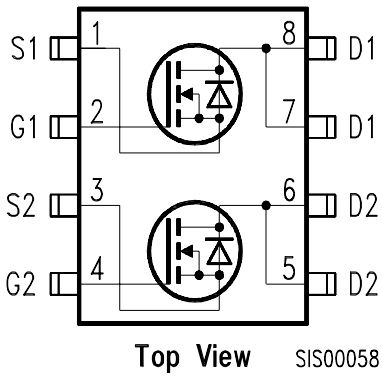
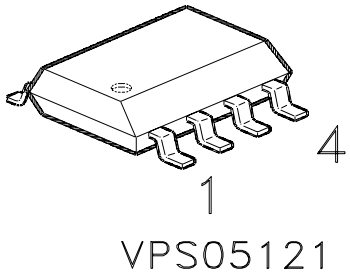
SIPMOS ® Small-Signal Transistor

- Dual N-channel
- Enhancement mode
- Logic Level
- Avalanche rated
- $V_{GS(th)}$ = 1.2 ...2.0 V





Type	V_{DS}	I_D	$R_{DS(on)}$	Package	Marking	Ordering Code
BSO307N	30 V	4.2 A	0.075 Ω	P-DSO-8		Q. . . . - . . . .

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

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current, *one channel active* T_A = 25 °C	I_D	4.2	A
Pulsed drain current, *one channel active* T_A = 25 °C	I_{Dpuls}	16.8	
Avalanche energy, single pulse I_D = 4.2 A, V_{DD} = 25 V, R_{GS} = 25 Ω L = 6.23 mH, T_j = 25 °C	E_{AS}	-	mJ
Avalanche current, repetitive,limited by $T_{j(max)}$	I_{AR}	4.2	A
Avalanche energy, periodic limited by $T_{j(max)}$	E_{AR}	-	mJ
Reverse diode dv/dt I_S = 4.2 A, V_{DS} = 20 V, di/dt = 200 A/µs T_{jmax} = 150 °C	dv/dt	-	KV/µs
Gate source voltage	V_{GS}	± 14	V
Power dissipation, *one channel avtive* T_A = 25 °C	P_{tot}	2	W
Chip or operating temperature	T_j	-55 ... + 150	°C
Storage temperature	T_{stg}	-55 ... + 150	
IEC climatic category, DIN IEC 68-1		55 / 150 / 56	

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Thermal resistance, junction-soldering point 1)2)	R_{thJS}	-	30	-	K/W
Thermal resistance, chip to ambient 1)2)	R_{thJA}	-	62.5	-	

1) Device on 50mm * 50mm *1.5mm epoxy PCB FR4 with 6 cm2 copper area around the heat slug footprint(one layer, 70 µm copper). PCB is vertical without blown air.

2) one channel active

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 = 25 °C	$V_{(BR)DSS}$	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 V_{DS} = 30 V, V_{GS} = 0 V, T_j = 25 °C V_{DS} = 30 V, V_{GS} = 0 V, T_j = 125 °C	I_{DSS}	- -	0.1 10	1 100	µA
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 = 4.2 A	$R_{DS(on)}$	-	0.055	0.075	Ω

