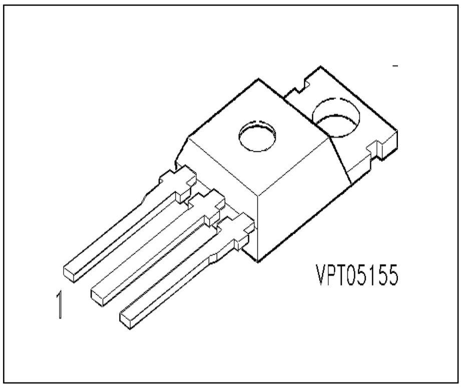
SIPMOS ® Power Transistor

- N channel
- Enhancement mode
- Avalanche-rated
- Logic Level
- d*v*/d*t* rated
- Low on-resistance
- 175 °C operating temperature
- also in TO-220 SMD available



Pin 1	Pin 2	Pin 3
G	D	S

Type	V_{DS}	I_D	$R_{DS(on)}$	Package	Ordering Code
BUZ 103AL	50 V	35 A	0.05 Ω	TO-220 AB	C67078-S1357-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current T_C = 29 °C	I_D	35	A
Pulsed drain current T_C = 25 °C	I_{Dpuls}	140	
Avalanche energy, single pulse I_D = 35 A, V_{DD} = 25 V, R_{GS} = 25 Ω L = 81 µH, T_j = 25 °C	E_{AS}	100	mJ
Reverse diode d*v*/d*t* I_S = 35 A, V_{DS} = 40 V, di_F/dt = 200 A/µs T_{jmax} = 175 °C	d*v*/d*t*	6	kV/µs
Gate source voltage	V_{GS}	± 14	V
Gate-source peak voltage,aperiodic	V_{gs}	± 20	
Power dissipation T_C = 25 °C	P_{tot}	120	W

Maximum Ratings

Parameter	Symbol	Values	Unit
Operating temperature	T_j	-55 ... + 175	°C
Storage temperature	T_{stg}	-55 ... + 175	
Thermal resistance, chip case	R_{thJC}	≤ 1.25	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 / 175 / 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 = -40 °C	$V_{(BR)DSS}$	50	-	-	V
Gate threshold voltage V_{GS}=$V_{DS,}$ I_D = 1 mA	$V_{GS(th)}$	1.2	1.6	2	
Zero gate voltage drain current	I_{DSS}				
V_{DS} = 50 V, V_{GS} = 0 V, T_j = 25 °C		-	0.1	1	µA
V_{DS} = 50 V, V_{GS} = 0 V, T_j = -40 °C		-	1	100	nA
V_{DS} = 50 V, V_{GS} = 0 V, T_j = 150 °C		-	10	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} = 5 V, I_D = 17.5 A	$R_{DS(on)}$	-	0.035	0.05	Ω

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

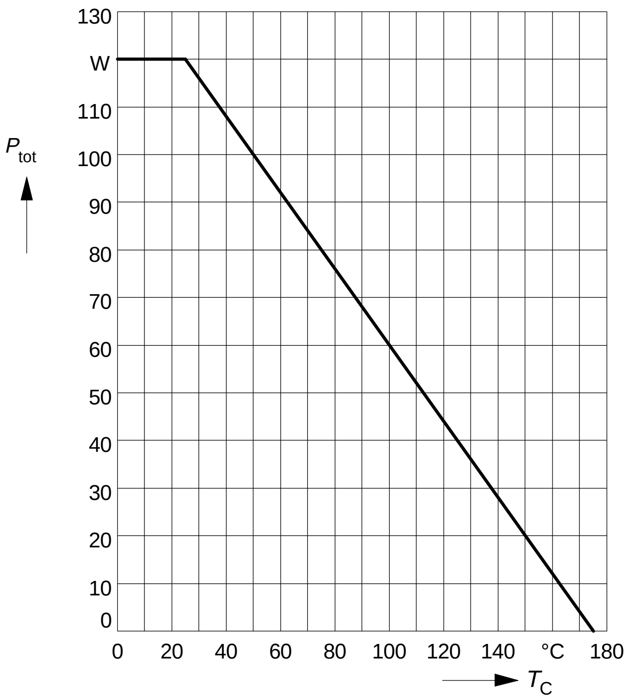
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$, I_D = 17.5 A	g_{fs}	10	22	-	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	-	1100	1500	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	-	330	500	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	-	140	210	
Turn-on delay time V_{DD} = 30 V, V_{GS} = 5 V, I_D = 3 A R_{GS} = 50 Ω	$t_{d(on)}$	-	35	55	ns
Rise time V_{DD} = 30 V, V_{GS} = 5 V, I_D = 3 A R_{GS} = 50 Ω	t_r	-	130	200	
Turn-off delay time V_{DD} = 30 V, V_{GS} = 5 V, I_D = 3 A R_{GS} = 50 Ω	$t_{d(off)}$	-	210	280	
Fall time V_{DD} = 30 V, V_{GS} = 5 V, I_D = 3 A R_{GS} = 50 Ω	t_f	-	120	160	

