Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

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Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

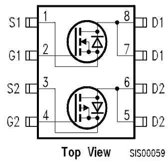
SIPMOS® Small-Signal-Transistor

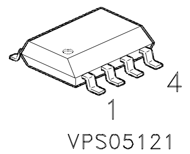
Product Summary

		N	P	
Drain source voltage	V_{DS}	60	-60	V
Drain-Source on-state resistance	$R_{DS(on)}$	0.12	0.3	Ω
Continuous drain current	I_D	3	-2	A

Features

- Dual N- and P -Channel
- Enhancement mode
- Avalanche rated
- Pb-free lead plating;RoHS compliant





Type	Package	Marking
BSO 612 CV	PG-DSO-8	612CV

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

Parameter	**Symbol**	Value		**Unit**
		N	P	
Continuous drain current	I_D			A
T_A = 25 °C		3	-2	
T_A = 70 °C		2.4	-1.6	
Pulsed drain current T_A = 25 °C	$I_{D\,puls}$	12	-8	
Avalanche energy, single pulse	E_{AS}			mJ
I_D = 3 A, V_{DD} = 25 V, R_{GS} = 25 Ω		47	-	
I_D = -2 A, V_{DD} = -25 V, R_{GS} = 25 Ω		-	70	
Avalanche energy, periodic limited by T_{jmax}	E_{AR}	0.2	0.2	
Reverse diode dv/dt, T_{jmax} = 150 °C	dv/dt			kV/µs
I_S = 3 A, V_{DS} = 48 V, di/dt = 200 A/µs		6	-	
I_S = -2 A, V_{DS} = -48 V, di/dt = -200 A/µs		-	6	
Gate source voltage	V_{GS}	±20	±20	V
Power dissipation T_A = 25 °C	P_{tot}	2	2	W
Operating and storage temperature	T_j , T_{stg}	-55...+150		°C
IEC climatic category; DIN IEC 68-1		55/150/56		

Termal Characteristics

Parameter		Symbol	Values			Unit
			min.	typ.	max.	
Dynamic Characteristics						
Thermal resistance, junction - soldering point	N	R_{thJS}	-	-	40	K/W
(Pin 4)	P		-	-	40	
SMD version, device on PCB:		R_{thJA}				
@ min. footprint; t ≤ 10 sec.	N		-	-	110	
@ 6 cm^2 cooling area [1]; t ≤ 10 sec.	N		-	-	62.5	
@ min. footprint; t ≤ 10 sec.	P		-	-	70	
@ 6 cm^2 cooling area [1]; t ≤ 10 sec.	P		-	-	62.5	

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

Parameter		Symbol	min.	typ.	max.	Unit
Drain- source breakdown voltage		$V_{(BR)DSS}$				V
V_{GS} = 0 V, I_D = 250 µA	N		60	-	-	
V_{GS} = 0 V, I_D = -250 µA	P		-60	-	-	
Gate threshold voltage, V_{GS} = V_{DS}		$V_{GS(th)}$				
I_D = 20 µA	N		2.1	3	4	
I_D = -450 µA	P		-2.1	-3	-4	
Zero gate voltage drain current		I_{DSS}				µA
V_{DS} = 60 V, V_{GS} = 0 V, T_j = 25 °C	N		-	0.1	1	
V_{DS} = 60 V, V_{GS} = 0 V, T_j = 125 °C	N		-	10	100	
V_{DS} = -60 V, V_{GS} = 0 V, T_j = 25 °C	P		-	-0.1	-1	
V_{DS} = -60 V, V_{GS} = 0 V, T_j = 125 °C	P		-	-10	-100	
Gate-source leakage current		I_{GSS}				nA
V_{GS} = 20 V, V_{DS} = 0 V	N		-	10	100	
V_{GS} = -20 V, V_{DS} = 0 V	P		-	-10	-100	
Drain-source on-state resistance		$R_{DS(on)}$				Ω
V_{GS} = 10 V, I_D = 3 A	N		-	0.09	0.12	
V_{GS} = -10 V , I_D = -2 A	P		-	0.22	0.3	

[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

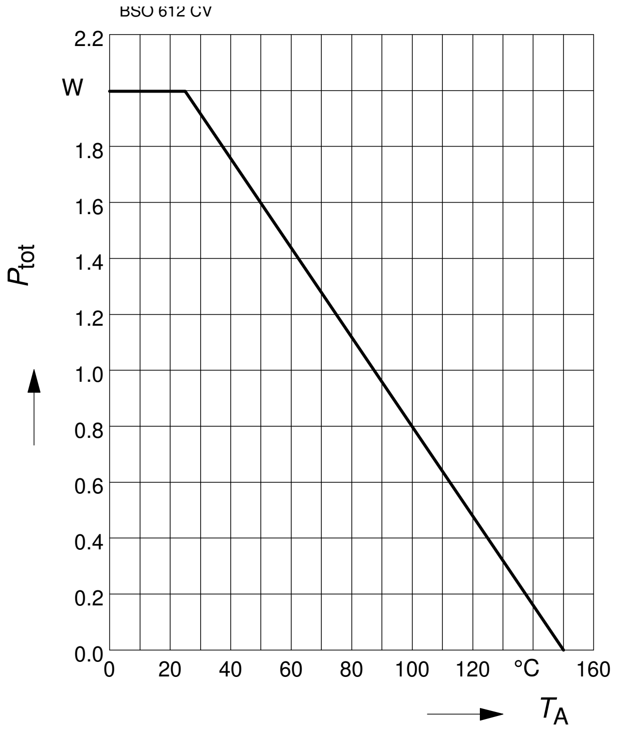
Parameter		Symbol	Values			Unit
			min.	typ.	max.	
Characteristics						
Transconductance		g_{fs}				S
$V_{DS} \geq 2 * I_D * R_{DS(on)max}$, I_D = 3 A	N		2	4	-	
$VV_{DS} \geq 2 * I_D * R_{DS(on)max}$, I_D = -2 A	P		1.2	2.4	-	
Input capacitance		C_{iss}				pF
V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	N		-	275	340	
V_{GS} = 0 V, V_{DS} = -25 V, f = 1 MHz	P		-	320	400	
Output capacitance		C_{oss}				
V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	N		-	90	115	
V_{GS} = 0 V, V_{DS} = -25 V, f = 1 MHz	P		-	105	130	
Reverse transfer capacitance		C_{rss}				
V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	N		-	50	65	
V_{GS} = 0 V, V_{DS} = -25 V, f = 1 MHz	P		-	40	50	
Turn-on delay time		$t_{d(on)}$				ns
V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3 A , R_G = 33 Ω	N		-	12	18	
V_{DD} = -30 V, V_{GS} = -10 V, I_D = -2 A , R_G = 27 Ω	P		-	15	23	
Rise time		t_r				
V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3 A, R_G = 33 Ω	N		-	35	55	
V_{DD} = -30 V, V_{GS} = -10 V, I_D = -2 A, R_G = 27 Ω	P		-	60	90	
Turn-off delay time		$t_{d(off)}$				
V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3 A , R_G = 33 Ω	N		-	25	40	
V_{DD} = -30 V, V_{GS} = -10 V, I_D = -2 A , R_G = 27 Ω	P		-	145	220	
Fall time		t_f				
V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3 A , R_G = 33 Ω	N		-	30	45	
V_{DD} = -30 V, V_{GS} = -10 V, I_D = -2 A , R_G = 27 Ω	P		-	95	140	