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

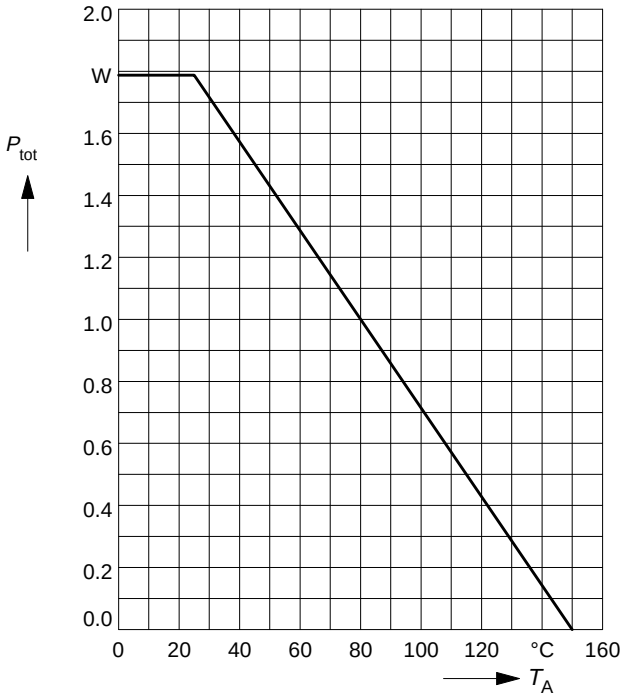
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$, I_D = 4.2 A	g_{fs}	3	6	-	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	-	400	500	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	-	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 = 4.2 A R_G = 16 Ω	$t_{d(on)}$	-	22	33	ns
Rise time V_{DD} = 15 V, V_{GS} = 4.5 V, I_D = 4.2 A R_G = 16 Ω	t_r	-	22	33	
Turn-off delay time V_{DD} = 15 V, V_{GS} = 4.5 V, I_D = 4.2 A R_G = 16 Ω	$t_{d(off)}$	-	22	33	
Fall time V_{DD} = 15 V, V_{GS} = 4.5 V, I_D = 4.2 A R_G = 16 Ω	t_f	-	25	38	
Gate charge at threshold V_{DD} = 15 V, $I_D \geq$ 0.1 A, V_{GS} 0 to 1 V	$Q_{g(th)}$	-	0.4	0.6	nC
Gate Charge at 5.0 V V_{DD} = 15 V, I_D = 4.2 A, V_{GS} 0 to 5 V	$Q_{g(5)}$	-	8	12	
Gate Charge total V_{DD} = 15 V, I_D = 4.2 A, V_{GS} 0 to 10 V	$Q_{g(total)}$	-	13	20	
Gate plateau voltage V_{DS} = 15 V, I_D = 4.2 A	$V_{(plateau)}$	-	3.2	-	V

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_A = 25 °C	I_S	-	-	4.2	A
Inverse diode direct current,pulsed T_A = 25 °C	I_{SM}	-	-	16.8	
Inverse diode forward voltage V_{GS} = 0 V, I_F = 8.4 A	V_{SD}	-	0.85	1.1	V
Reverse recovery time V_R = 15 V, I_F=I_S, di_F/dt = 100 A/µs	t_{rr}	-	25	38	ns
Reverse recovery charge V_R = 15 V, I_F=I_S, di_F/dt = 100 A/µs	Q_{rr}	-	20	30	nC

