

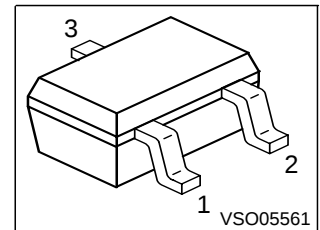
SIPMOS® Small-Signal-Transistor

Features

- P-Channel
- Enhancement mode
- Avalanche rated
- Logic Level
- dv/dt rated
- Pb-free lead plating; RoHS compliant
- Qualified according to AEC Q101
- Halogen-free according to IEC61249-2-21

Product Summary

Drain source voltage	V_{DS}	-60	V
Drain-source on-state resistance	$R_{DS(on)}$	8	Ω
Continuous drain current	I_D	-0.15	A



Type	Package	Tape and Reel	Marking	Pin 1	PIN 2	PIN 3
BSS84PW	PG-SOT-323	H6327:3000pcs/r.	YBs	G	S	D

Maximum Ratings, at $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Value	Unit
Continuous drain current $T_A = 25\text{ °C}$	I_D	-0.15	A
Pulsed drain current $T_A = 25\text{ °C}$	$I_{D\text{ puls}}$	-0.6	
Avalanche energy, single pulse $I_D = -0.15\text{ A}$, $V_{DD} = -25\text{ V}$, $R_{GS} = 25\text{ }\Omega$	E_{AS}	2.61	mJ
Avalanche energy, periodic limited by T_{jmax}	E_{AR}	0.03	
Reverse diode dv/dt $I_S = -0.15\text{ A}$, $V_{DS} = -48\text{ V}$, $di/dt = 200\text{ A}/\mu\text{s}$, $T_{jmax} = 150\text{ °C}$	dv/dt	6	kV/ μs
Gate source voltage	V_{GS}	± 20	V
Power dissipation $T_A = 25\text{ °C}$	P_{tot}	0.3	W
Operating and storage temperature	T_j , T_{stg}	-55...+150	°C
IEC climatic category; DIN IEC 68-1		55/150/56	
ESD Class JESF22-A114-HBM		Class 0	

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Thermal resistance, junction - soldering point (Pin 3)	R_{thJS}	-	-	110	K/W
SMD version, device on PCB:	R_{thJA}				
@ min. footprint		-	-	420	
@ 6 cm ² cooling area ¹⁾		-	-	350	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain-source breakdown voltage $V_{GS} = 0\text{ V}$, $I_D = -250\text{ }\mu\text{A}$	$V_{(BR)DSS}$	-60	-	-	V
Gate threshold voltage, $V_{GS} = V_{DS}$ $I_D = -20\text{ }\mu\text{A}$	$V_{GS(th)}$	-1	-1.5	-2	
Zero gate voltage drain current $V_{DS} = -60\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 25\text{ }^{\circ}\text{C}$ $V_{DS} = -60\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 125\text{ }^{\circ}\text{C}$	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-state resistance $V_{GS} = -2.7\text{ V}$, $I_D = -0.01\text{ A}$	$R_{DS(on)}$	-	10.5	25	Ω
Drain-source on-state resistance $V_{GS} = -4.5\text{ V}$, $I_D = -0.12\text{ A}$	$R_{DS(on)}$	-	6.9	12	
Drain-source on-state resistance $V_{GS} = -10\text{ V}$, $I_D = -0.15\text{ A}$	$R_{DS(on)}$	-	4.6	8	

¹⁾Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical without blown air.

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

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic Characteristics

Transconductance	g_{fs}	$V_{DS} \leq 2 \cdot I_D \cdot R_{DS(on)max}$, $I_D = 0.15\text{A}$	0.08	0.16	-	S
Input capacitance	C_{iss}	$V_{GS} = 0\text{V}$, $V_{DS} = -25\text{V}$, $f = 1\text{MHz}$	-	15.3	19.1	pF
Output capacitance	C_{oss}		-	5.8	7.3	
Reverse transfer capacitance	C_{rss}		-	3	3.8	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -30\text{V}$, $V_{GS} = -4.5\text{V}$, $I_D = -0.12\text{A}$, $R_G = 25\Omega$	-	6.7	10	ns
Rise time	t_r		-	16.2	24.3	
Turn-off delay time	$t_{d(off)}$		-	8.6	12.9	
Fall time	t_f		-	20.5	30.8	