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

Parameter		Symbol	Values			Unit
			min.	typ.	max.	
Characteristics						
Gate to source charge		Q_{gs}				nC
V_{DD} = 48 V, I_D = 3 A	N		-	1	1.5	
V_{DD} = -48 V, I_D = -2 A	P		-	2	3	
Gate to drain charge		Q_{gd}				
V_{DD} = 48 V, I_D = 3 A	N		-	5.5	8.3	
V_{DD} = -48 V, I_D = -2 A	P		-	4.5	6.8	
Gate charge total		Q_g				
V_{DD} = 48 V, I_D = 3 A, V_{GS} = 0 to 10V	N		-	10.3	15.5	
V_{DD} = -48 V, I_D = -2 A, V_{GS} = 0 to -10V	P		-	10.5	16	
Gate plateau voltage		$V_{(plateau)}$				V
V_{DD} = 48 V, I_D = 3 A	N		-	5	-	
V_{DD} = -48 V, I_D = -2 A	P		-	-4	-	
Reverse Diode						
Inverse diode continuous forward current	N	I_S	-	-	3	A
T_A = 25 °C	P		-	-	-2	
Inverse diode direct current,pulsed	N	I_{SM}	-	-	12	
T_A = 25 °C	P		-	-	-8	
Inverse diode forward voltage		V_{SD}				V
V_{GS} = 0 V, I_F = I_S	N		-	0.9	1.2	
V_{GS} = 0 V, I_F = I_S	P		-	-0.9	-1.2	
Reverse recovery time		t_{rr}				ns
V_R = 30 V, I_F=I_S, di_F/dt = 100 A/µs	N		-	55	85	
V_R = -30 V, I_F=I_S , di_F/dt = -100 A/µs	P		-	55	85	
Reverse recovery charge		Q_{rr}				nC
V_R = 30 V, I_F=I_S , di_F/dt = 100 A/µs	N		-	90	135	
V_R = -30 V, I_F=I_S, di_F/dt = -100 A/µs	P		-	65	100	

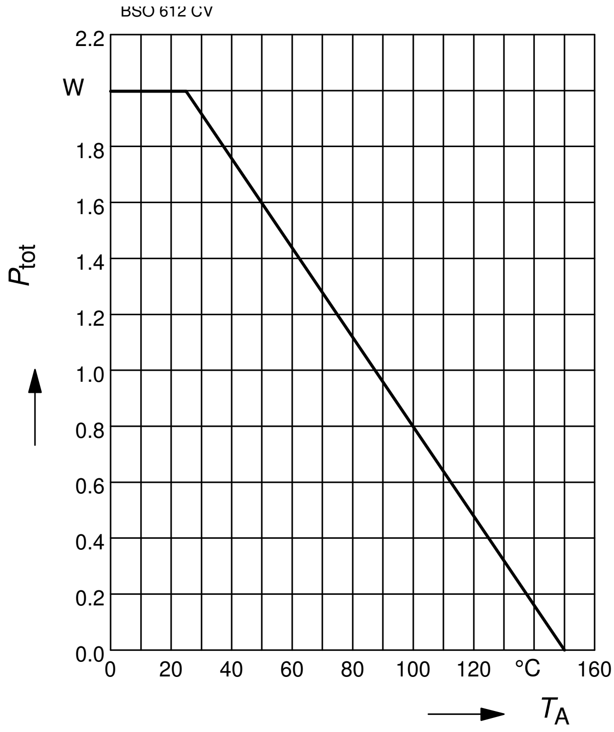
Power Dissipation (N-Ch.)

$P_{tot} = f(T_A)$



Power Dissipation (P-Ch.)

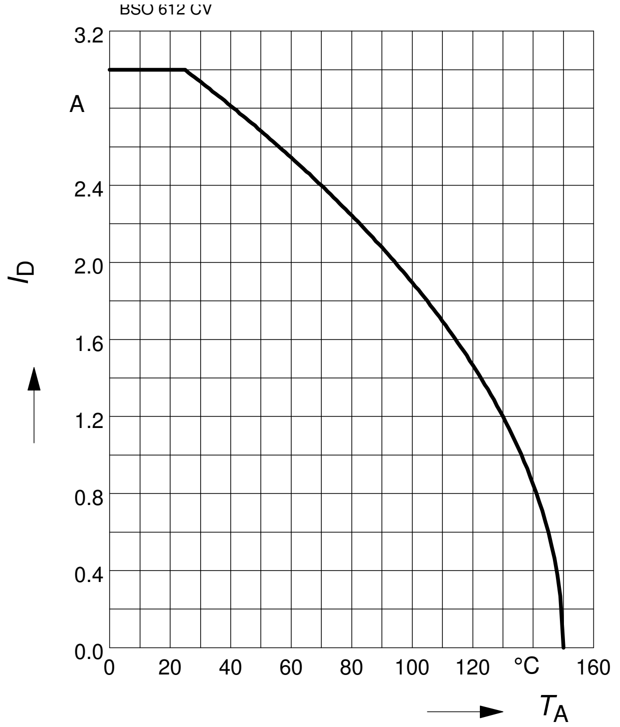
$P_{tot} = f(T_A)$



Drain current (N-Ch.)

$I_D = f(T_A)$

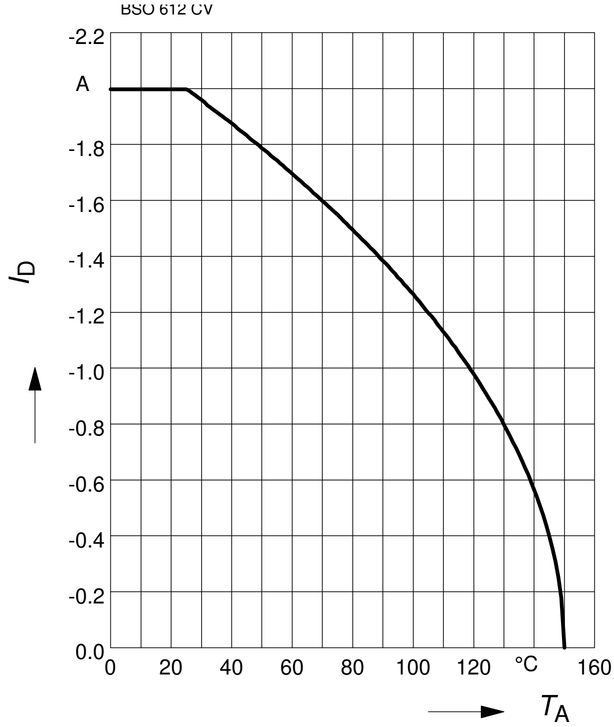
parameter: $V_{GS} \geq 10$ V



Drain current (P-Ch.)

