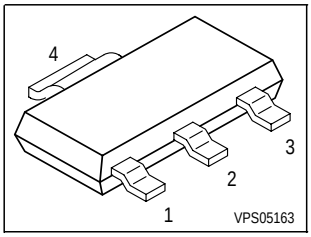
SIPMOS® Small-Signal-Transistor

Features

- N-Channel
- Enhancement mode
- Logic Level
- d*v*/d*t* rated

Product Summary

Drain source voltage	V_{DS}	30	V
Drain-Source on-state resistance	$R_{DS(on)}$	0.05	Ω
Continuous drain current	I_D	4.7	A



Type	Package	Ordering Code
BSP308	SOT-223	Q67000-S4011

Pin 1	Pin 2/4	PIN 3
G	D	S

Maximum Ratings,at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Value	Unit
Continuous drain current T_A = 25 °C T_A = 70 °C	I_D	 4.7 3.9	A
Pulsed drain current T_A = 25 °C	$I_{D\ puls}$	18.8	
Reverse diode d*v*/d*t* I_S = 4.7 A, V_{DS} = 20 V, d*i*/d*t* = 200 A/µs, T_{jmax} = 150 °C	d*v*/d*t*	6	kV/µs
Gate source voltage	V_{GS}	±20	V
Power dissipation T_A = 25 °C	P_{tot}	1.8	W
Operating and storage temperature	T_j , T_{stg}	-55...+150	°C
IEC climatic category; DIN IEC 68-1		55/150/56	

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Thermal resistance, junction - soldering point	R_{thJS}	-	-	25	K/W
SMD version, device on PCB:	R_{thJA}				K/W
@ min. footprint		-	-	110	
@ 6 cm^2 cooling area [1)]		-	-	70	

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 = 250 µA	$V_{(BR)DSS}$	30	-	-	V
Gate threshold voltage, V_{GS} = V_{DS} I_D = 20 µA	$V_{GS(th)}$	1.2	1.6	2	
Zero gate voltage drain current	I_{DSS}				µA
V_{DS} = 30 V, V_{GS} = 0 V, T_j = 25 °C		-	0.1	1	
V_{DS} = 30 V, V_{GS} = 0 V, T_j = 125 °C		-	10	100	
Gate-source leakage current V_{GS} = 20 V, V_{DS} = 0 V	I_{GSS}	-	10	100	nA
Drain-Source on-state resistance V_{GS} = 4.5 V, I_D = 3.9 A	$R_{DS(on)}$	-	0.05	0.075	Ω
Drain-Source on-state resistance V_{GS} = 10 V, I_D = 4.7	$R_{DS(on)}$	-	0.03	0.05	Ω

[1]Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm^2 (one layer, 70 µm thick) copper area for drain connection. PCB is vertical without blown air.

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance V_{DS}≥2*I_D*$R_{DS(on)max}$, I_D = 3.9 A	g_{fs}	6.1	8.8	-	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	-	400	500	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	-	160	200	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	-	70	90	
Turn-on delay time V_{DD} = 15 V, V_{GS} = 4.5 V, I_D = 3.9 A , R_G = 15 Ω	$t_{d(on)}$	-	16	24	ns
Rise time V_{DD} = 15 V, V_{GS} = 4.5 V, I_D = 3.9 A , R_G = 15 Ω	t_r	-	30	45	
Turn-off delay time V_{DD} = 15 V, V_{GS} = 4.5 V, I_D = 3.9 A , R_G = 15 Ω	$t_{d(off)}$	-	16	24	
Fall time V_{DD} = 15 V, V_{GS} = 4.5 V, I_D = 3.9 A , R_G = 15 Ω	t_f	-	15	23	