Power dissipation

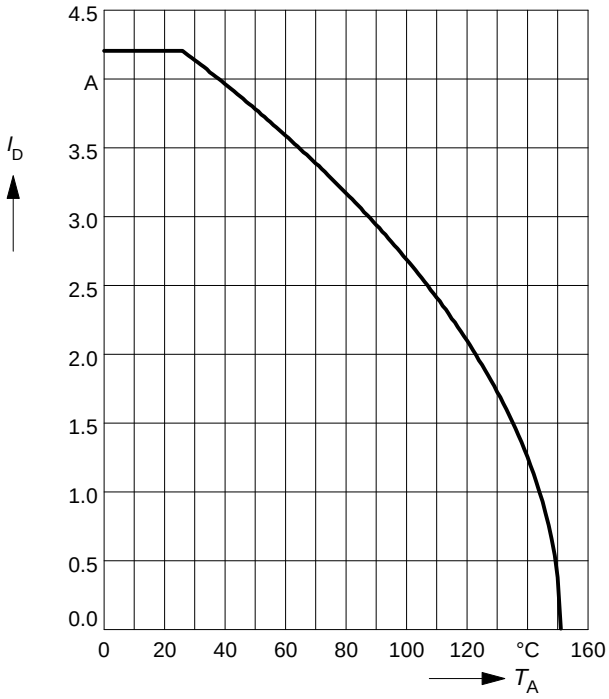
$P_{tot} = f(T_A)$



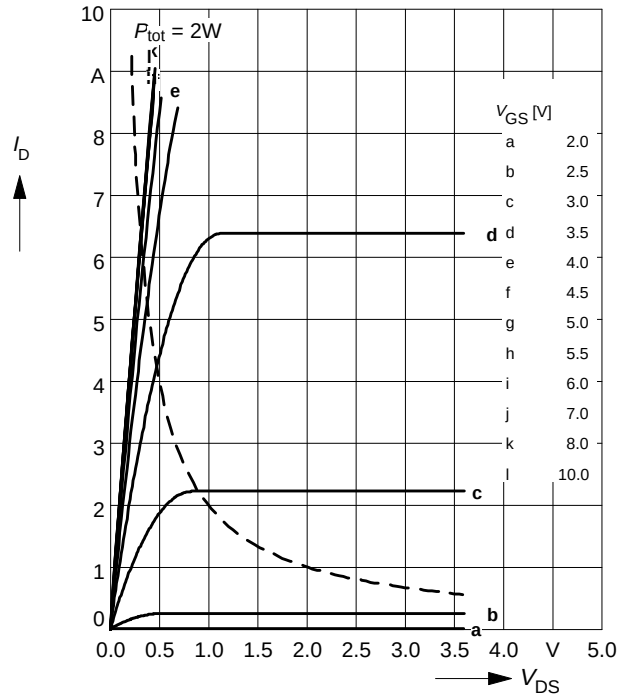
Drain current

$I_D = f(T_A)$

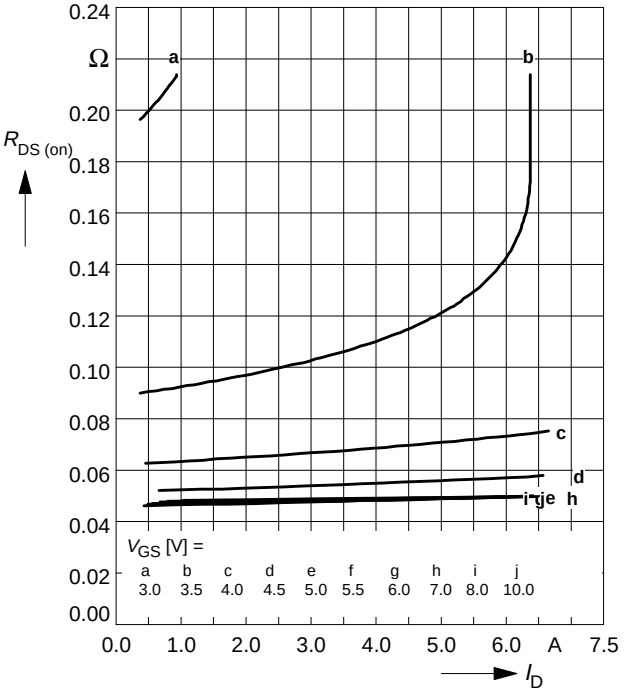
parameter: $V_{GS} \geq 4$ V



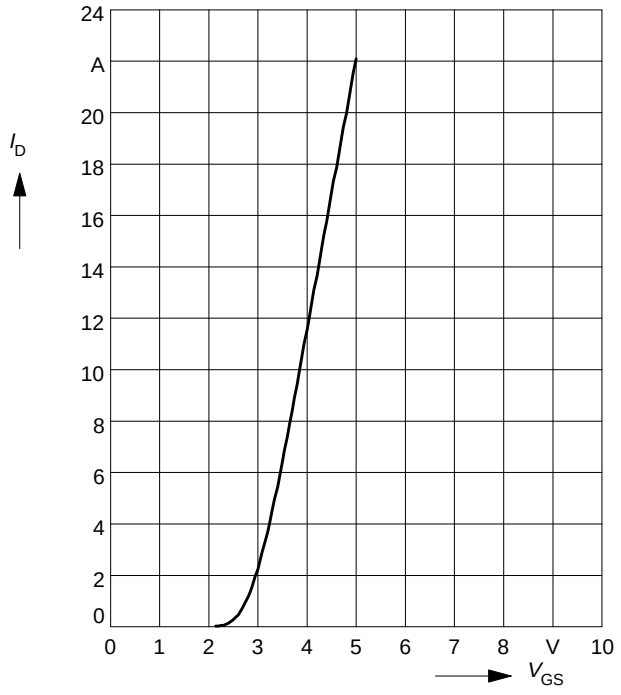
Typ. output characteristics
$I_D = f(V_{DS})$
parameter: t_p = 80 µs