$I_D = f(T_A)$

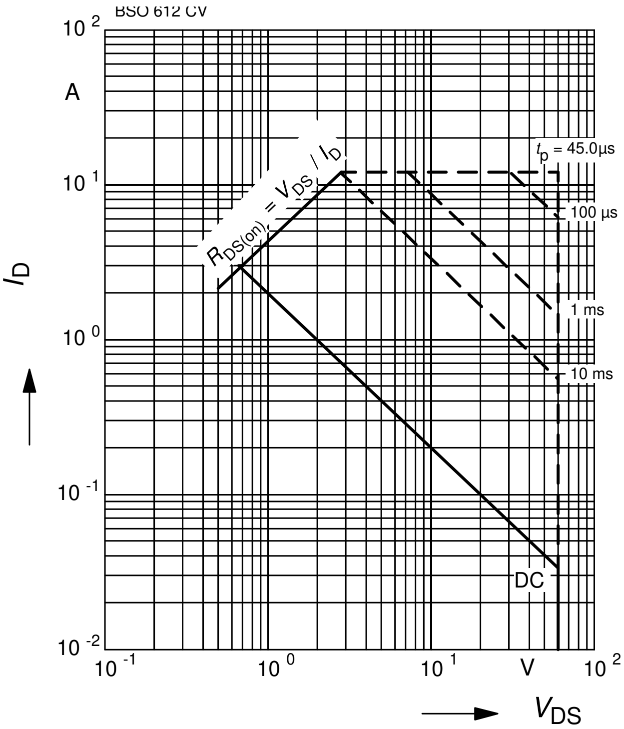
parameter: $V_{GS} \geq -10$ V



Safe operating area (N-Ch.)

$I_D = f(V_{DS})$

parameter : $D = 0$, $T_A = 25$ °C



Safe operating area (P-Ch.)

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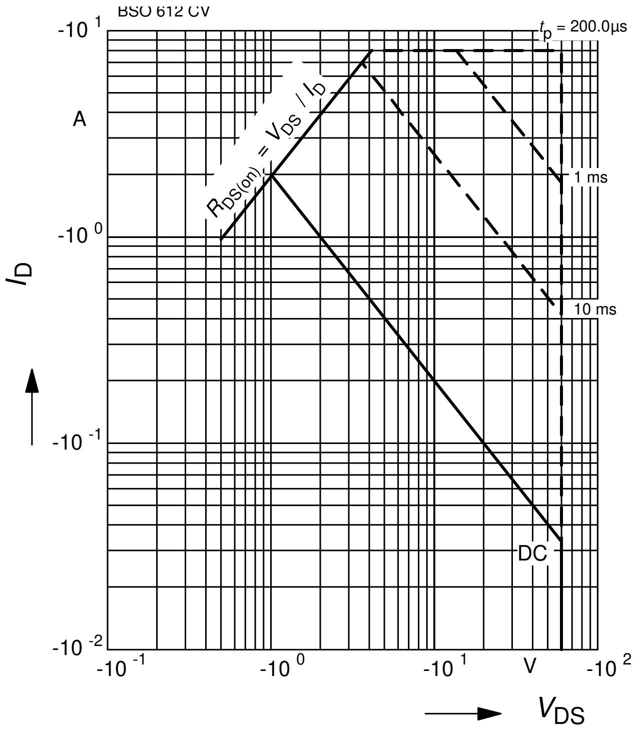
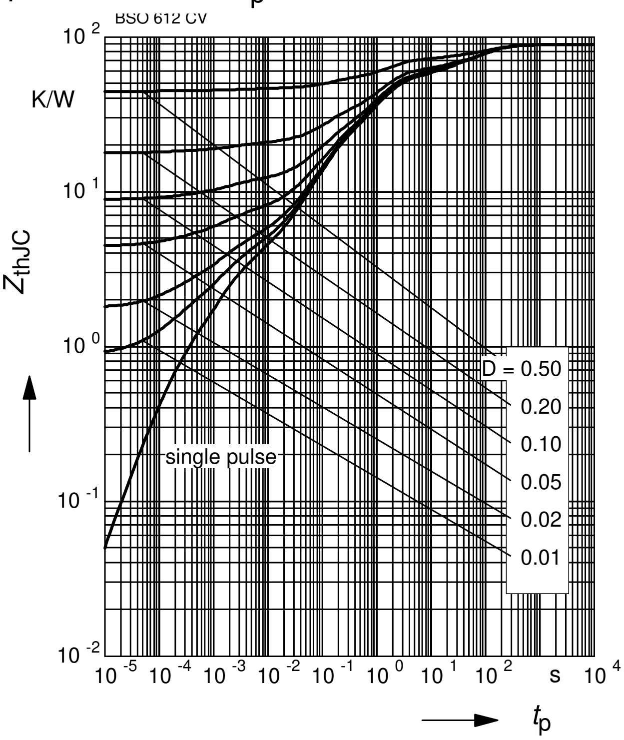
parameter : $D = 0$, $T_A = 25$ °C



Transient thermal impedance (N-Ch.)

$Z_{thJC} = f(t_p)$

parameter : $D = t_p/T$



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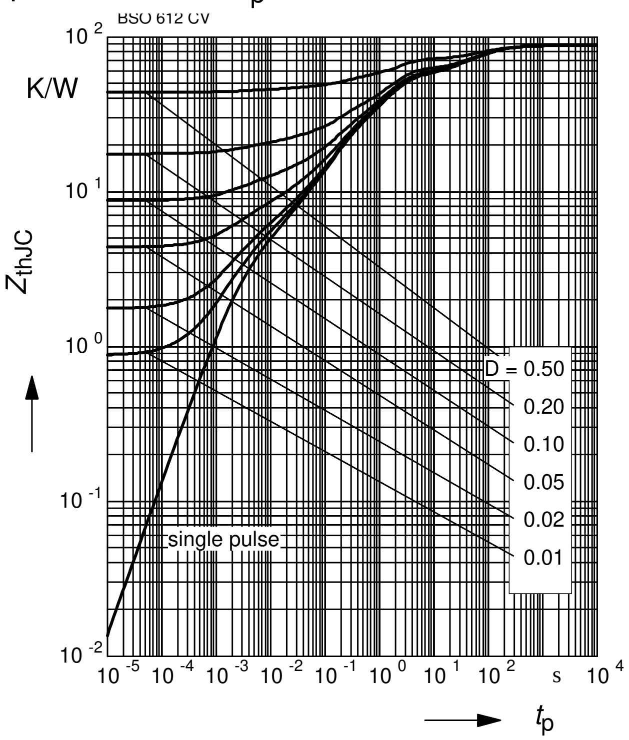
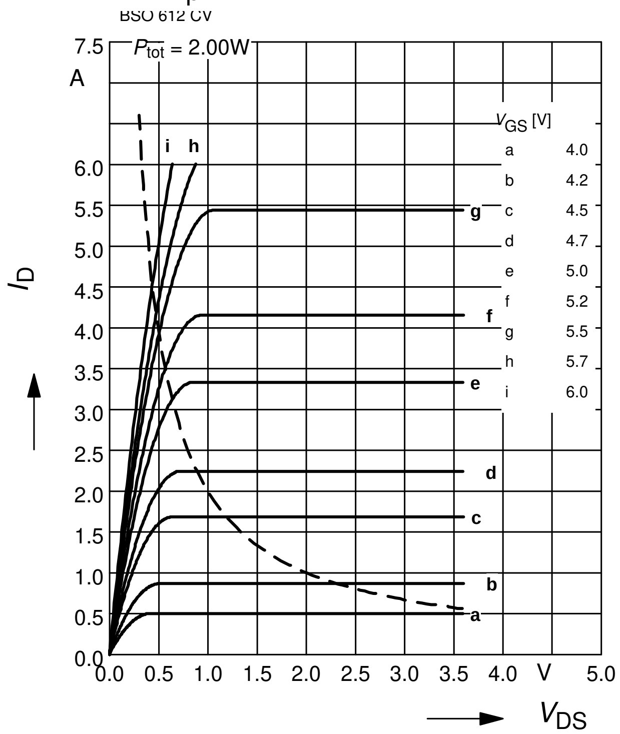


