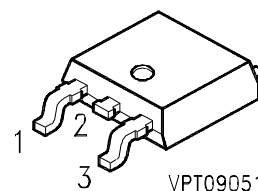
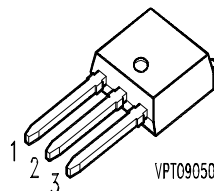


SIPMOS[®] Power Transistor

- N 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
SPD10N10	100 V	10 A	0.2 Ω	P-TO252	C67078-S... - ..
SPU10N10	100 V	10 A	0.2 Ω	P-TO251	C67078-S... - ..

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current $T_C = 25\text{ }^\circ\text{C}$	I_D	10	A
Pulsed drain current $T_C = 25\text{ }^\circ\text{C}$	I_{Dpuls}	40	
Avalanche energy, single pulse $I_D = 10\text{ A}$, $V_{DD} = 25\text{ V}$, $R_{GS} = 25\text{ }\Omega$ $L = 1.18\text{ mH}$, $T_j = 25\text{ }^\circ\text{C}$	E_{AS}	59	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, junction - case	R_{thJC}	≤ 3.1	K/W
Thermal resistance, junction - ambient (PCB mount)**	R_{thJA}	≤ 50	
Thermal resistance, junction - ambient	R_{thJA}	≤ 100	
IEC climatic category, DIN IEC 68-1		55 / 150 / 56	

** when mounted on 1 " square PCB (FR4);for recommended footprint

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 $V_{GS} = 0\text{ V}$, $I_D = 0.25\text{ mA}$, $T_j = 25^\circ\text{C}$	$V_{(BR)DSS}$	100	-	-	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 $V_{DS} = 100\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 25^\circ\text{C}$ $V_{DS} = 100\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 125^\circ\text{C}$	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	
Drain-Source on-resistance $V_{GS} = 10\text{ V}$, $I_D = 6\text{ A}$	$R_{DS(on)}$	-	0.15	0.2	Ω

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

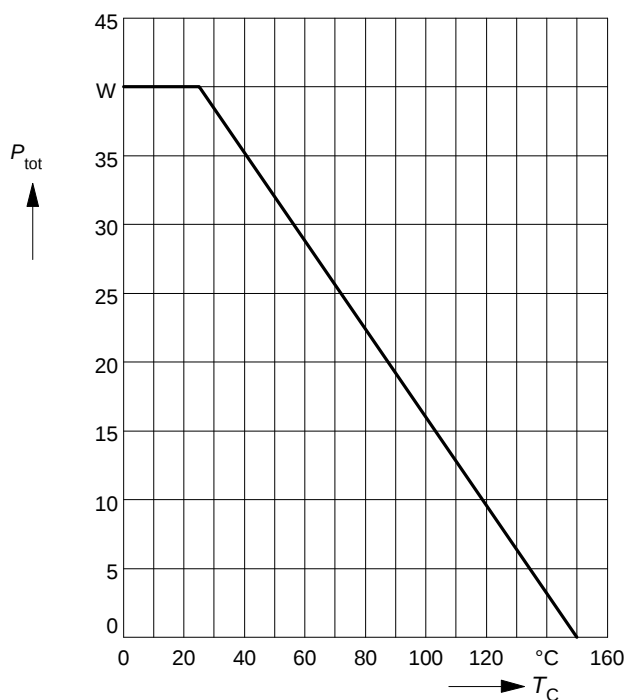
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}, I_D = 6 \text{ A}$	g_{fs}	3	4.3	-	S
Input capacitance $V_{GS} = 0 \text{ V}, V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}$	C_{iss}	-	400	530	pF
Output capacitance $V_{GS} = 0 \text{ V}, V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}$	C_{oss}	-	120	180	
Reverse transfer capacitance $V_{GS} = 0 \text{ V}, V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}$	C_{rss}	-	70	105	
Turn-on delay time $V_{DD} = 30 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 3 \text{ A}$ $R_G = 50 \Omega$	$t_{d(on)}$	-	10	15	ns
Rise time $V_{DD} = 30 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 3 \text{ A}$ $R_G = 50 \Omega$	t_r	-	45	70	
Turn-off delay time $V_{DD} = 30 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 3 \text{ A}$ $R_G = 50 \Omega$	$t_{d(off)}$	-	55	75	
Fall time $V_{DD} = 30 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 3 \text{ A}$ $R_G = 50 \Omega$	t_f	-	40	55	