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	-	-	35	A
Inverse diode direct current,pulsed T_C = 25 °C	I_{SM}	-	-	140	
Inverse diode forward voltage V_{GS} = 0 V, I_F = 70 A	V_{SD}	-	1.2	1.8	V
Reverse recovery time V_R = 30 V, I_F=I_S, di_F/dt = 100 A/µs	t_{rr}	-	55	-	nS
Reverse recovery charge V_R = 30 V, I_F=I_S, di_F/dt = 100 A/µs	Q_{rr}	-	90	-	nC

Power dissipation

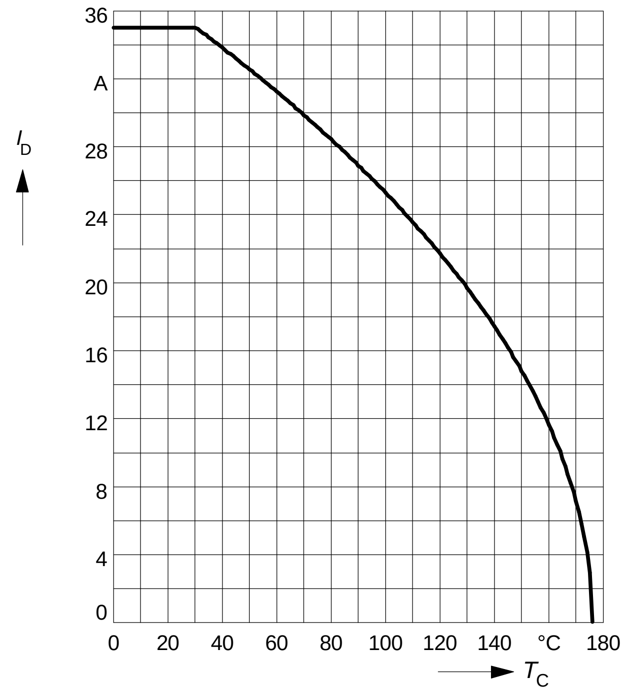