Gate Charge Characteristics

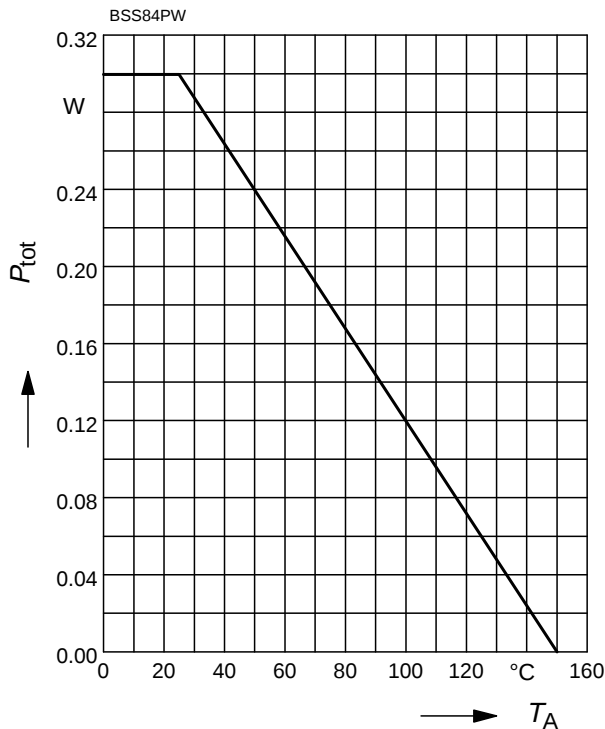
Gate to source charge	Q_{gs}	$V_{DD} = -48\text{V}$, $I_D = -0.15\text{A}$	-	0.25	0.38	nC
Gate to drain charge	Q_{gd}		-	0.3	0.45	
Gate charge total	Q_g	$V_{DD} = -48\text{V}$, $I_D = -0.15\text{A}$, $V_{GS} = 0$ to -10V	-	1	1.5	
Gate plateau voltage	$V(\text{plateau})$	$V_{DD} = -48\text{V}$, $I_D = -0.15\text{A}$	-	-3.4	-	V

Reverse Diode

Inverse diode continuous forward current	I_S	$T_A = 25^{\circ}\text{C}$	-	-	-0.15	A
Inverse diode direct current, pulsed	I_{SM}		-	-	-0.6	
Inverse diode forward voltage	V_{SD}	$V_{GS} = 0\text{V}$, $I_F = -0.15\text{A}$	-	-0.84	-1.12	V
Reverse recovery time	t_{rr}	$V_R = -30\text{V}$, $I_F = I_S$, $di_F/dt = 100\text{A}/\mu\text{s}$	-	23.6	35.4	ns
Reverse recovery charge	Q_{rr}		-	11.6	17.4	