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	-	-	10	A
Inverse diode direct current,pulsed $T_C = 25\text{ }^{\circ}\text{C}$	I_{SM}	-	-	40	
Inverse diode forward voltage $V_{GS} = 0\text{ V}, I_F = 20\text{ A}$	V_{SD}	-	1.4	1.6	V
Reverse recovery time $V_R = 30\text{ V}, I_F=I_S, di_F/dt = 100\text{ A}/\mu\text{s}$	t_{rr}	-	170	-	ns
Reverse recovery charge $V_R = 30\text{ V}, I_F=I_S, di_F/dt = 100\text{ A}/\mu\text{s}$	Q_{rr}	-	0.3	-	μC

Power dissipation

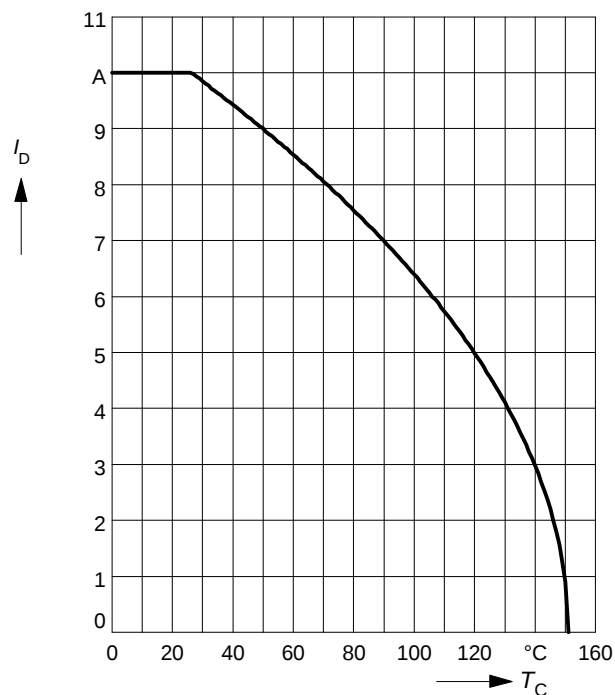
$$P_{\text{tot}} = f(T_C)$$



Drain current

$$I_D = f(T_C)$$

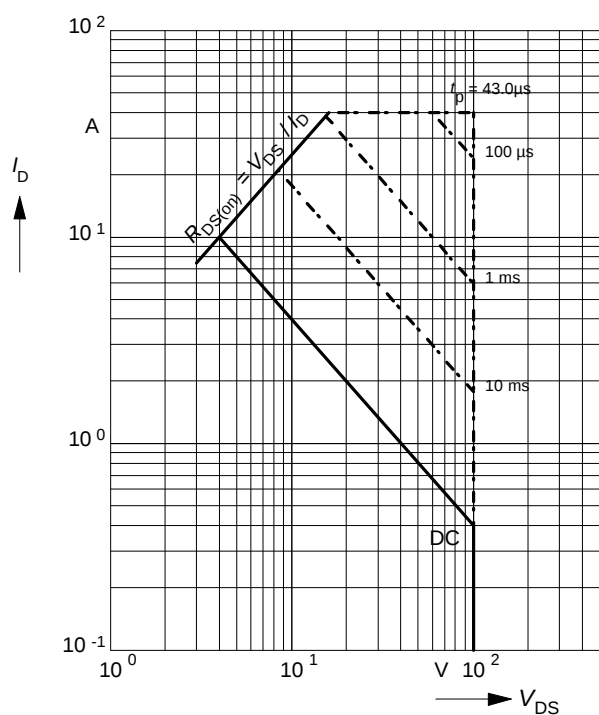
parameter: $V_{GS} \geq 10$ V



Safe operating area

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

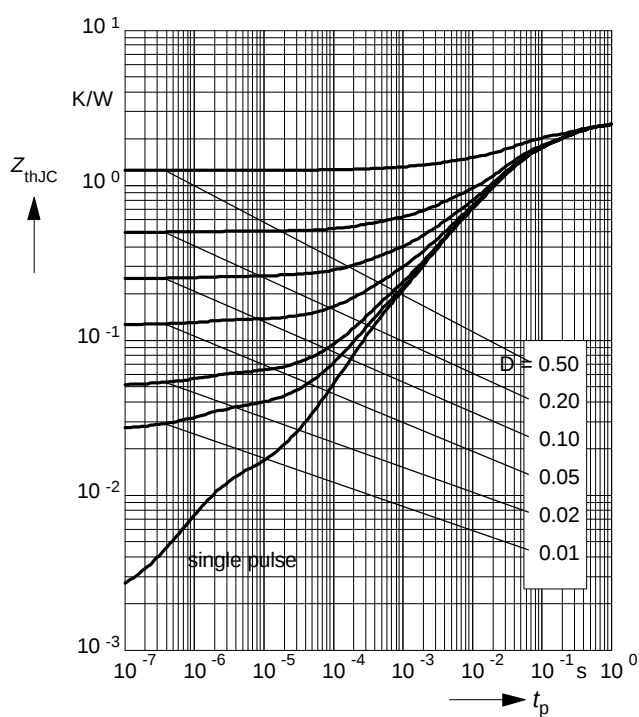
parameter: $D = 0.01$, $T_C = 25^\circ\text{C}$