$P_{tot} = f(T_C)$



Drain current

$I_D = f(T_C)$

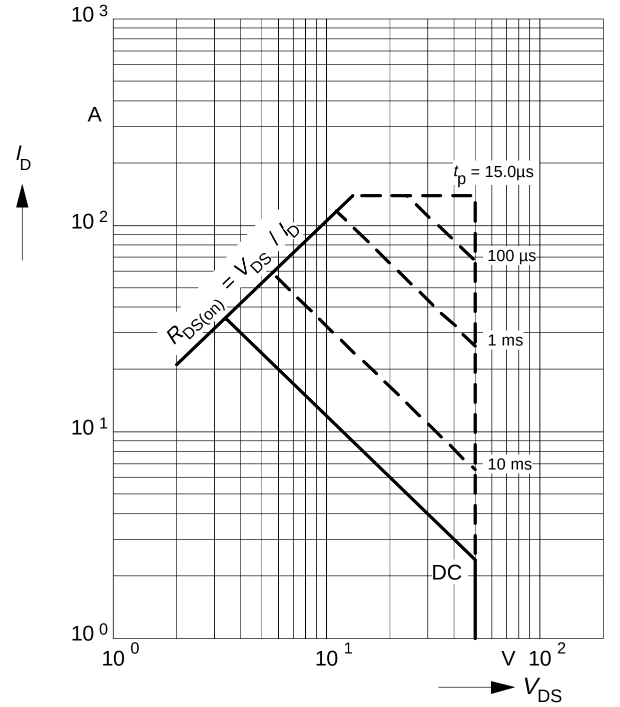
parameter: $V_{GS} \geq 5$ V



Safe operating area

$I_D = f(V_{DS})$

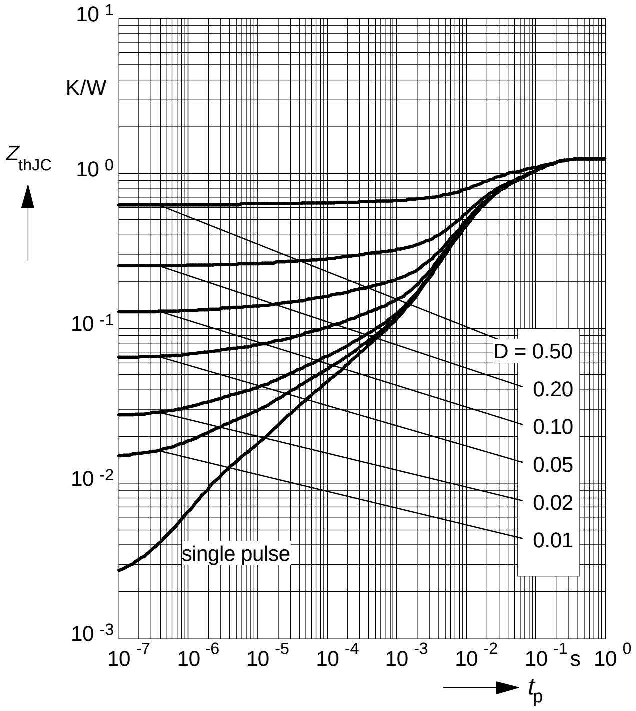
parameter: $D = 0.01$, $T_C = 25°C$



Transient thermal impedance

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

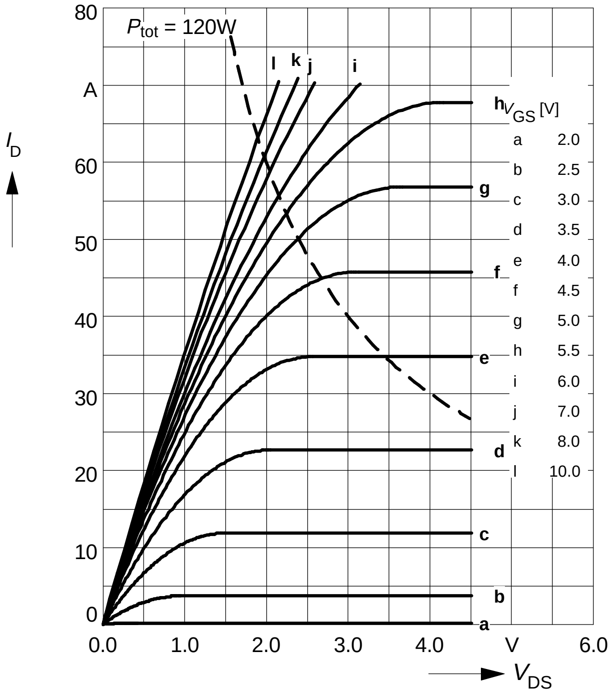
parameter: $D = t_p / T$



Typ. output characteristics