Typ. drain-source on-resistance
$R_{DS\,(on)} = f(I_D)$
parameter: t_p = 80 µs, T_j = 25 °C



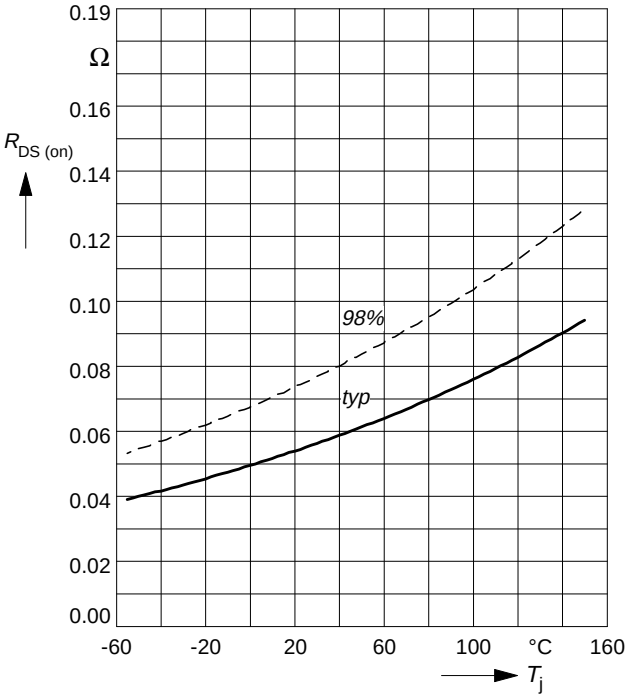
Typ. transfer characteristics $I_D = f(V_{GS})$
parameter: t_p = 80 µs
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



Drain-source on-resistance

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

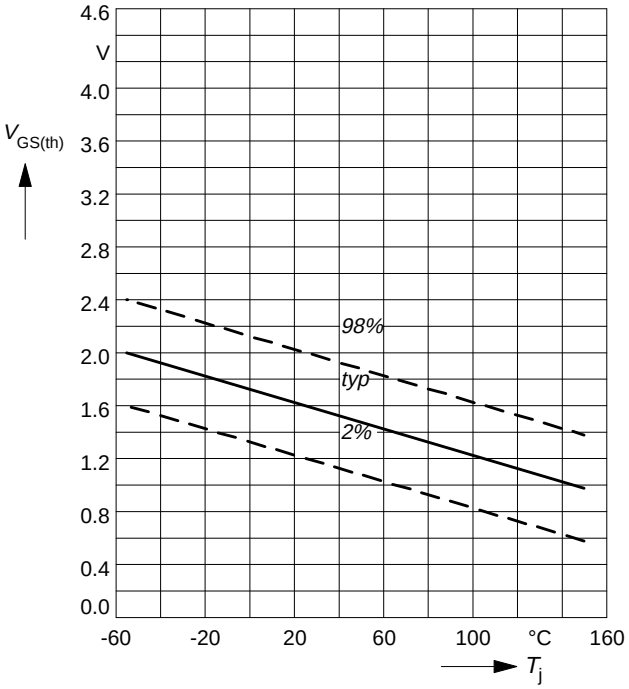
parameter: I_D = 4.2 A, V_{GS} = 4.5 V



Gate threshold voltage

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

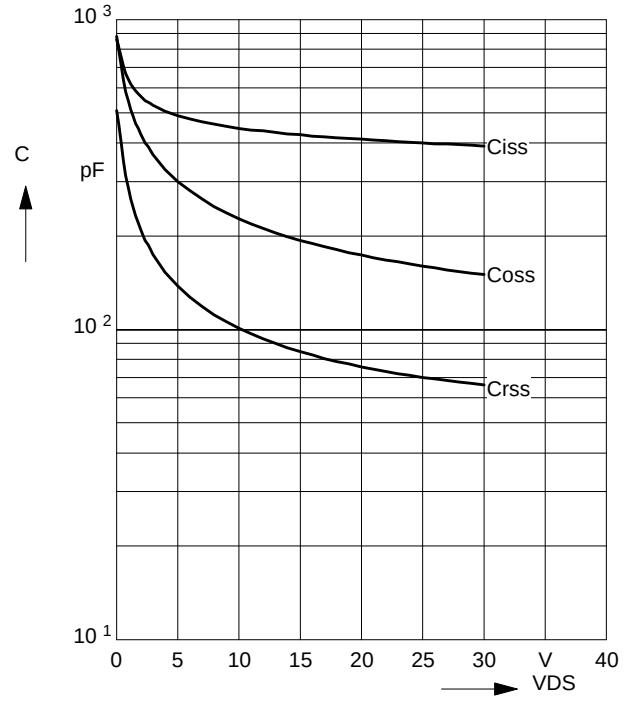
parameter: $V_{GS} = V_{DS}$, I_D = 20 µA