Transient thermal impedance

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

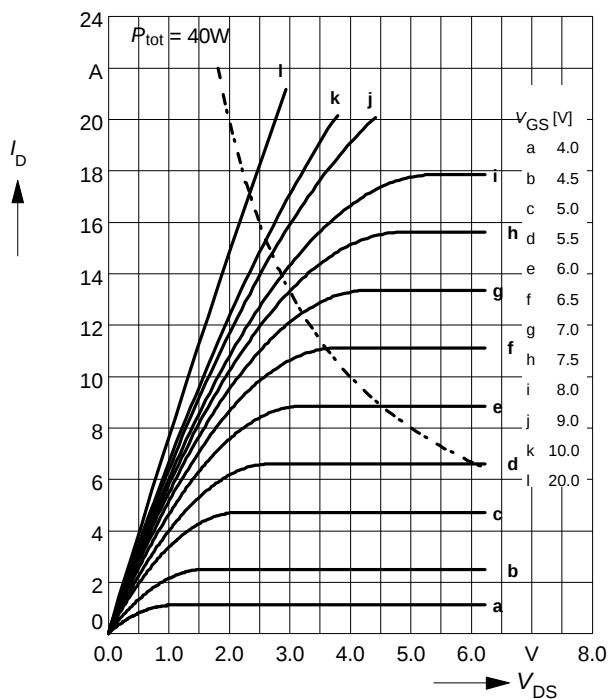
parameter: $D = t_p / T$



Typ. output characteristics

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

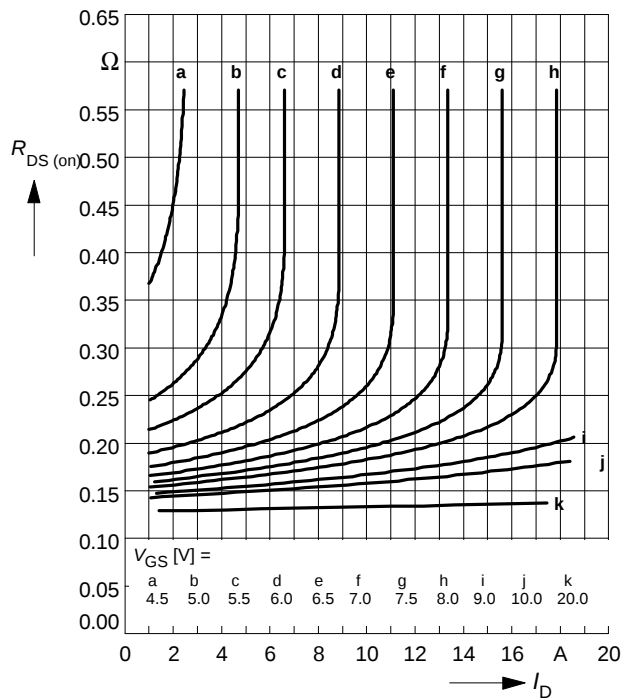
parameter: $t_p = 80 \mu s$, $T_j = 25^\circ C$



Typ. drain-source on-resistance