$I_D = f(V_{DS})$

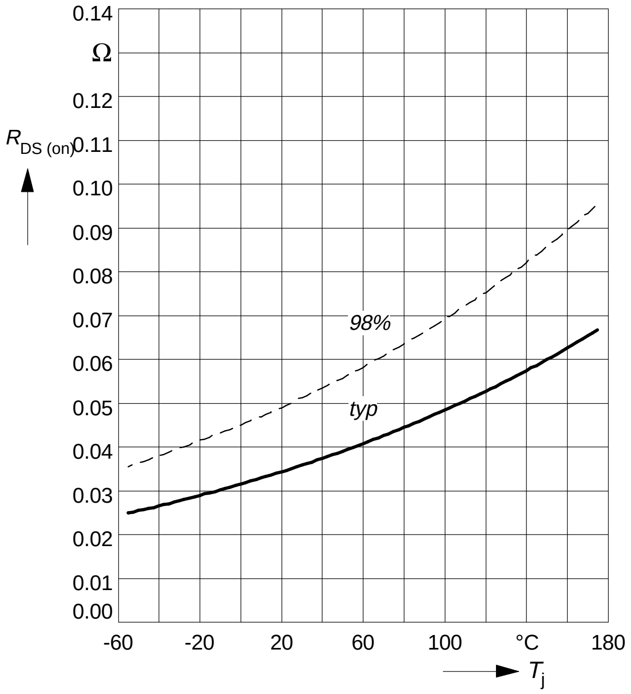
parameter: t_p = 80 µs



Drain-source on-resistance

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

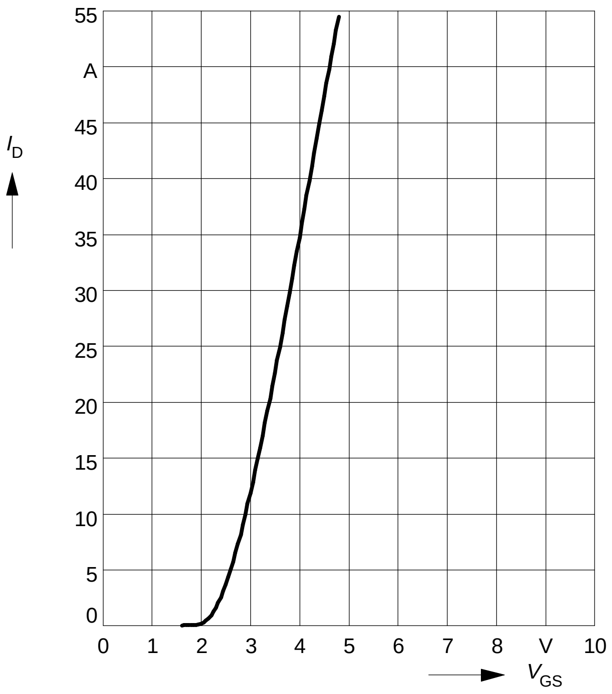
parameter: I_D = 17.5 A, V_{GS} = 5 V



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

parameter: t_p = 80 µs

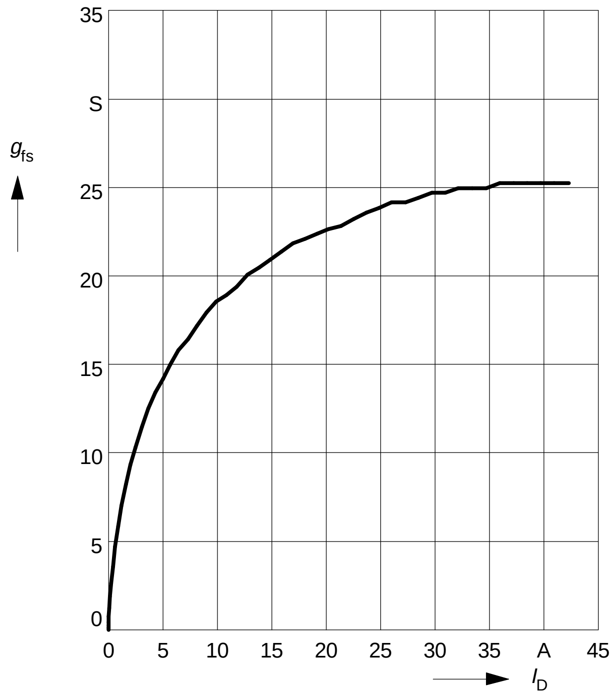
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



