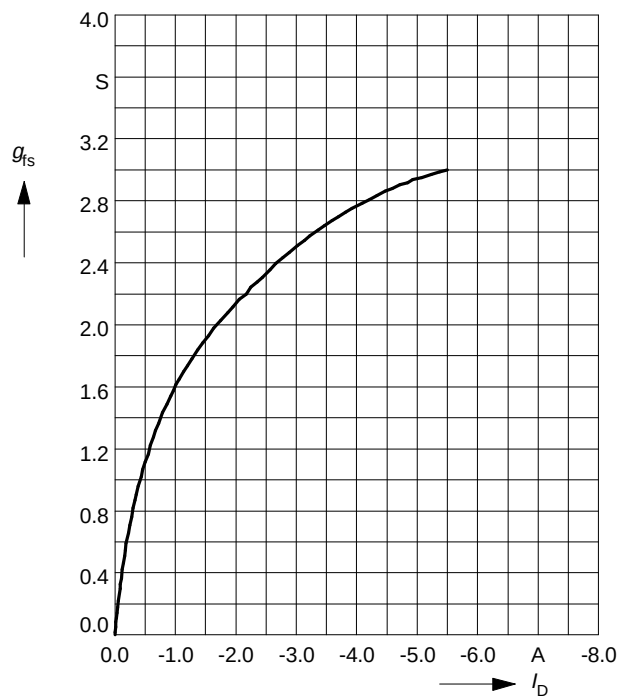
$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$



Typ. forward transconductance $g_{fs} = f(I_D)$

parameter: $t_p = 80 \mu s$,

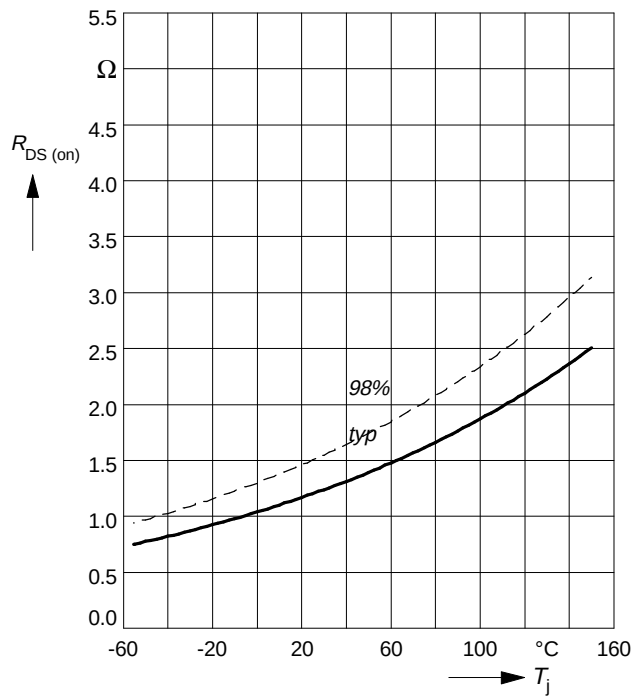
$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$



Drain-source on-resistance

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

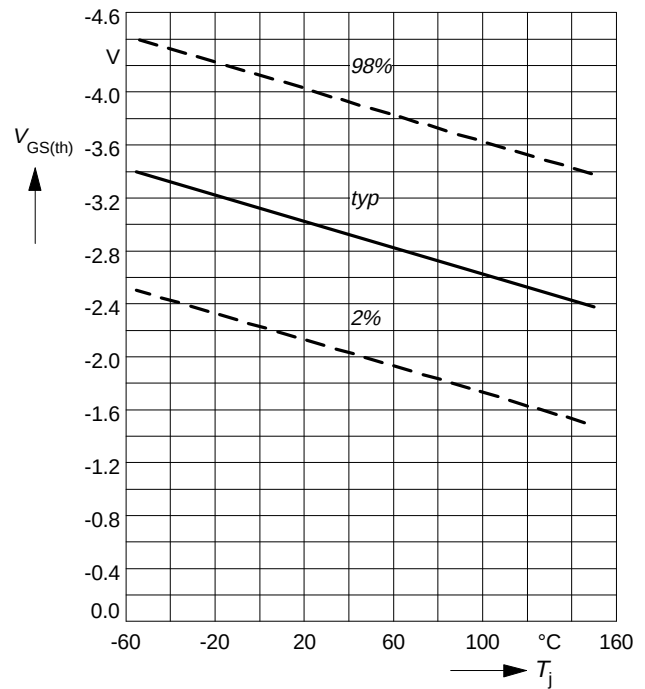
parameter: $I_D = -2.3 \text{ A}$, $V_{GS} = -10 \text{ V}$