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

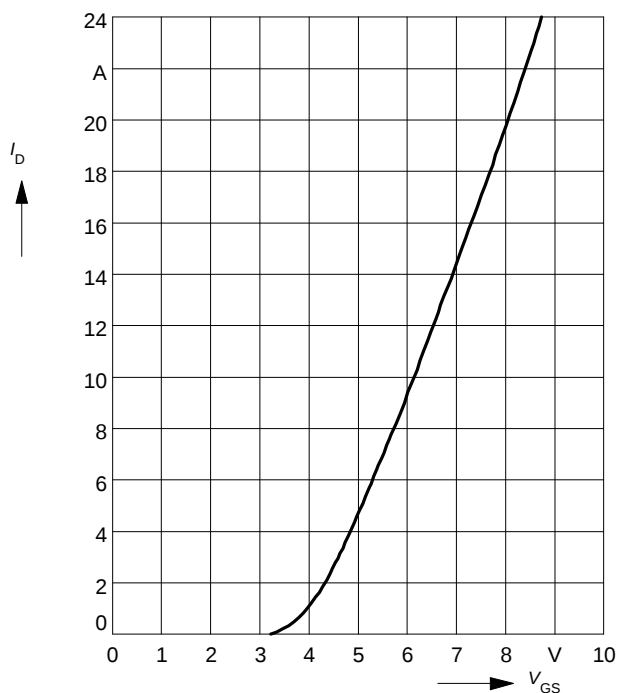
parameter: $t_p = 80 \mu s$, $T_j = 25^\circ C$



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

parameter: $t_p = 80 \mu s$

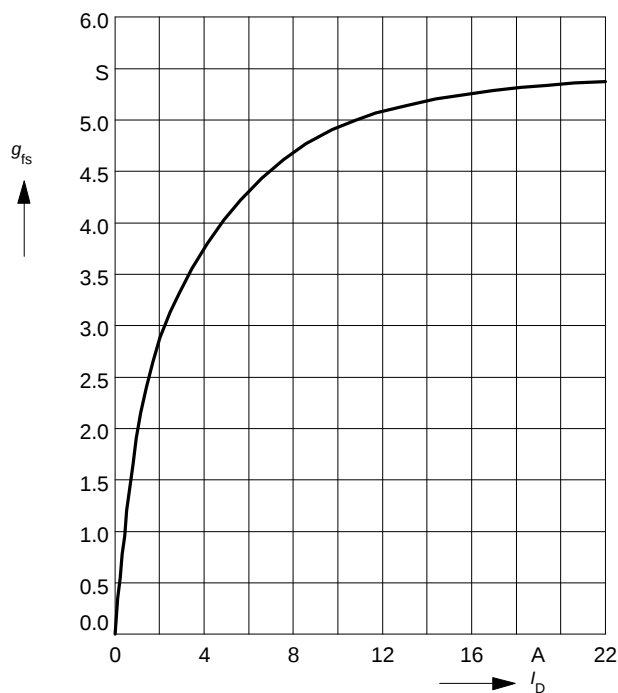
$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$