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

parameter: t_p = 80 µs,

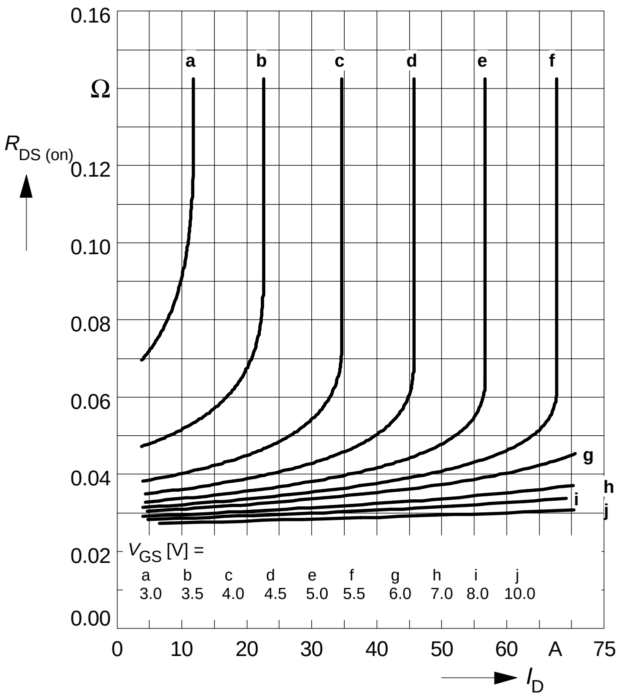
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



Typ. drain-source on-resistance

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

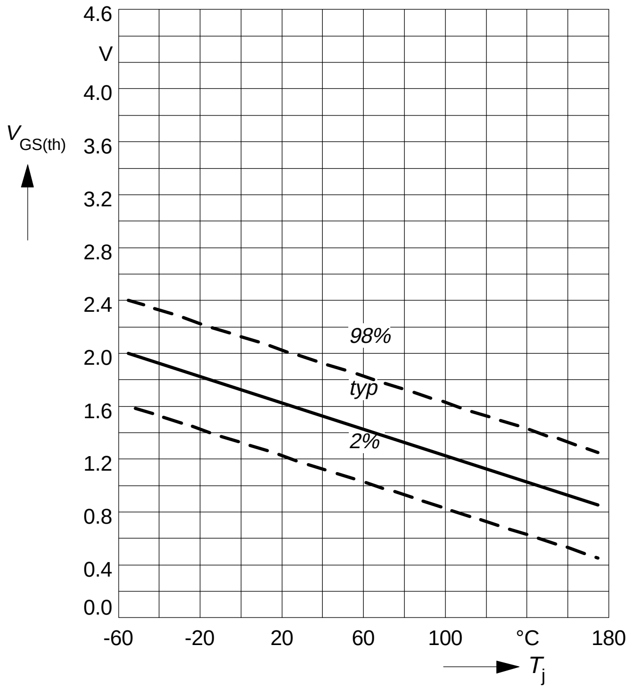
parameter: V_{GS}



Gate threshold voltage

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

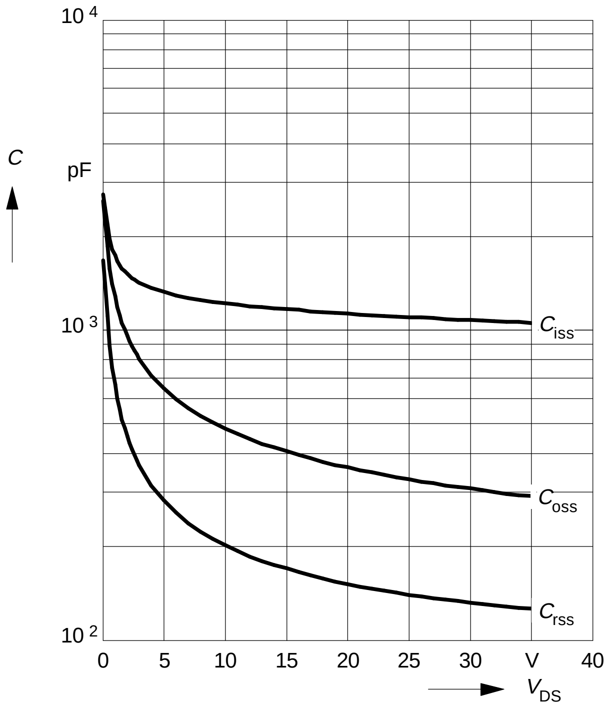
parameter: $V_{GS} = V_{DS}$, $I_D = 1$ mA