Typ. output characteristics (N-Ch.)

$I_D = f(V_{DS})$

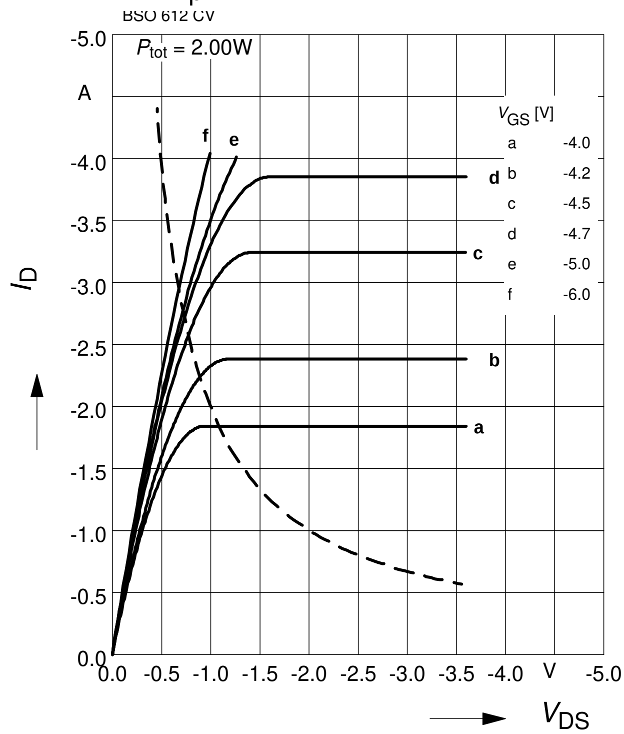
parameter: t_p = 80 µs



Typ. output characteristics (P-Ch.)

$I_D = f(V_{DS})$

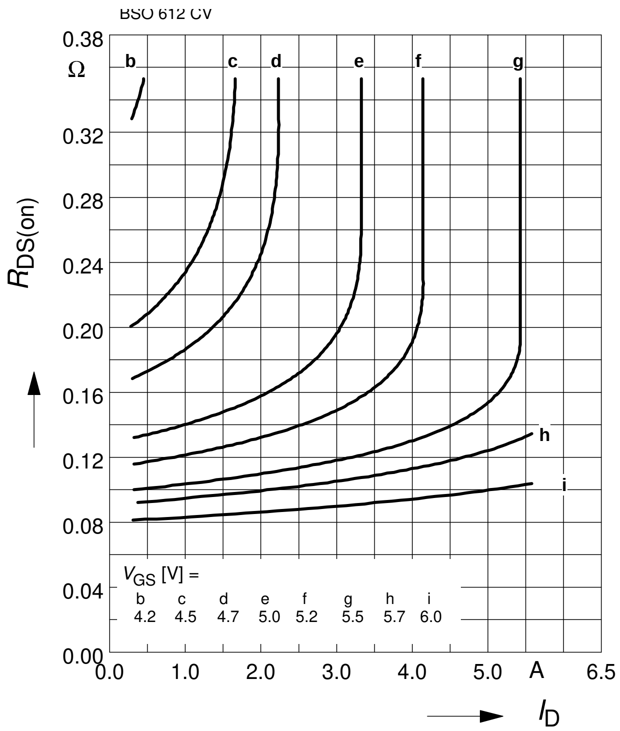
parameter: t_p = 80 µs



Typ. drain-source-on-resistance (N-Ch.)

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

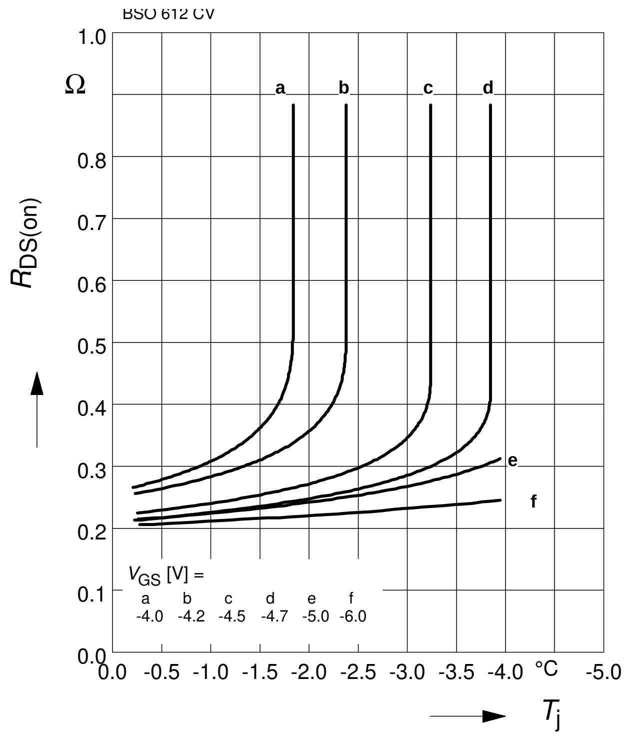
parameter: V_{GS}



Typ. drain-source-on-resistance (P-Ch.)