Gate threshold voltage

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

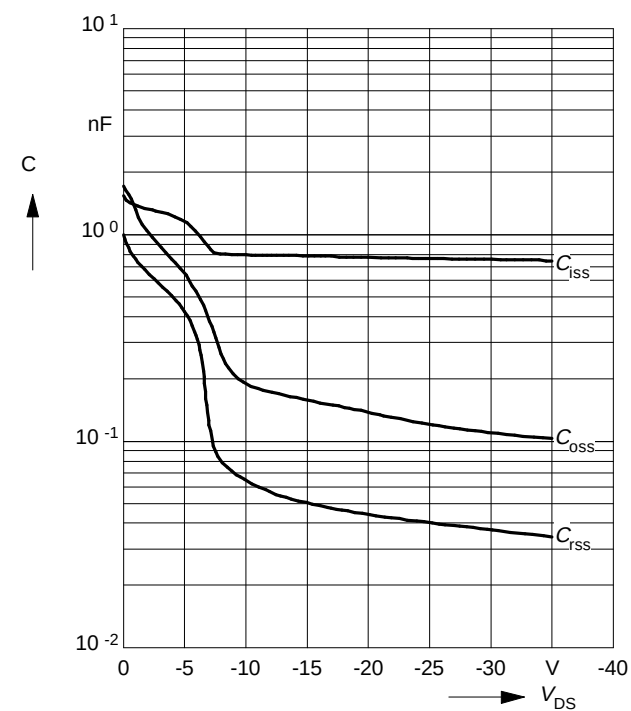
parameter: $V_{GS} = V_{DS}$, $I_D = 1 \text{ mA}$



Typ. capacitances

$$C = f(V_{DS})$$

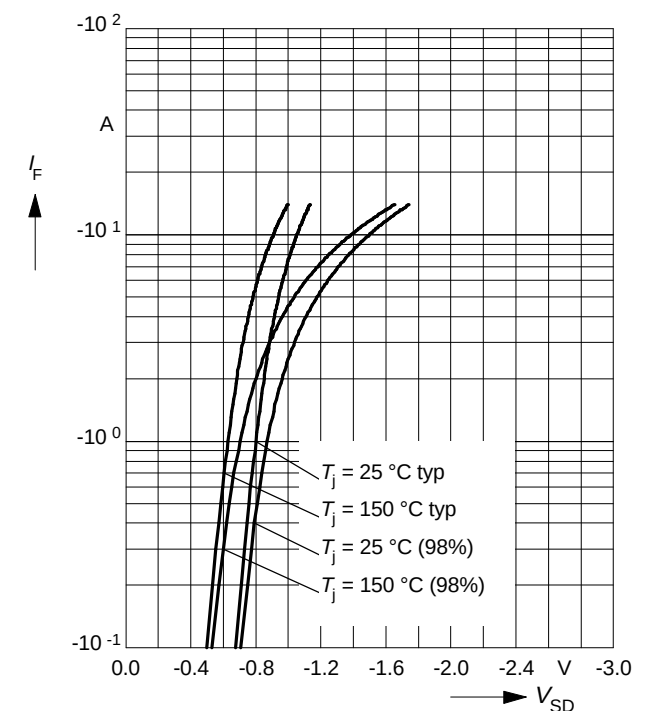
parameter: $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$