Power Dissipation

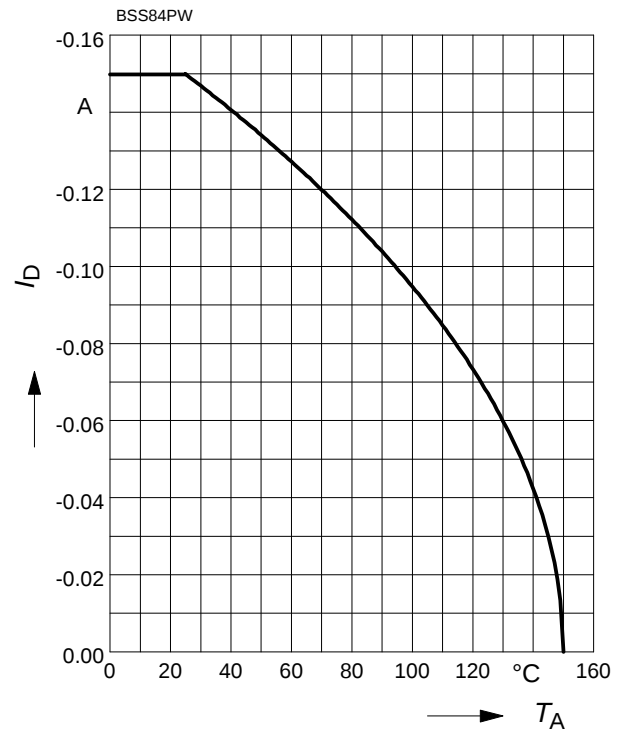
$$P_{\text{tot}} = f(T_A)$$



Drain current

$$I_D = f(T_A)$$

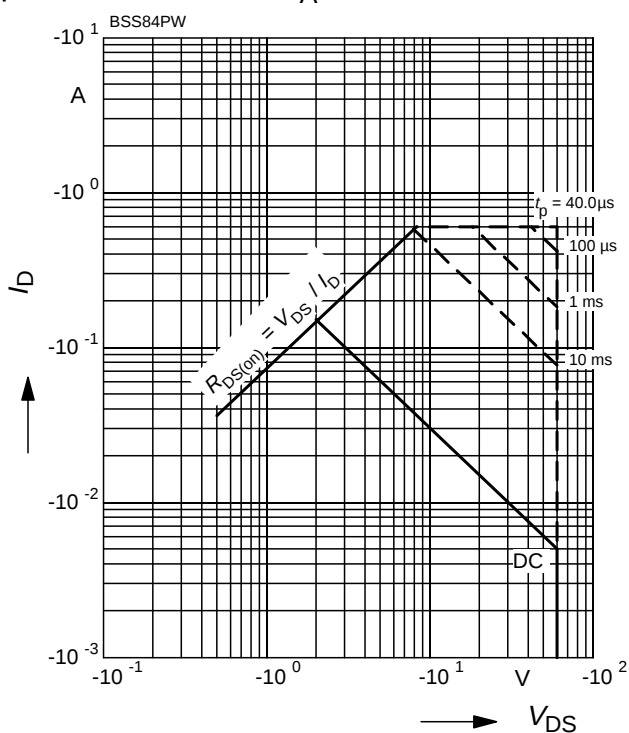
parameter: $V_{\text{GS}} \geq 10 \text{ V}$



Safe operating area

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

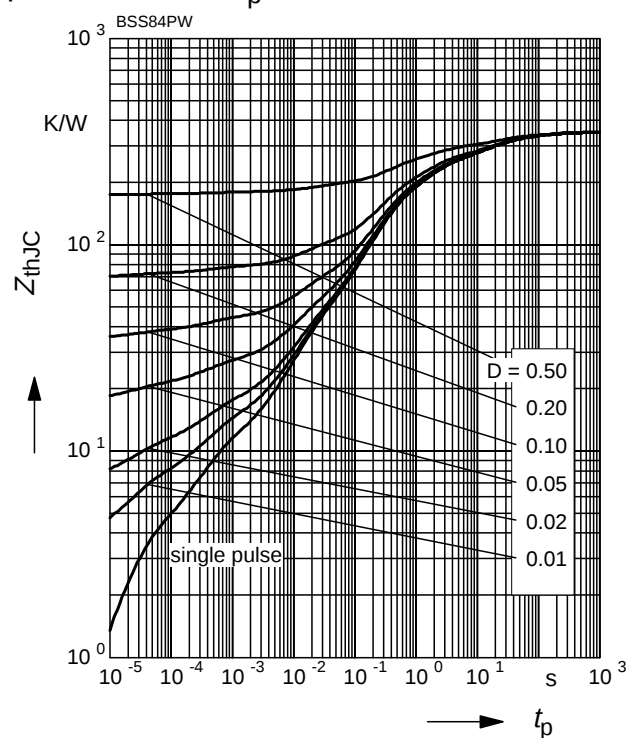
parameter: $D = 0$, $T_A = 25^{\circ}\text{C}$