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

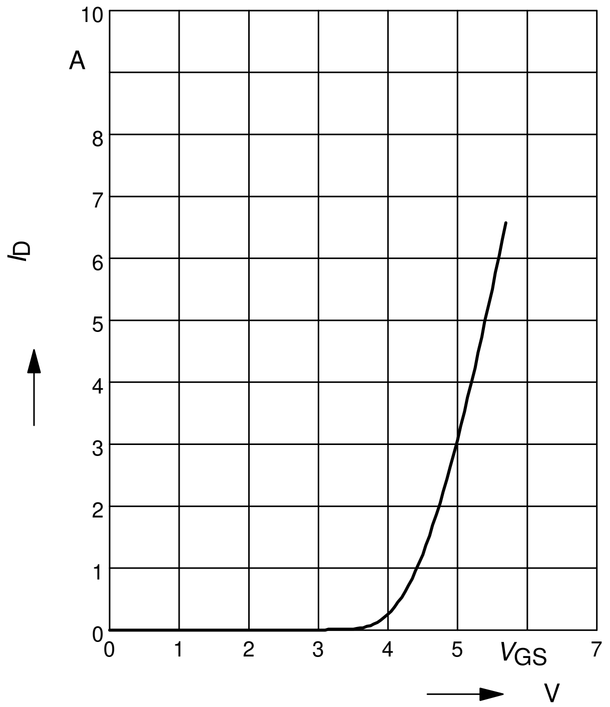
parameter: V_{GS}



Typ. transfer characteristics (N-Ch.)

parameter: t_p = 80 µs

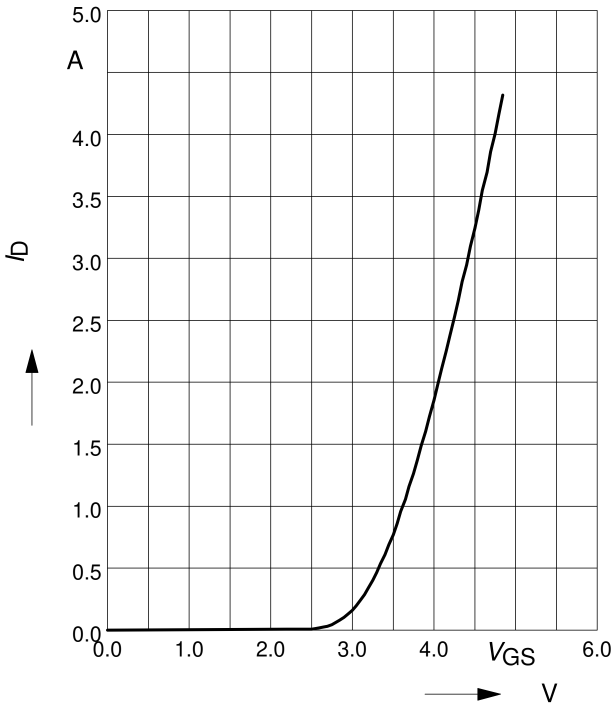
$I_D = f(V_{GS})$, $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



Typ. transfer characteristics (P-Ch.)

parameter: t_p = 80 µs

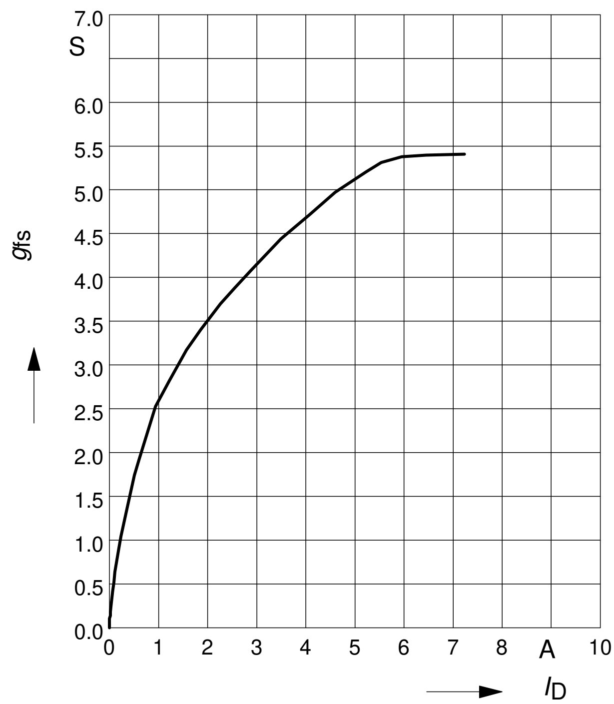
$I_D = f(V_{GS})$, $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



Typ. forward transconductance (N-Ch.)

g_{fs} = f(I_D); T_j = 25 °C

parameter: g_{fs}



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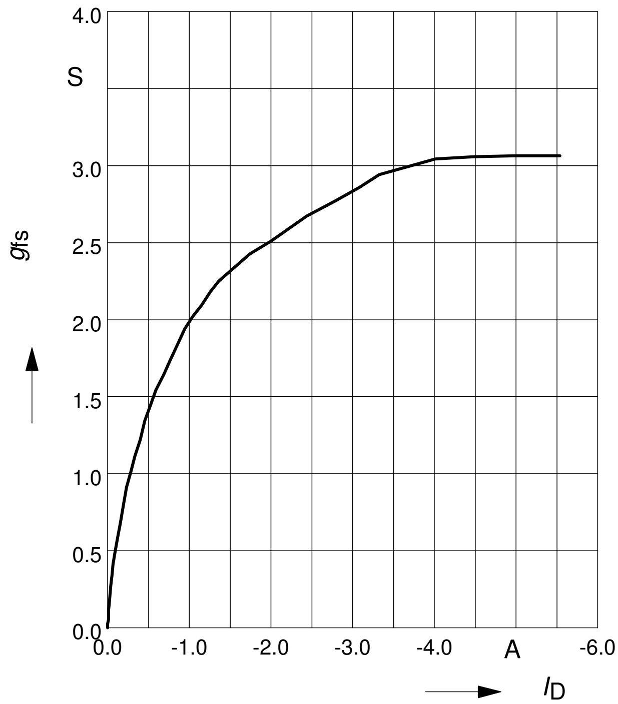
g_{fs} = f(I_D); T_j = 25 °C

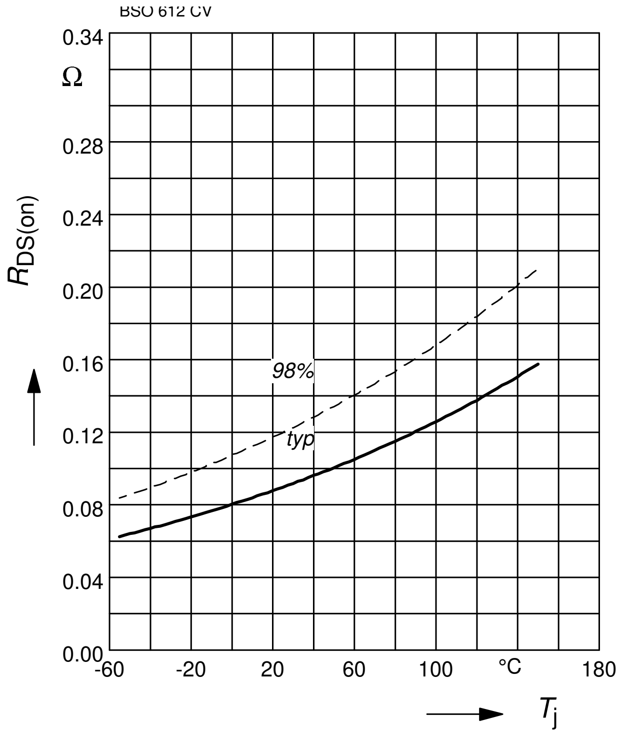
parameter: g_{fs}



Drain-source on-resistance (N-Ch.)