Typ. capacitances

$C = f(V_{DS})$

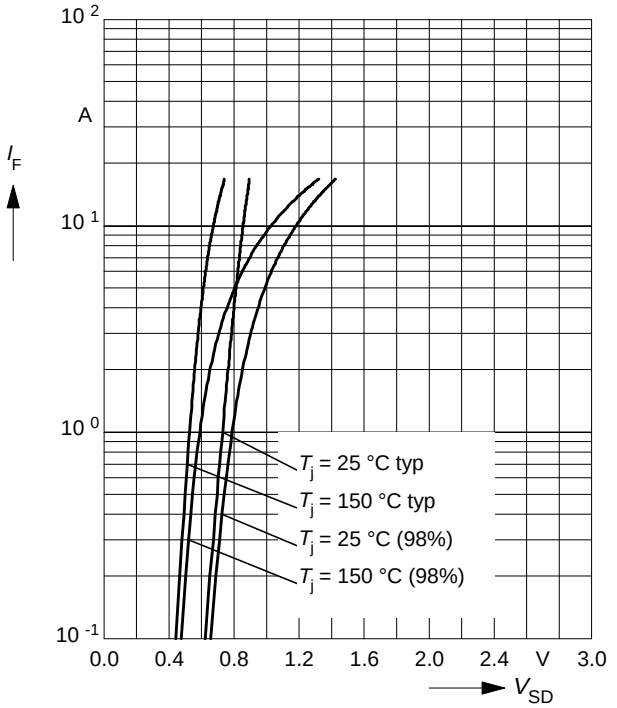
parameter: V_{GS}=0V, f = 1 MHz



Forward characteristics of reverse diode

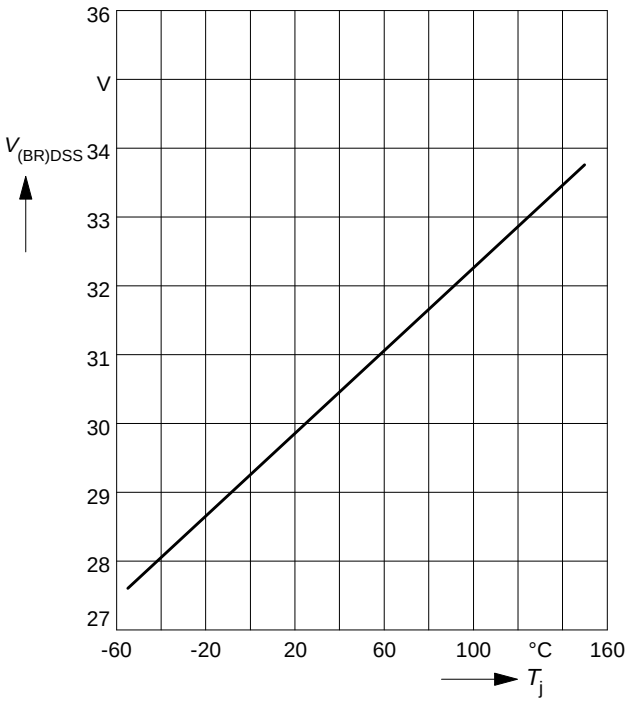
$I_F = f(V_{SD})$

parameter: T_j, t_p = 80 µs



Drain-source breakdown voltage

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



Typ. gate charge

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

parameter: $I_{D\ puls} = 4$ A