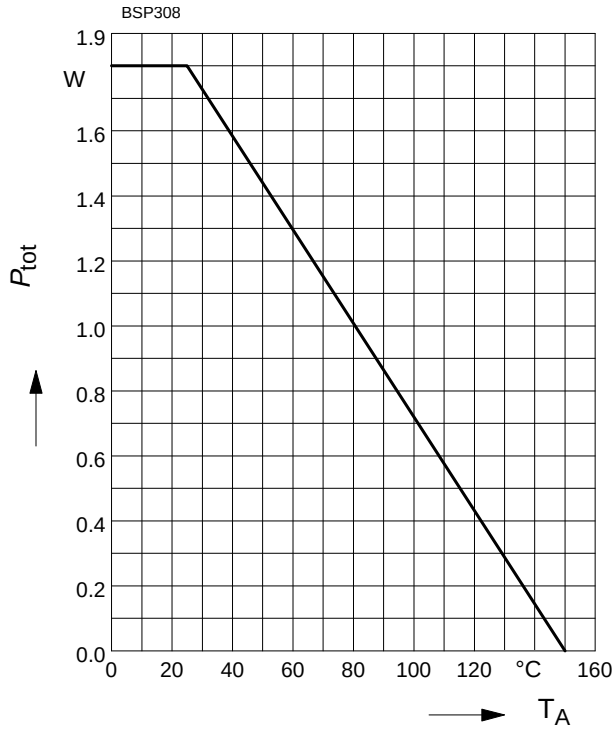
Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Gate to source charge V_{DD} = 24 V, I_D = 4.7 A	Q_{gs}	-	1.9	2.9	nC
Gate to drain charge V_{DD} = 24 V, I_D = 4.7 A	Q_{gd}	-	5.4	8.1	
Gate charge total V_{DD} = 24 V, I_D = 4.7 A, V_{GS} = 0 to 10 V	Q_g	-	14.5	22	
Gate plateau voltage V_{DD} = 24 V , I_D = 4.7 A	$V_{(plateau)}$	-	3.1	-	V

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse Diode					
Inverse diode continuous forward current T_A = 25 °C	I_S	-	-	4.7	A
Inverse diode direct current,pulsed T_A = 25 °C	I_{SM}	-	-	18.8	
Inverse diode forward voltage V_{GS} = 0 V, I_F = 4.7 A	V_{SD}	-	0.84	1.1	V
Reverse recovery time V_R = 15 V, I_F=I_S , di_F/dt = 100 A/µs	t_{rr}	-	38.4	57.6	ns
Reverse recovery charge V_R = 15 V, I_F=I_S , di_F/dt = 100 A/µs	Q_{rr}	-	22.3	33.5	nC