Transient thermal impedance

$$Z_{\text{thJA}} = f(t_p)$$

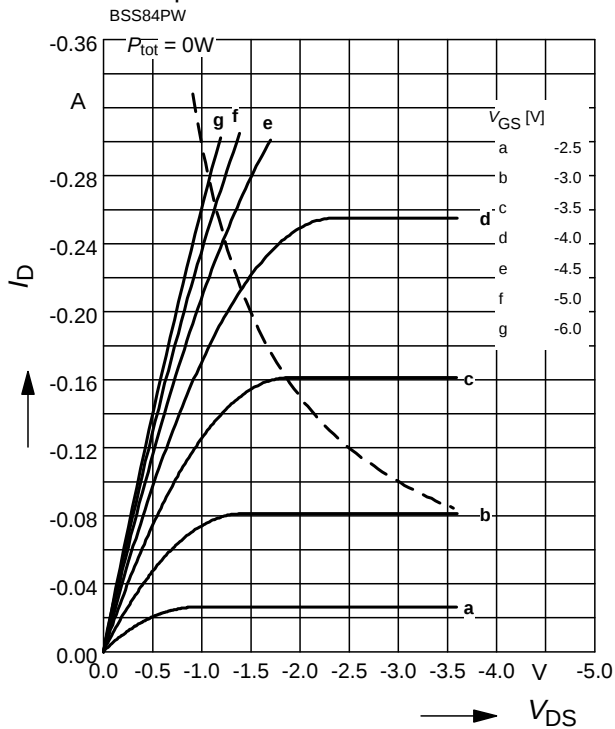
parameter: $D = t_p / T$



Typ. output characteristic

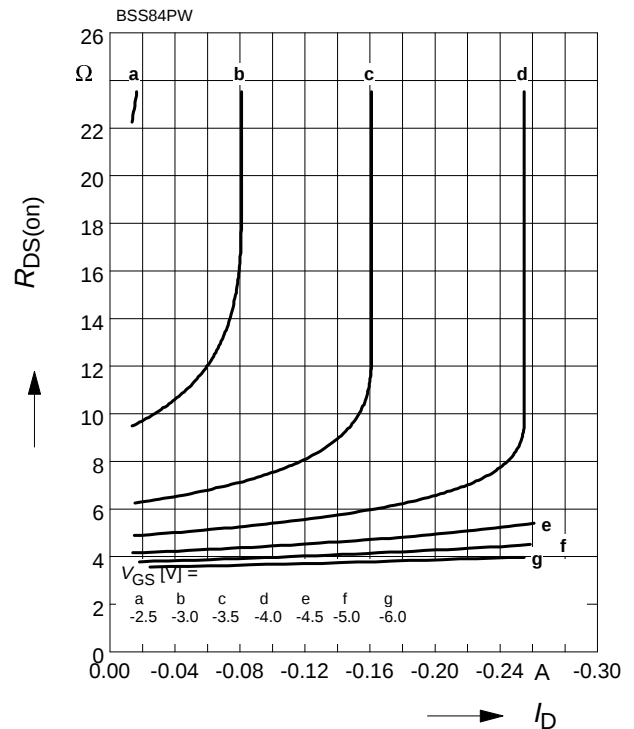
$$I_D = f(V_{DS}); T_J = 25^\circ\text{C}$$