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

parameter: $t_p = 80 \mu s$,

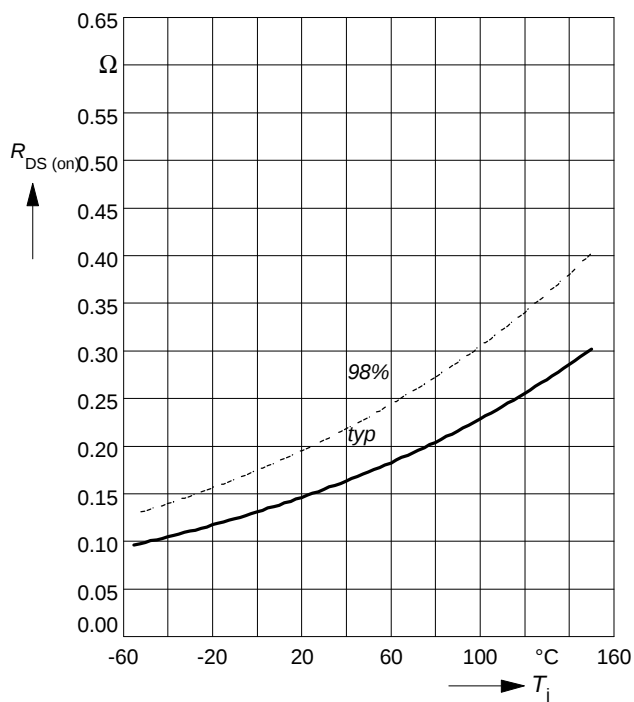
$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$



Drain-source on-resistance

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

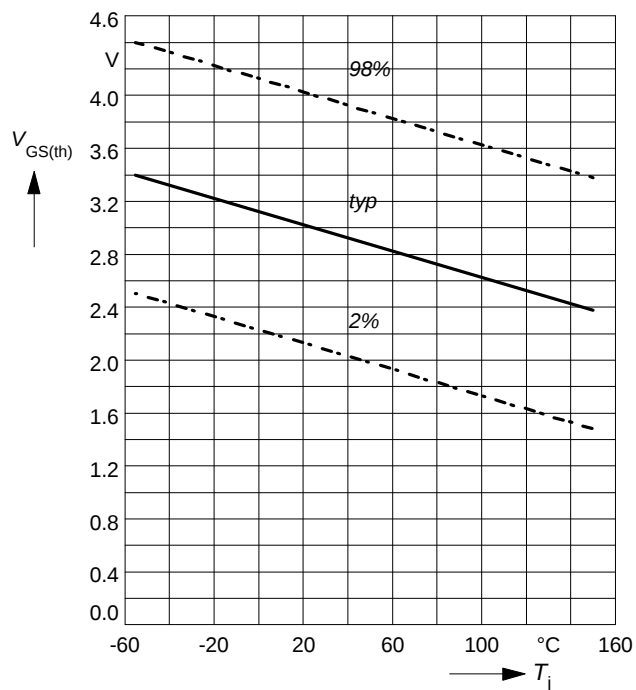
parameter: $I_D = 6\text{ A}$, $V_{GS} = 10\text{ V}$