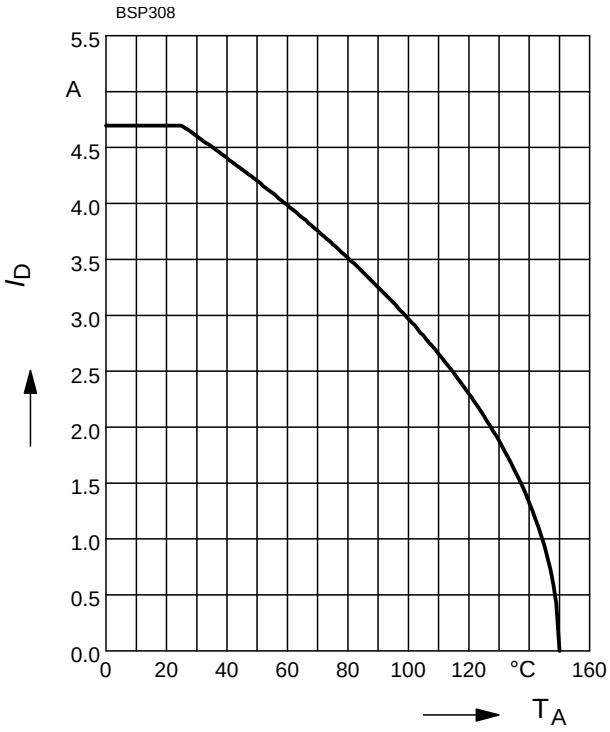
Power Dissipation

$P_{tot} = f(T_A)$



Drain current

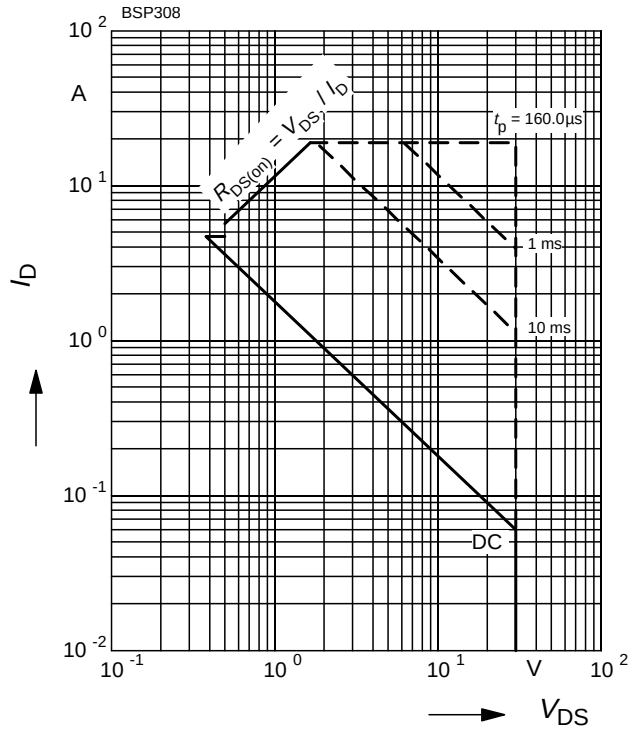
$I_D = f(T_A)$



Safe operating area

$I_D = f(V_{DS})$

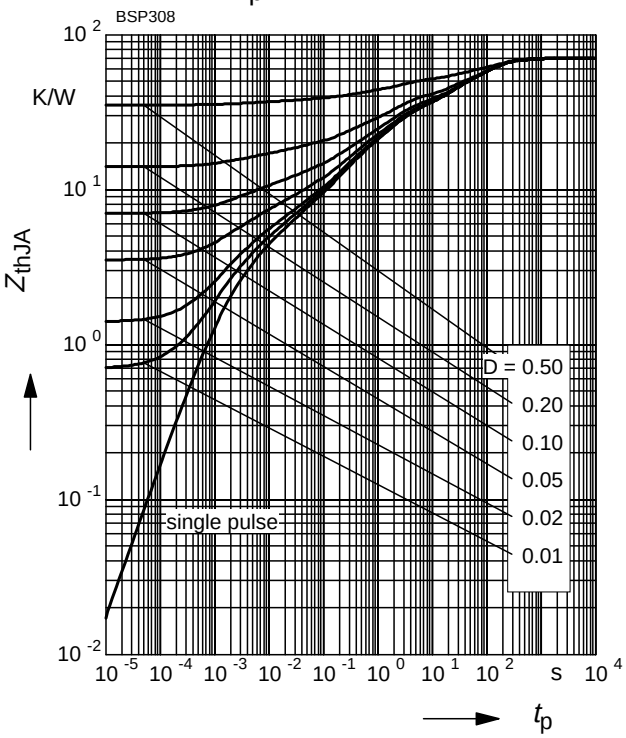
parameter : $D = 0$, $T_A = 25$ °C



Transient thermal impedance

$Z_{thJA} = f(t_p)$