Forward characteristics of reverse diode

$$I_F = f(V_{SD})$$

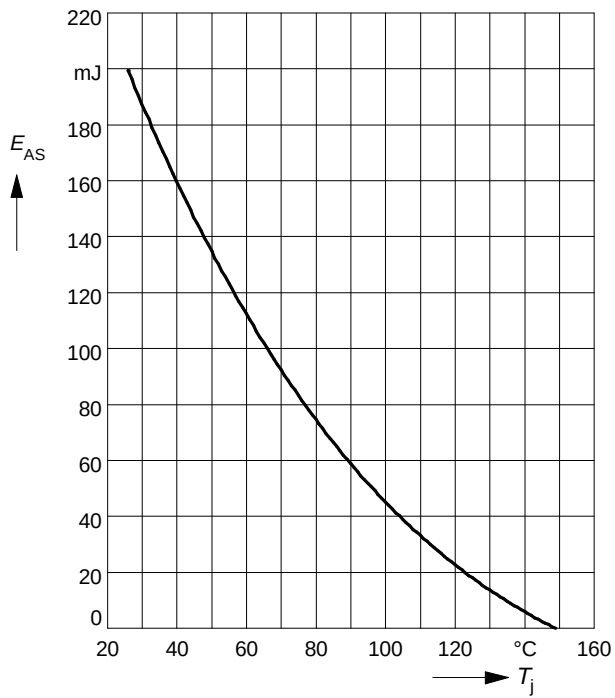
parameter: T_j , $t_p = 80 \mu\text{s}$



Avalanche energy $E_{AS} = f(T_j)$

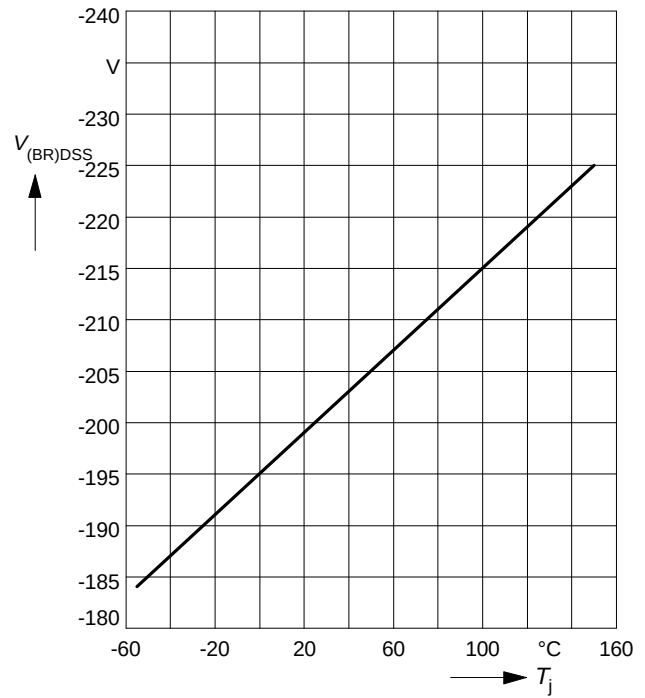
parameter: $I_D = -3.6$ A, $V_{DD} = -25$ V

$R_{GS} = 25$ Ω , $L = 23$ mH



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

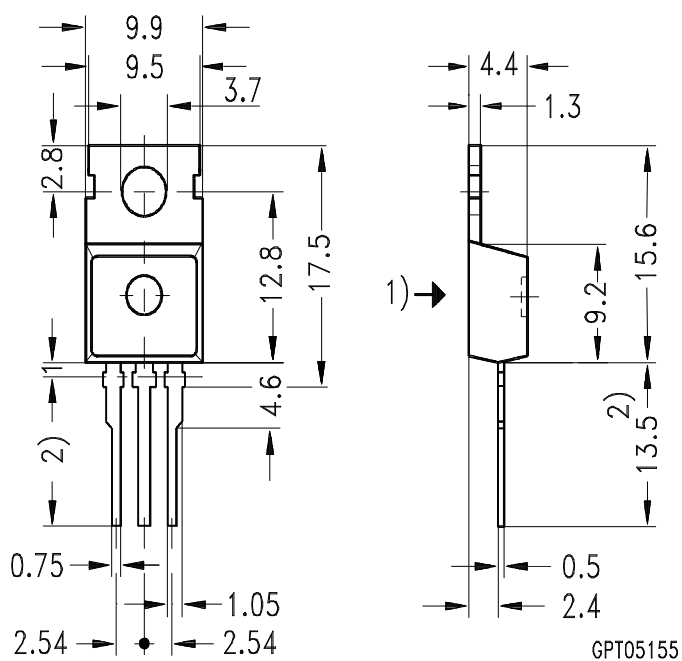
$V_{(BR)DSS} = f(T_j)$



Package Outlines

TO-220 AB

Dimension in mm



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