Gate threshold voltage

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

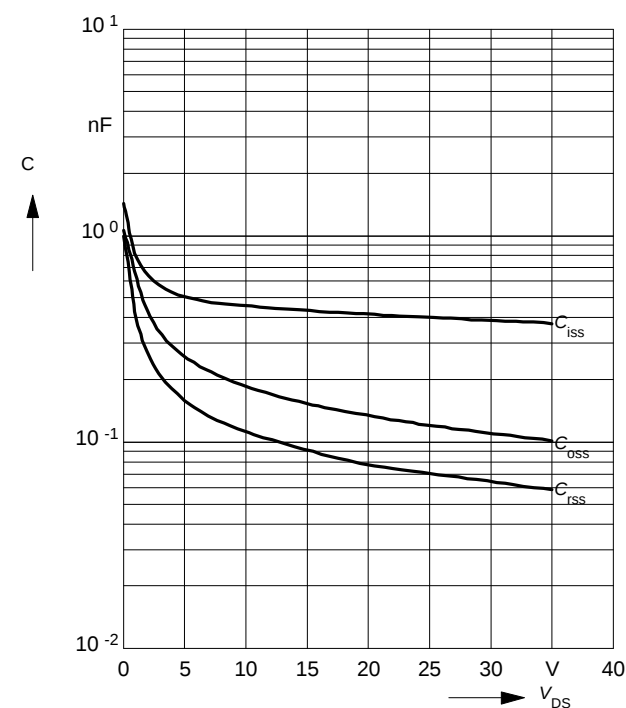
parameter: $V_{GS} = V_{DS}$, $I_D = 1\text{ mA}$



Typ. capacitances

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

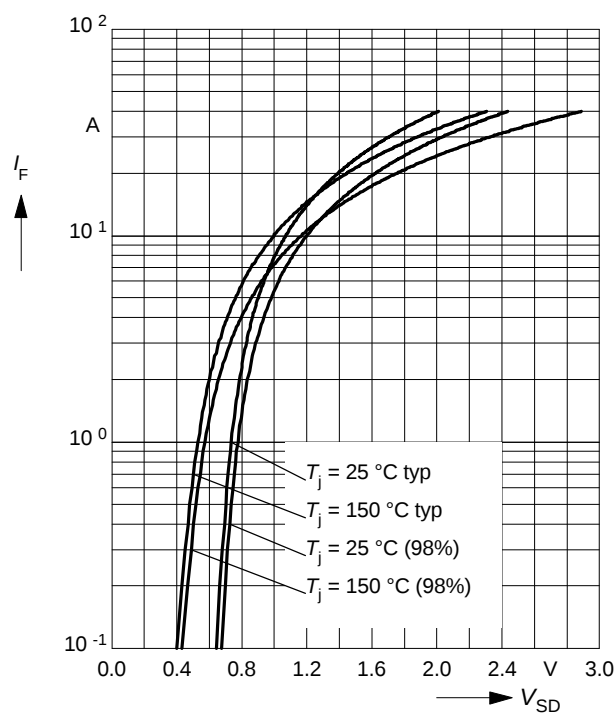
parameter: $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$



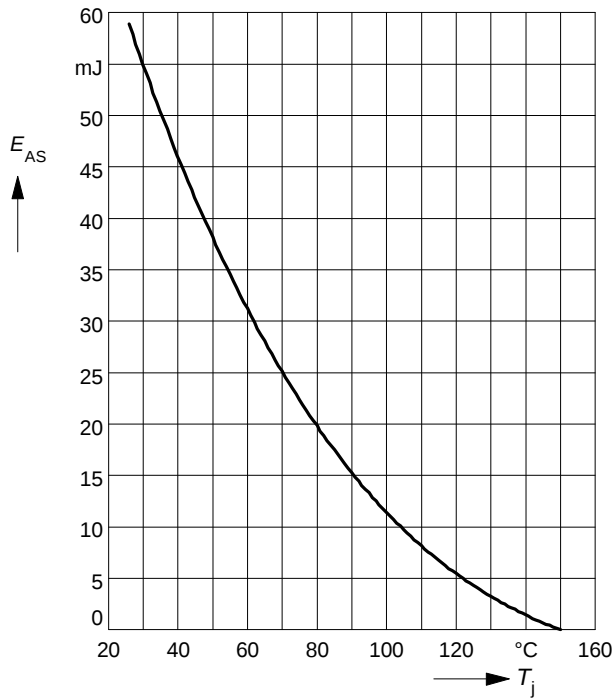
Forward characteristics of reverse diode