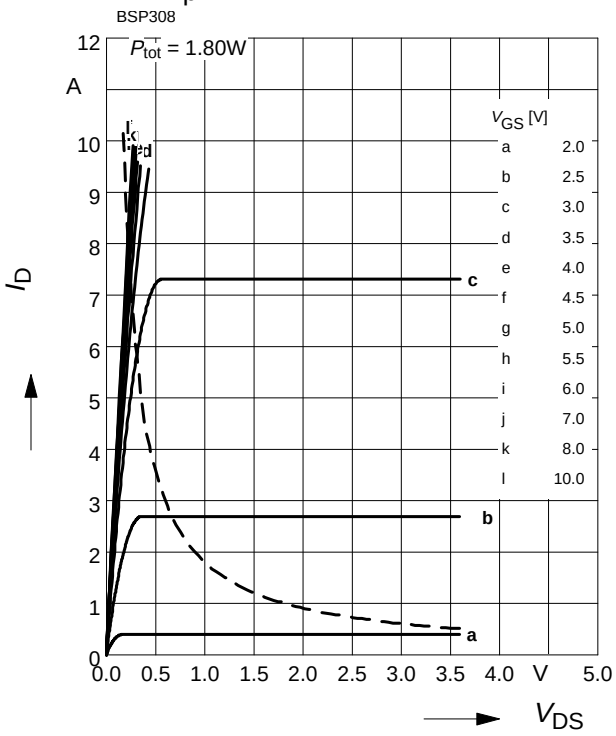
parameter : $D = t_p / T$



Typ. output characteristics

$I_D = f(V_{DS})$

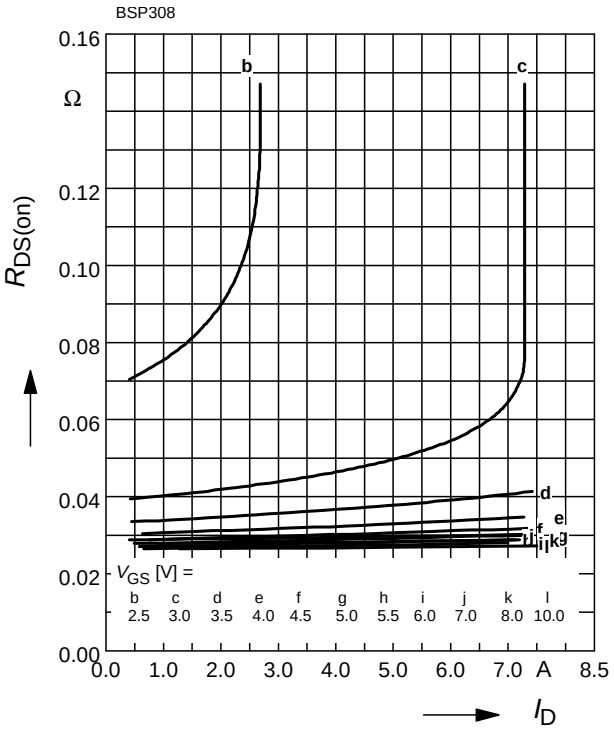
parameter: t_p = 80 µs



Typ. drain-source-on-resistance

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

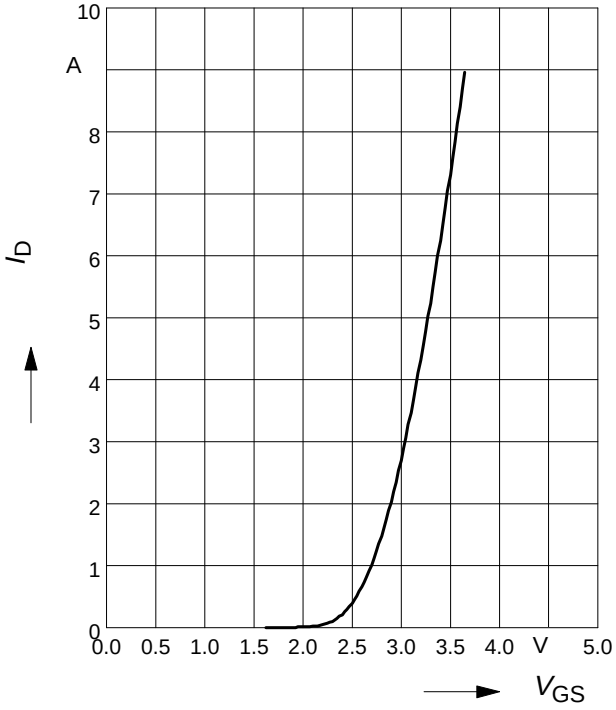
parameter: V_{GS}