Typ. capacitances

$C = f(V_{DS})$

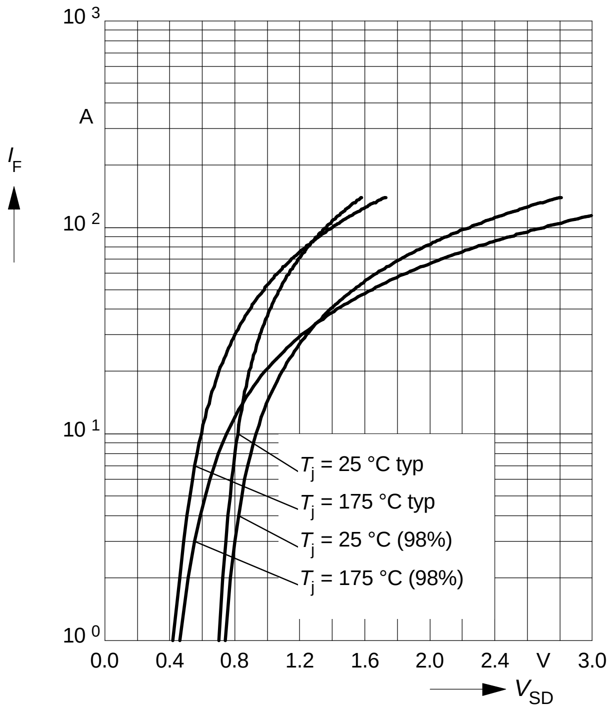
parameter: $V_{GS} = 0$V, $f = 1$MHz



Forward characteristics of reverse diode

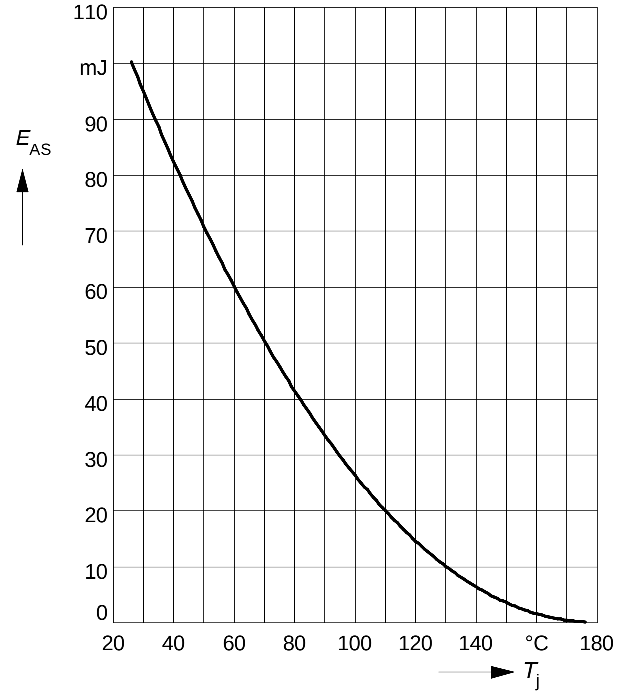
$I_F = f(V_{SD})$

parameter: T_j, $t_p = 80$ µs



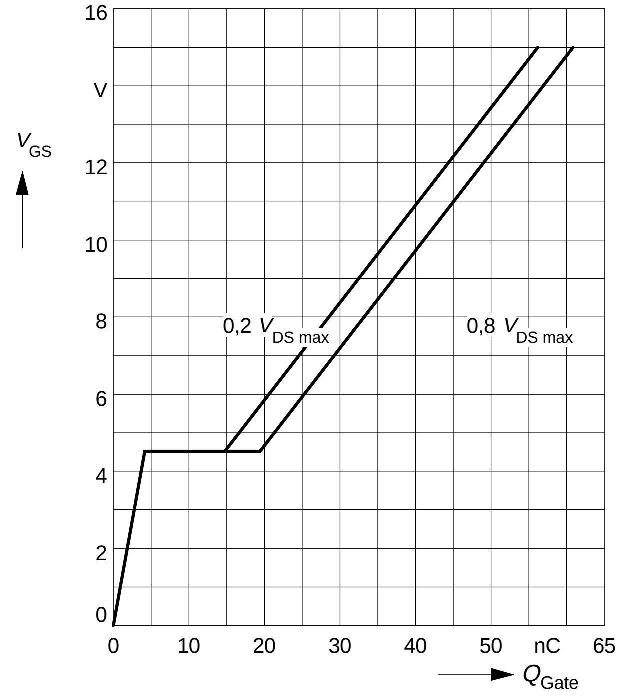
Avalanche energy $E_{AS} = f(T_j)$