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


Typ. drain-source-on-resistance

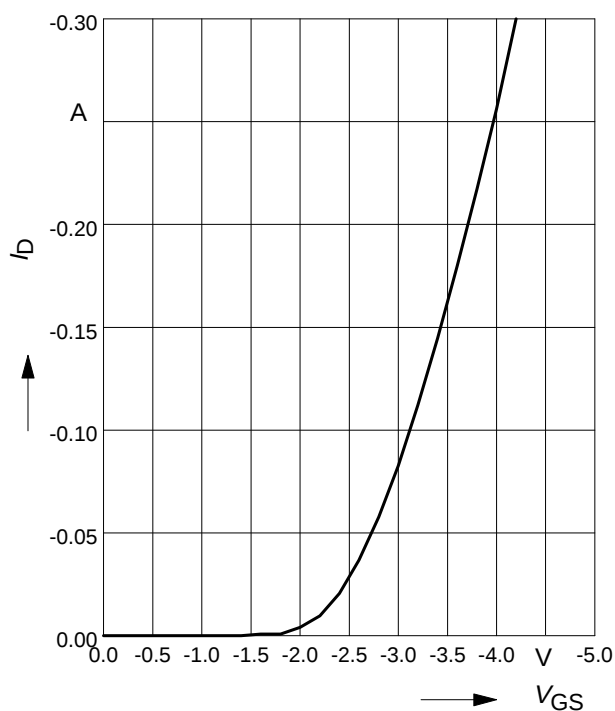
$$R_{DS(\text{on})} = f(I_D)$$

parameter: V_{GS}


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

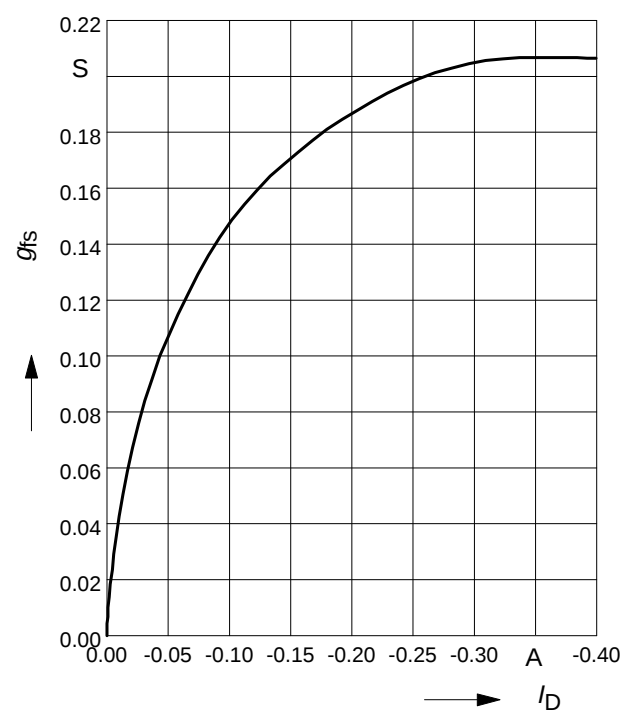
$$V_{DS} \geq 2 \times I_D \times R_{DS(\text{on})\text{max}}$$