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

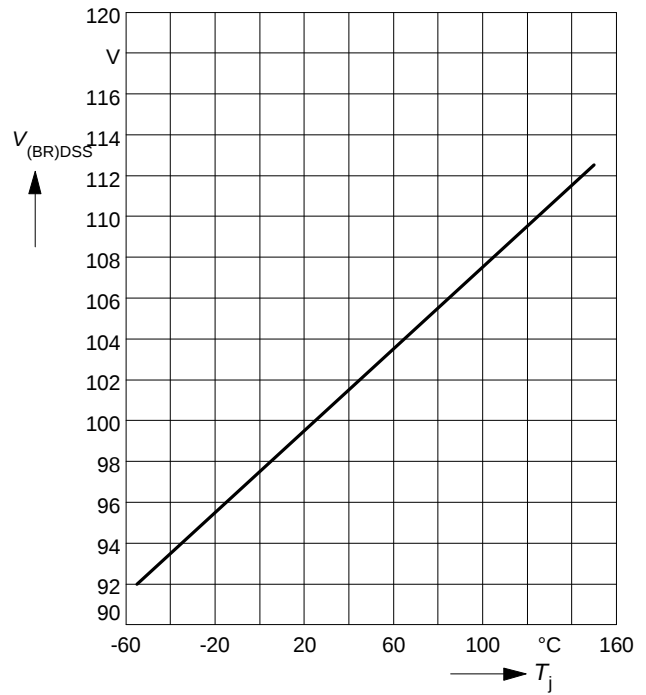
parameter: T_j , $t_p = 80\text{ }\mu\text{s}$



Avalanche energy $E_{AS} = f(T_j)$
 parameter: $I_D = 10\text{ A}$, $V_{DD} = 25\text{ V}$
 $R_{GS} = 25\ \Omega$, $L = 1.18\text{ mH}$



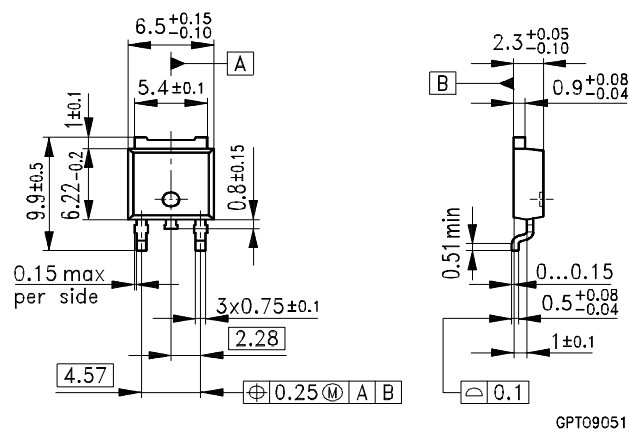
Drain-source breakdown voltage
 $V_{(BR)DSS} = f(T_j)$



Package Outlines

P-TO252

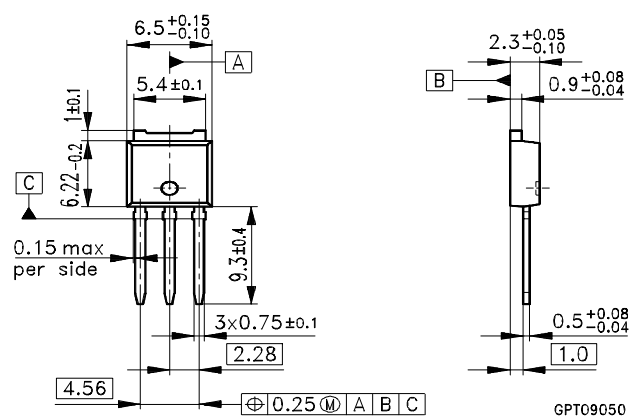
Dimension in mm



All metal surfaces tin plated, except area of cut.

P-TO251

Dimension in mm



All metal surfaces tin plated, except area of cut.