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

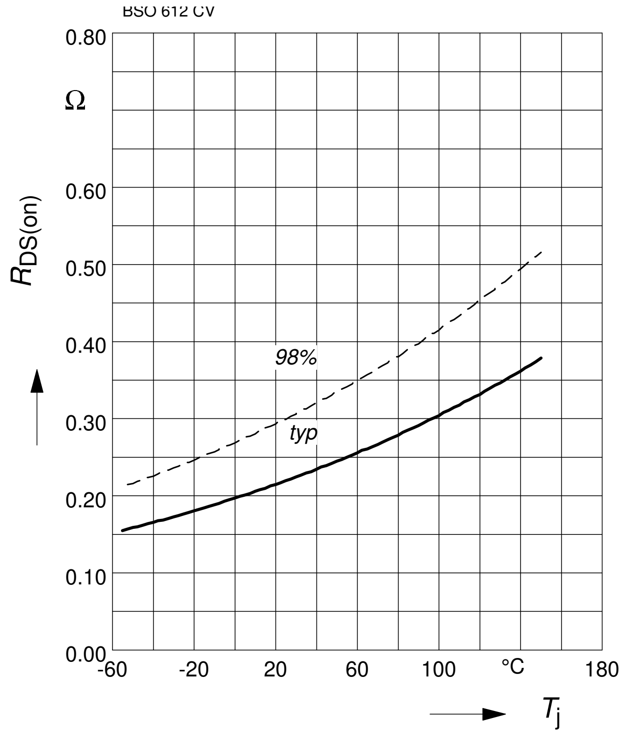
parameter : $I_D = 3$ A , $V_{GS} = 10$ V



Drain-source on-resistance (P-Ch.)

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

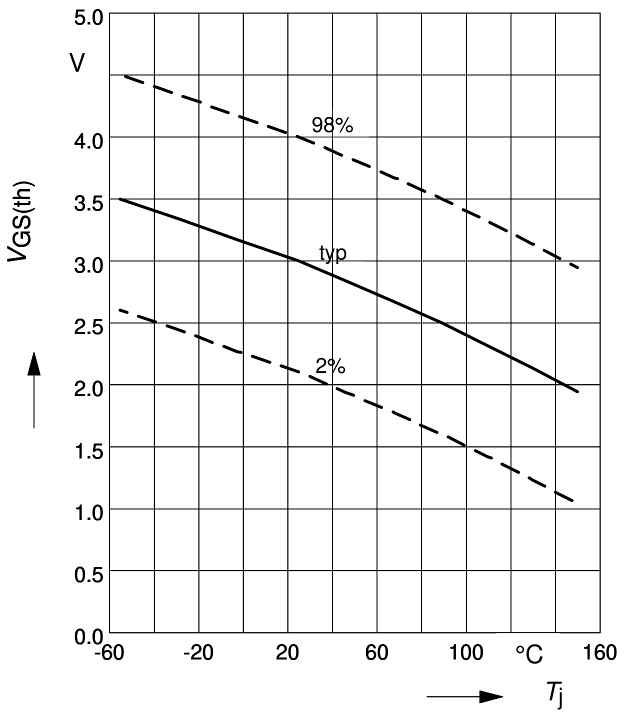
parameter : $I_D = -2$ A , $V_{GS} = -10$ V



Gate threshold voltage (N-Ch.)

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

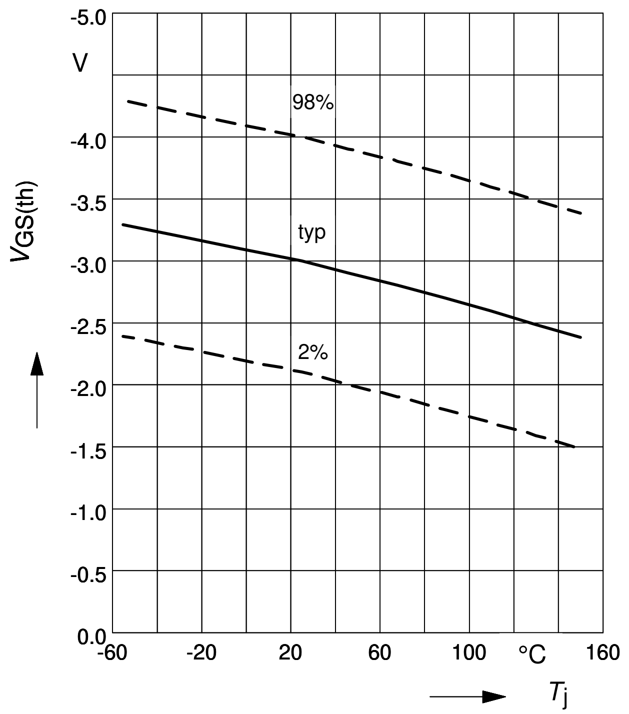
parameter: $V_{GS} = V_{DS}$, $I_D = 20$ µA



Gate threshold voltage (P-Ch.)

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

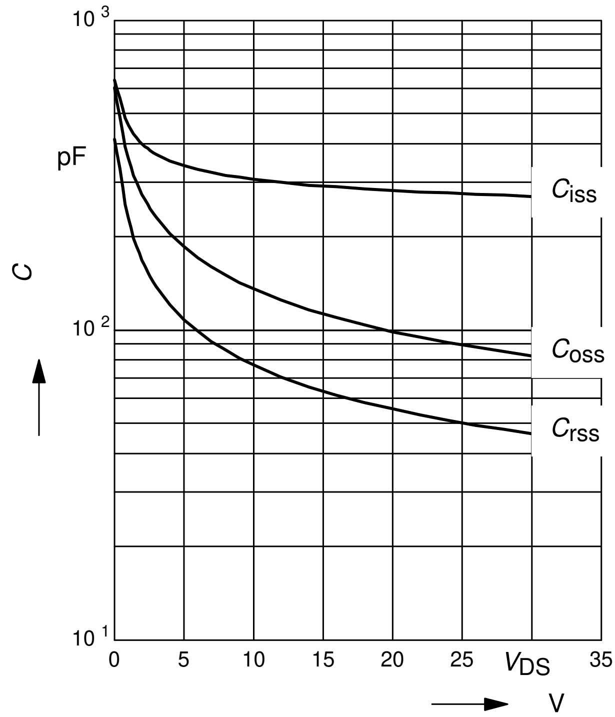
parameter: $V_{GS} = V_{DS}$, $I_D = -450$ µA



Typ. capacitances (N-Ch.)

$C = f(V_{DS})$

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



Typ. capacitances (P-Ch.)