parameter: I_D = 35 A, V_{DD} = 25 V
R_{GS} = 25 Ω, L = 81 µH



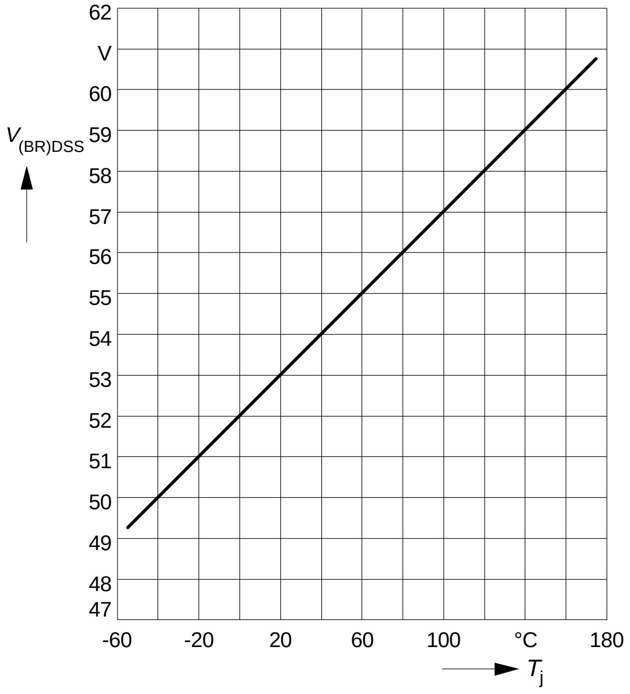
Typ. gate charge

$V_{GS} = f(Q_{Gate})$
parameter: $I_{D\ puls}$ = 52 A



Drain-source breakdown voltage

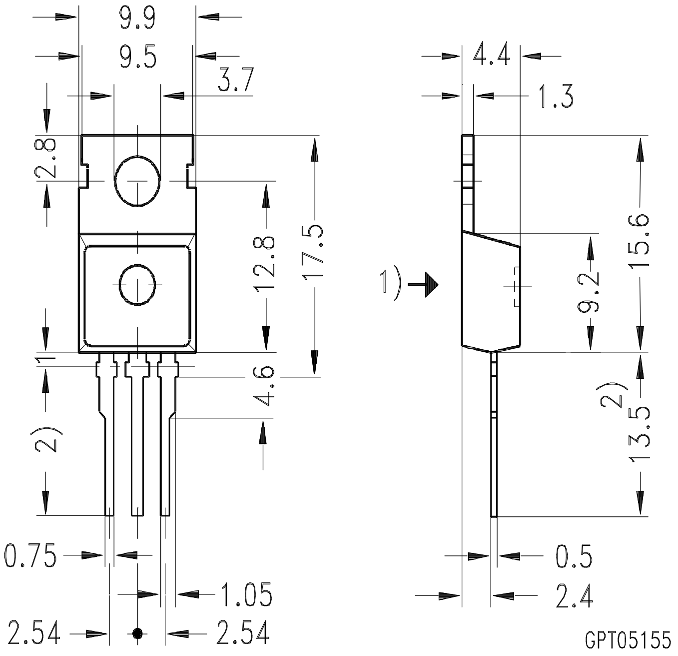
$V_{(BR)DSS} = f(T_j)$



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