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


Typ. forward transconductance

$$g_{fs} = f(I_D); T_J = 25^\circ\text{C}$$

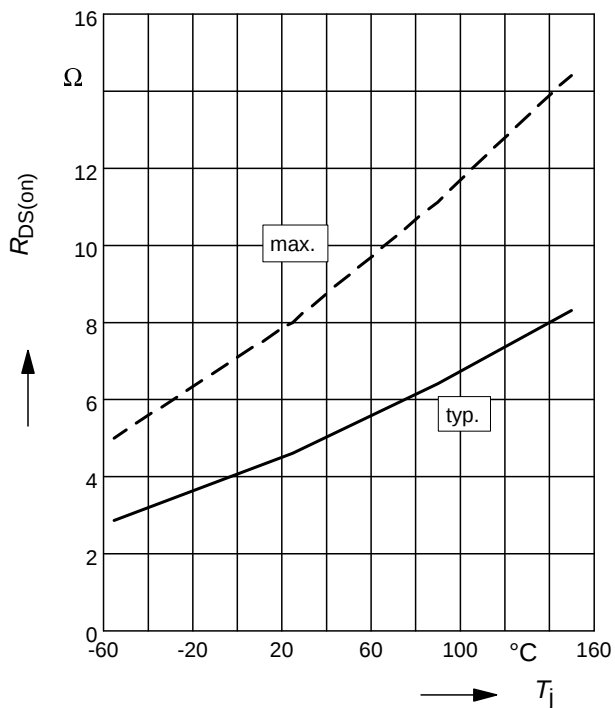
parameter: g_{fs}



Drain-source on-resistance

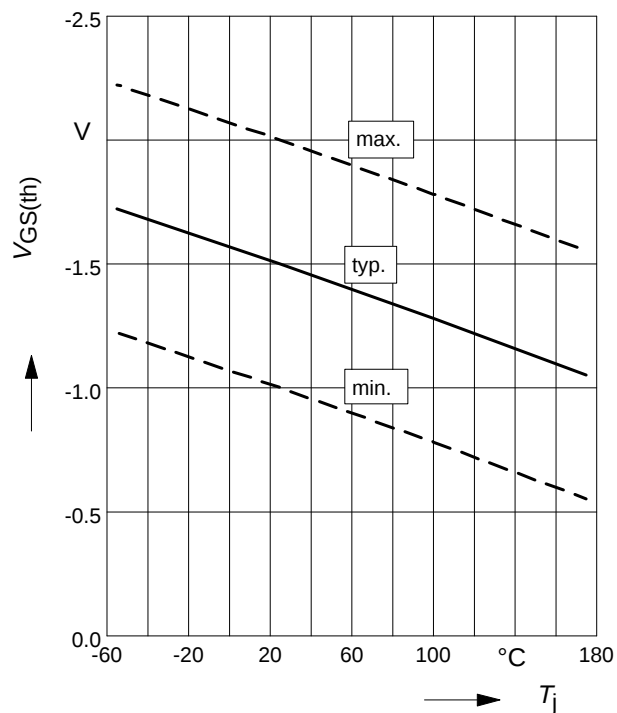
$$R_{DS(on)} = f(T_j)$$

parameter: $I_D = -0.17A$, $V_{GS} = -10V$


Gate threshold voltage

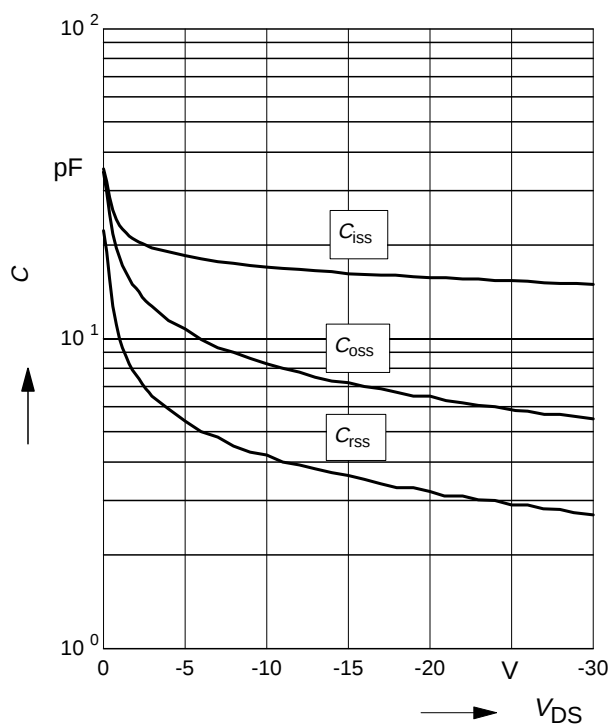
$$V_{GS(th)} = f(T_j)$$

parameter: $V_{GS} = V_{DS}$, $I_D = -20 \mu A$


Typ. capacitances

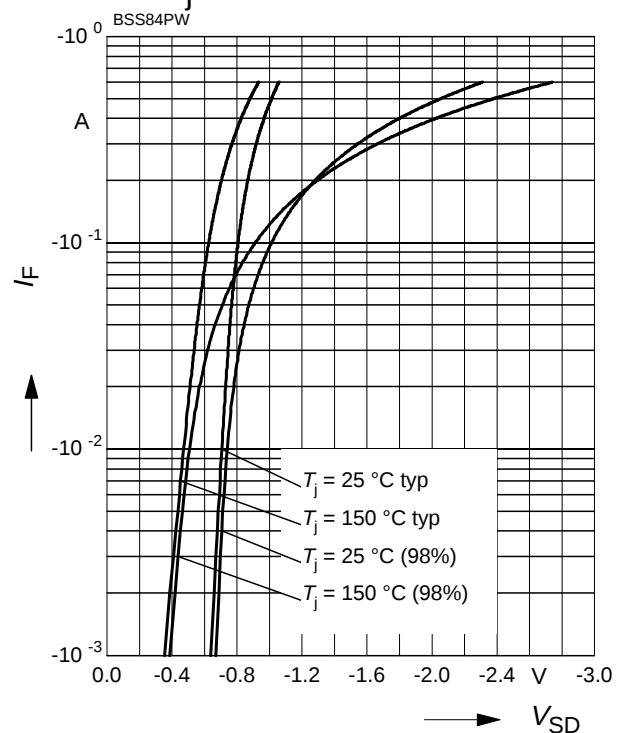
$$C = f(V_{DS})$$

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