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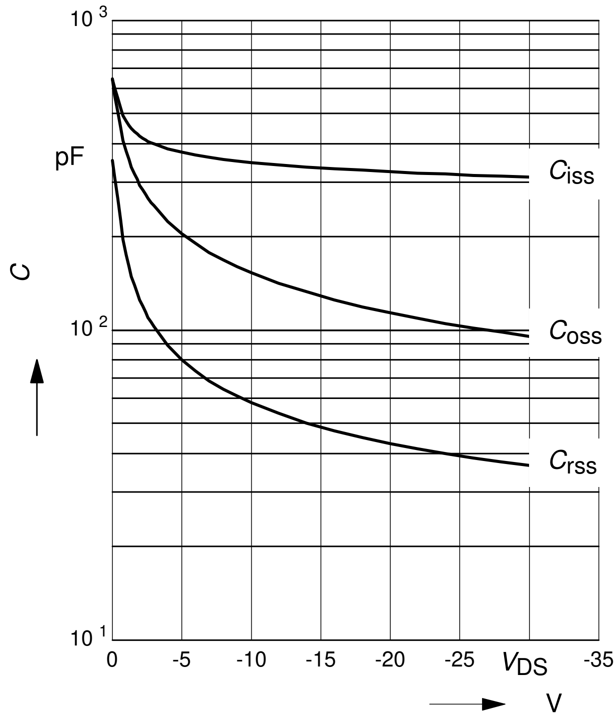
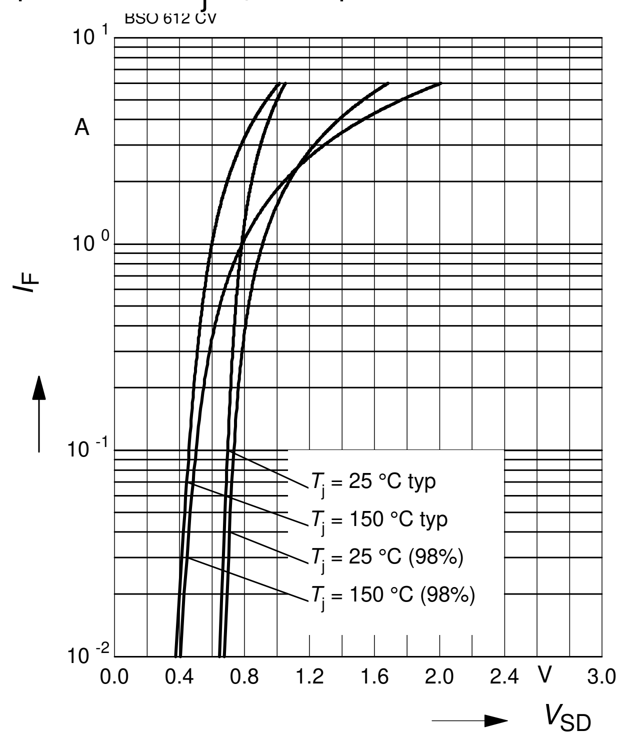
parameter: V_{GS}=0 V, f=1 MHz



Forward characteristics of reverse diode

$I_F = f(V_{SD})$, (N-Ch.)

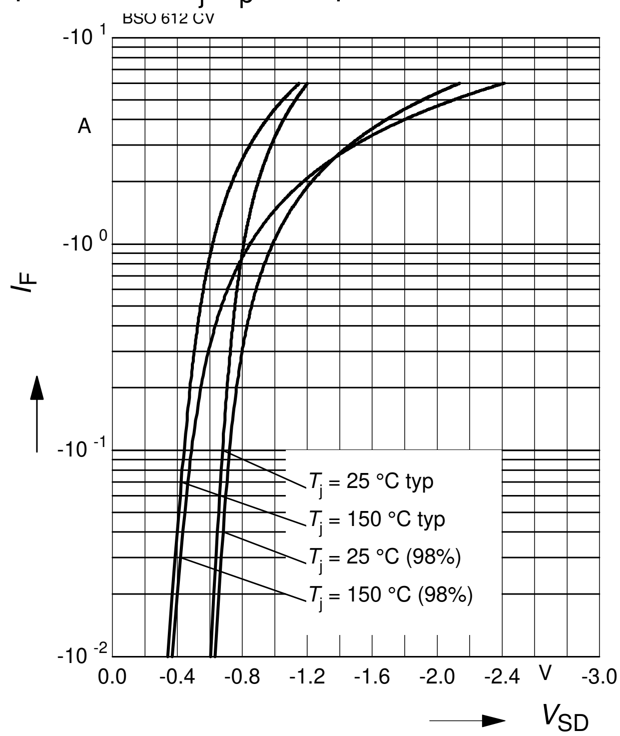
parameter: T_j , tp = 80 µs



Forward characteristics of reverse diode

$I_F = f(V_{SD})$, (P-Ch.)

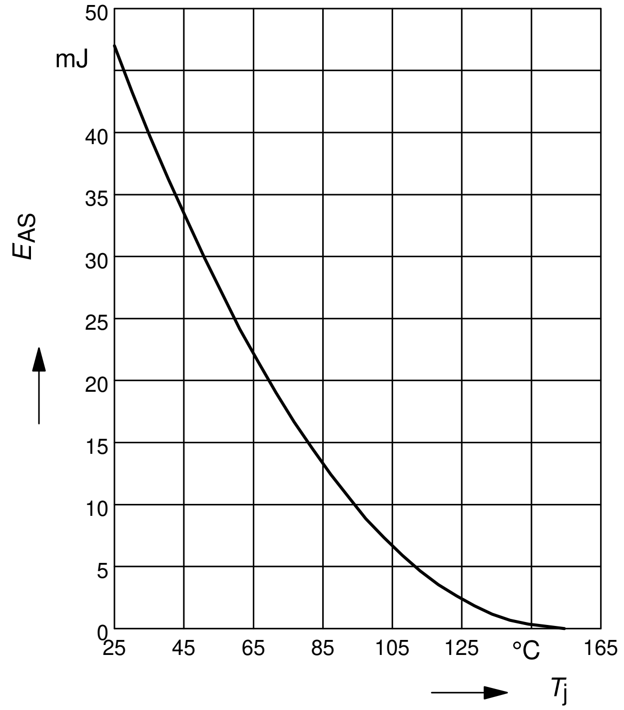
parameter: T_j , t_p = 80 µs



Avalanche Energy $E_{AS} = f(T_j)$ (N-Ch.)