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

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

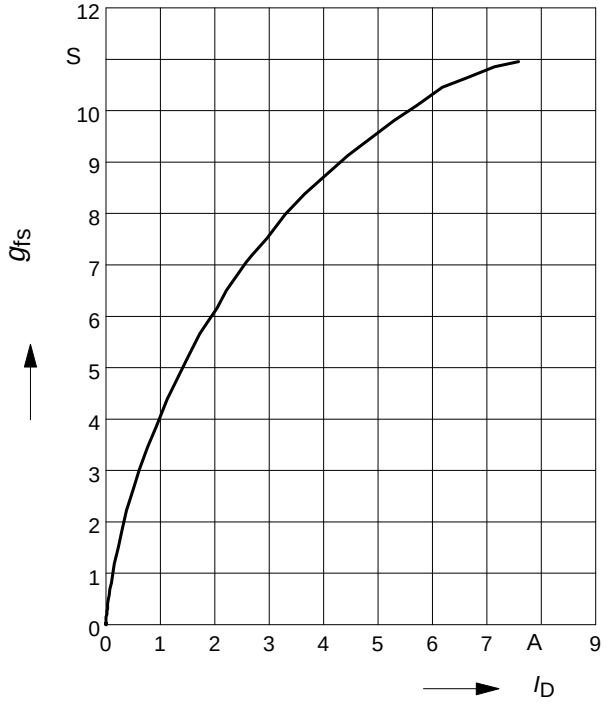
parameter: t_p = 80 µs



Typ. forward transconductance

$g_{fs} = f(I_D)$; T_j=25°C

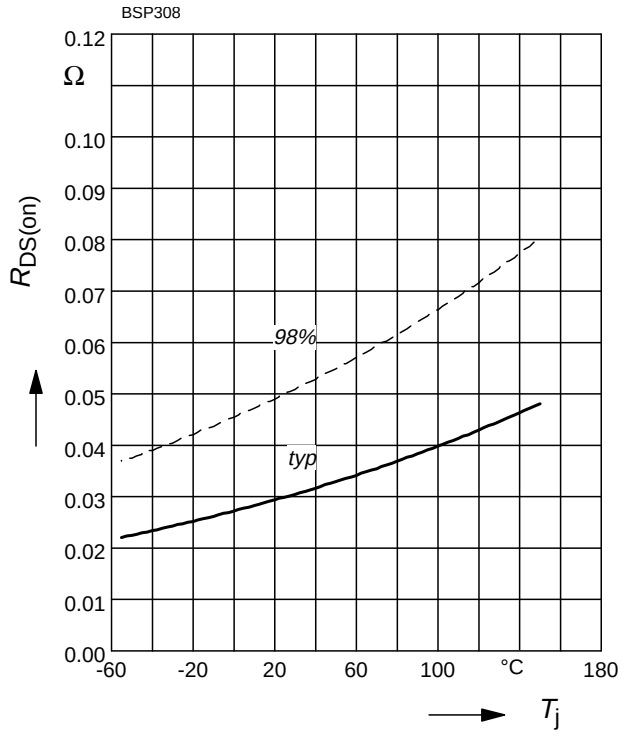
parameter: g_{fs}



Drain-source on-resistance