Forward characteristics of reverse diode

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

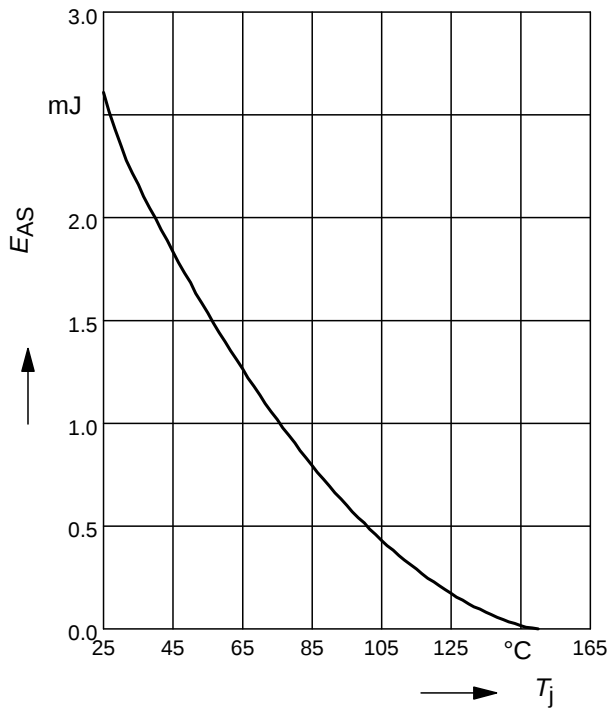
parameter: T_j , $t_p = 80 \mu s$



Avalanche energy

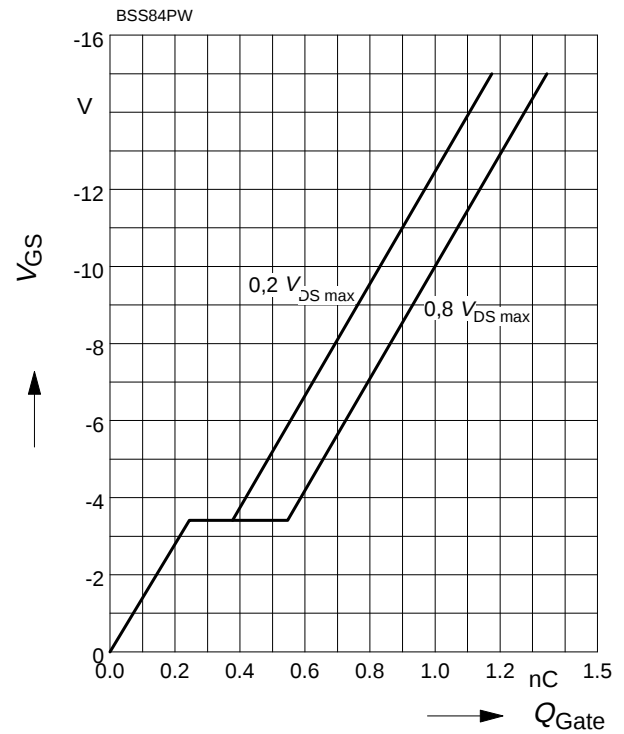
$$E_{AS} = f(T_j)$$

par.: $I_D = -0.15 \text{ A}$, $V_{DD} = -25 \text{ V}$, $R_{GS} = 25 \ \Omega$

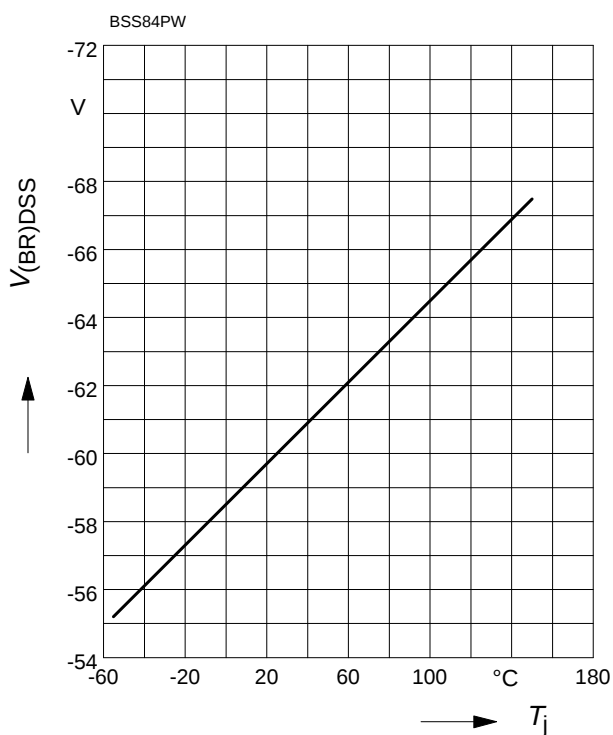

Typ. gate charge

$$V_{GS} = f(Q_{\text{Gate}})$$

parameter: $I_D = -0.15 \text{ A}$ pulsed


Drain-source breakdown voltage

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



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