parameter: I_D = 3 A, V_{DD} = 25 V

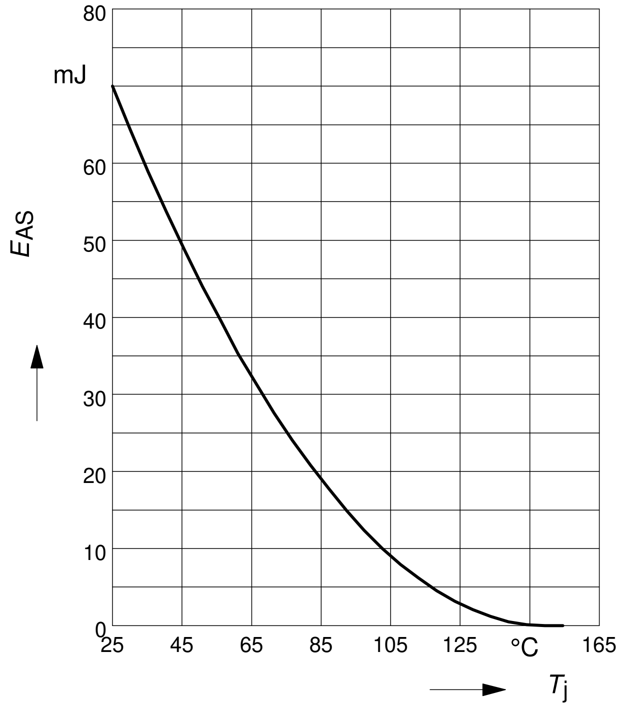
R_{GS} = 25 Ω



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

parameter: I_D = -2 A, V_{DD} = -25 V

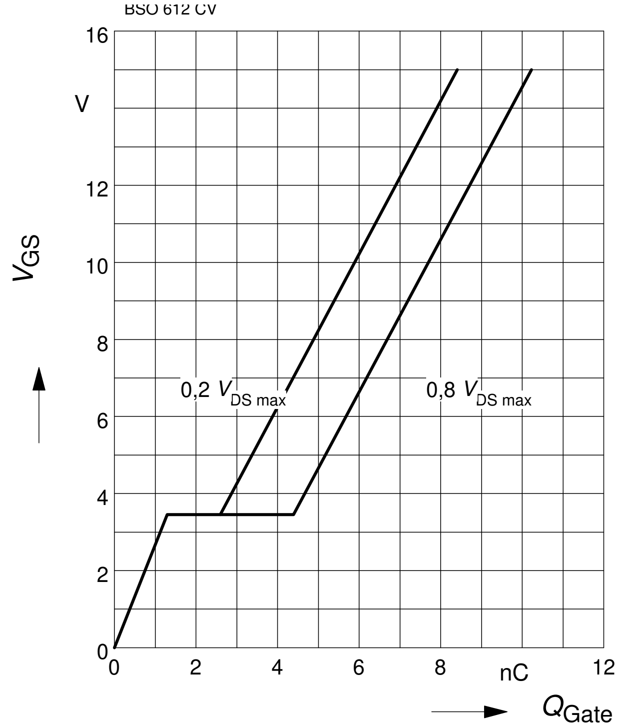
R_{GS} = 25 Ω



Typ. gate charge (N-Ch.)

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

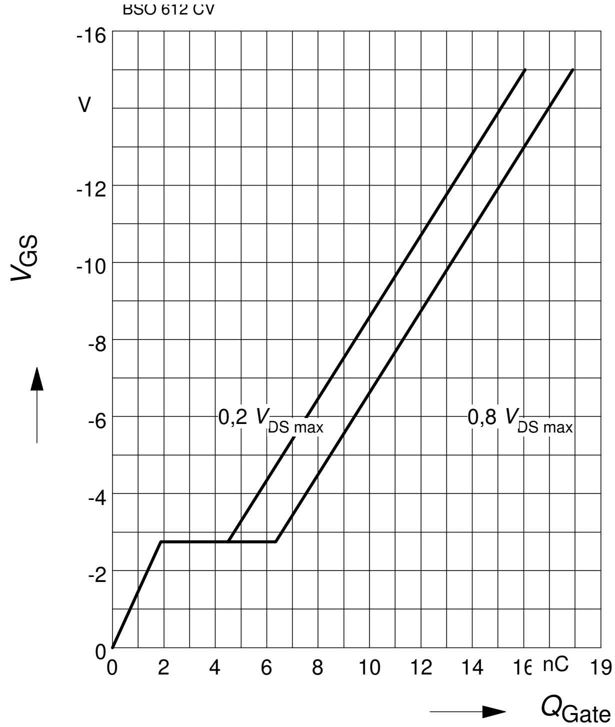
parameter: I_D = 3 A



Typ. gate charge (P-Ch.)

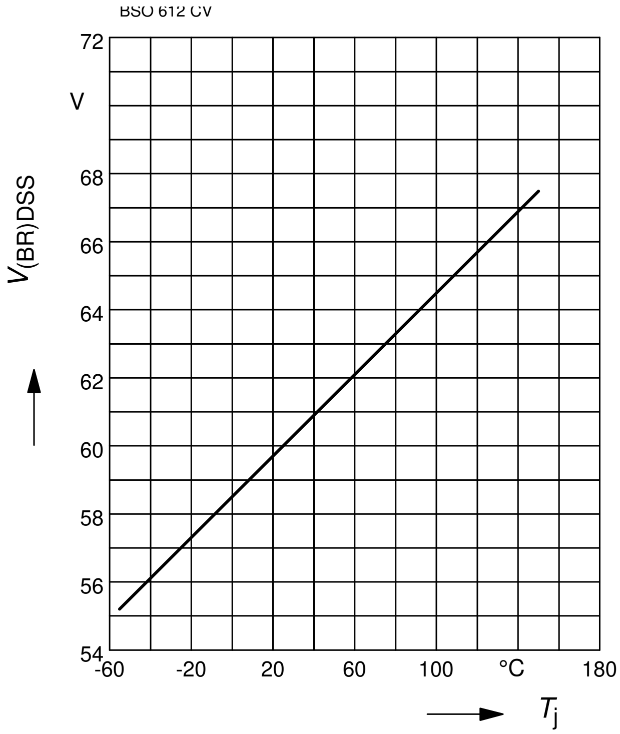
$V_{GS} = f(Q_{Gate})$

parameter: I_D = -2 A



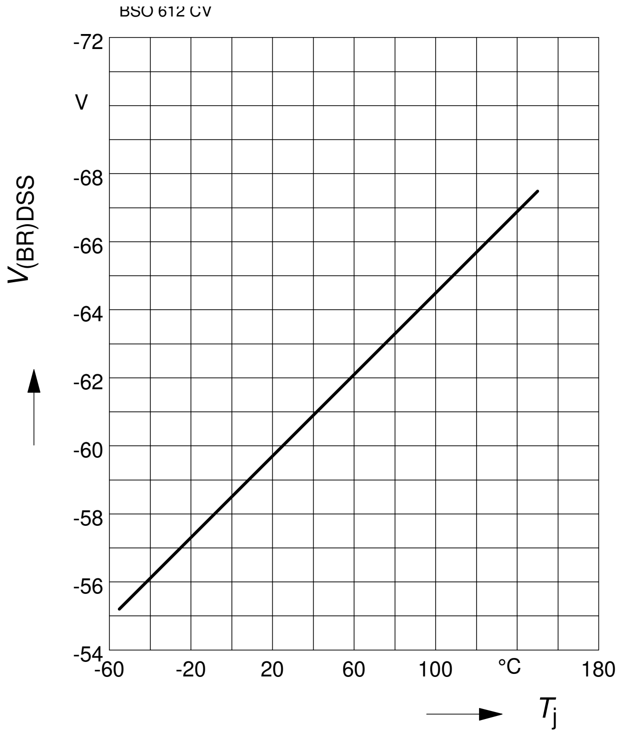
Drain-source breakdown voltage

$V_{(BR)DSS}$ = f (T_j), (N-Ch.)



Drain-source breakdown voltage

$V_{(BR)DSS}$ = f (T_j), (P-Ch.)



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