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

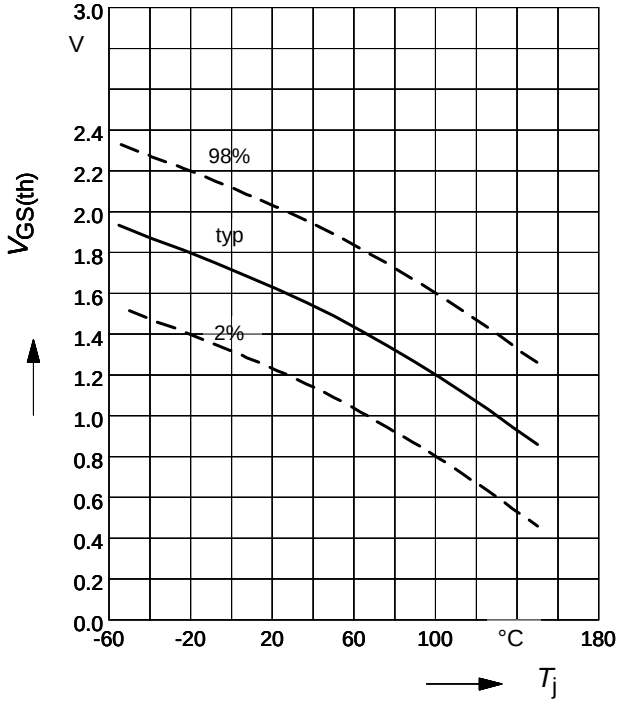
parameter : I_D = 4.7 , V_{GS} = 10 V



Gate threshold voltage

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

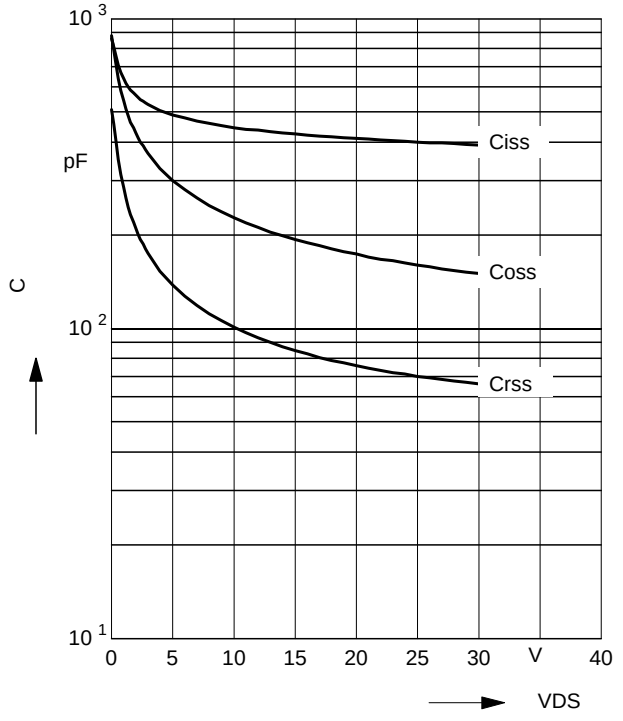
parameter: $V_{GS} = V_{DS}$, I_D = 20 µA



Typ. capacitances

C = f(V_{DS})

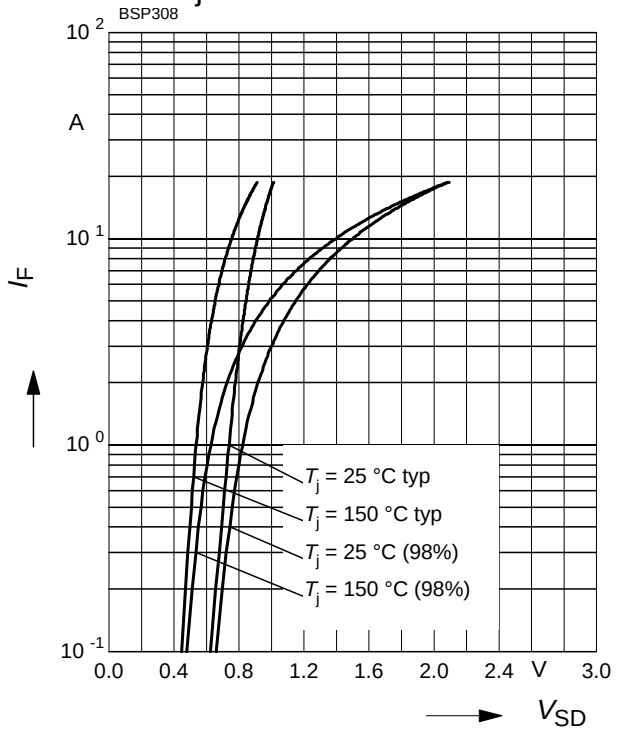
parameter: V_{GS}=0 V, f=1 MHz



Forward characteristics of reverse diode

$I_F = f(V_{SD})$

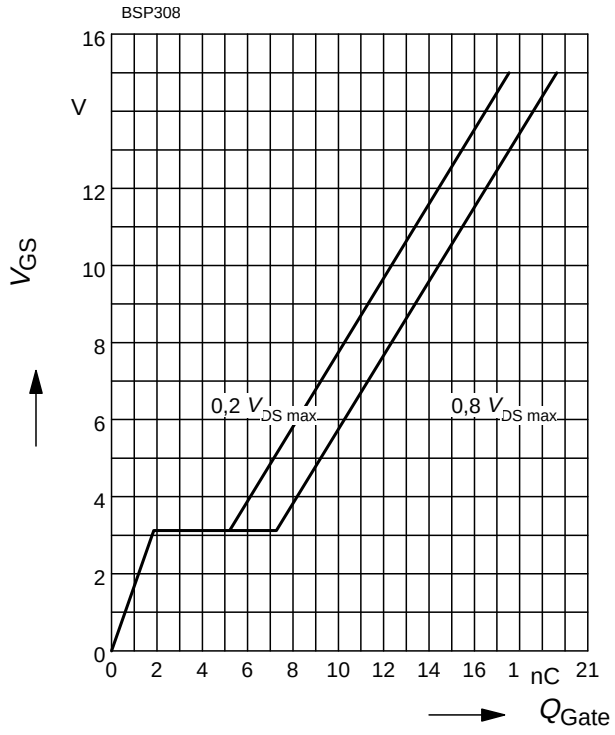
parameter: T_j , tp = 80 µs



Typ. gate charge

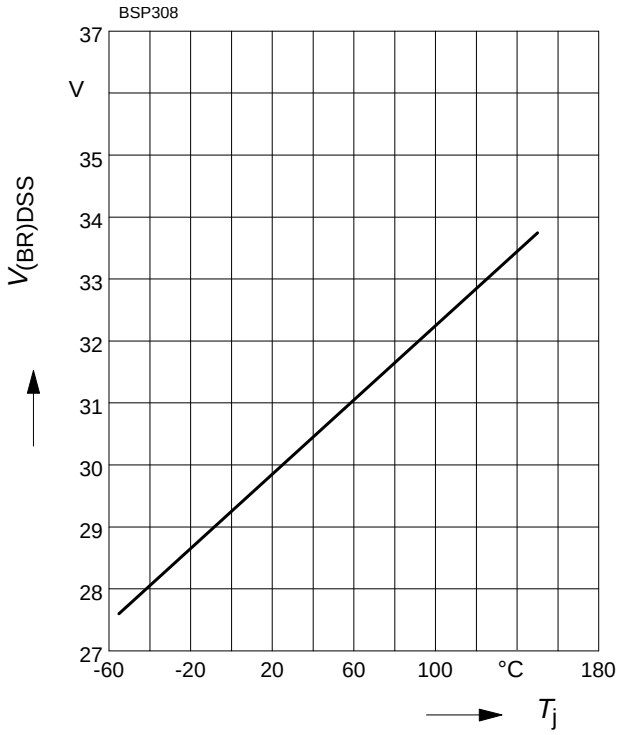
$V_{GS} = f\ (Q_{Gate})$

parameter: I_D = 4.7 A pulsed



Drain-source breakdown voltage

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



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