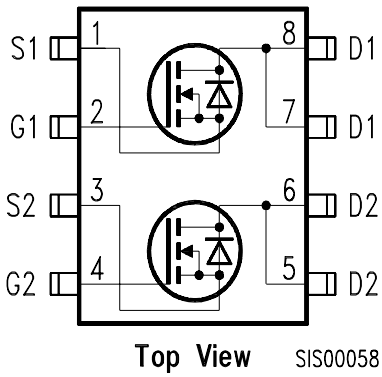
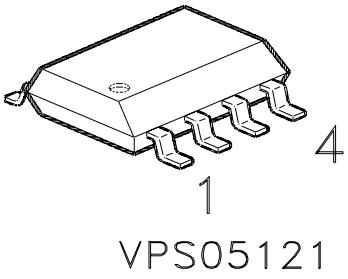
SIPMOS ® Small-Signal Transistor

- Dual N-channel
- Enhancement mode
- Avalanche rated
- $V_{GS(th)}$ =2.1 ...4.0V





Type	V_{DS}	I_D	$R_{DS(on)}$	Package	Marking	Ordering Code
BSO 615NV	60 V	3.1 A	0.12 Ω	P-DSO-8		Q67000-S. . .

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

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current, *one channel active*	I_D		A
T_A = 25 °C		3.1	
T_A = 100 °C		1.95	
Pulsed drain current, *one channel active*	I_{Dpuls}		
T_A = 25 °C		12.4	
Avalanche energy, single pulse	E_{AS}		mJ
I_D = 3.1 A, V_{DD} = 25 V, R_{GS} = 25 Ω			
L = 12.8 mH, T_j = 25 °C		60	
Avalanche current, repetitive,limited by $T_{j(max)}$	I_{AR}	3.1	A
Avalanche energy, periodic limited by $T_{j(max)}$	E_{AR}	0.2	mJ
Reverse diode dv/dt	dv/dt		KV/µs
I_S = 3.1 A, V_{DS} = 40 V, di/dt = 200 A/µs			
T_{jmax} = 150 °C		6	
Gate source voltage	V_{GS}	± 20	V
Power dissipation, *one channel avtive*	P_{tot}		W
T_A = 25 °C		2	
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}	-	tbd	-	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	$V_{(BR)DSS}$	60	-	-	V
Gate threshold voltage V_{GS}=V_{DS}, I_D = 0.02 mA	$V_{GS(th)}$	2.1	3	4	
Zero gate voltage drain current V_{DS} = 60 V, V_{GS} = 0 V, T_j = -40 °C V_{DS} = 60 V, V_{GS} = 0 V, T_j = 25 °C V_{DS} = 60 V, V_{GS} = 0 V, T_j = 125 °C	I_{DSS}	 - - -	 - 0.1 -	 0.1 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} = 10 V, I_D = 3.1 A	$R_{DS(on)}$	-	0.09	0.12	Ω

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

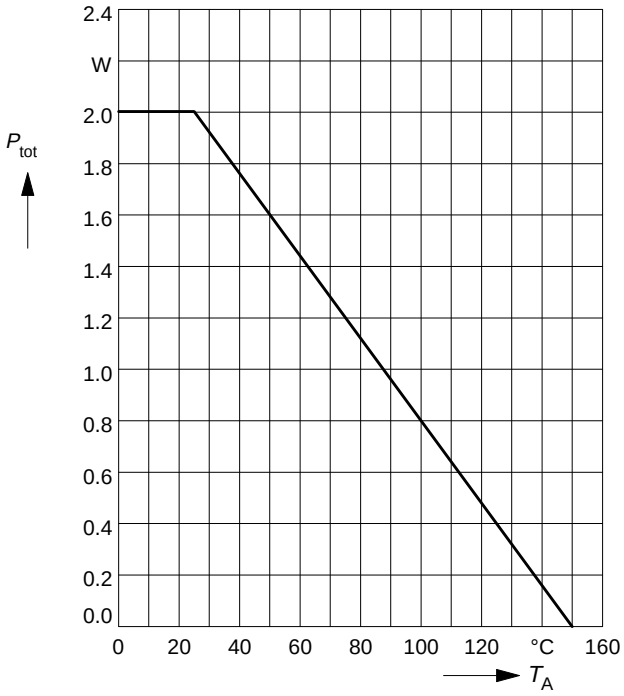
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$, I_D = 3.1 A	g_{fs}	2.5	-	-	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	-	275	340	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	-	90	115	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	-	50	60	
Turn-on delay time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3.1 A R_G = 32.6 Ω	$t_{d(on)}$	-	11	17	ns
Rise time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3.1 A R_G = 32.6 Ω	t_r	-	24	36	
Turn-off delay time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3.1 A R_G = 32.6 Ω	$t_{d(off)}$	-	25	38	
Fall time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3.1 A R_G = 32.6 Ω	t_f	-	35	53	
Gate charge at threshold V_{DD} = 40 V, I_D = 0.1 A, V_{GS} 0 to 1 V	$Q_{g(th)}$	-	0.24	0.3	nC
Gate Charge at 7.0 V V_{DD} = 40 V, I_D = 3.1 A, V_{GS} 0 to 7 V	$Q_{g(7)}$	-	7.4	9.3	
Gate Charge total V_{DD} = 40 V, I_D = 3.1 A, V_{GS} 0 to 10 V	$Q_{g(total)}$	-	9.7	12	
Gate plateau voltage V_{DS} = 15 V, I_D = 3.1 A	$V_{(plateau)}$	-	4.7	-	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	-	-	3.1	A
Inverse diode direct current,pulsed T_A = 25 °C	I_{SM}	-	-	12.4	
Inverse diode forward voltage V_{GS} = 0 V, I_F = 6.2 A	V_{SD}	-	1	1.2	V
Reverse recovery time V_R = 30 V, I_F=I_S, di_F/dt = 100 A/µs	t_{rr}	-	45	56	ns
Reverse recovery charge V_R = 30 V, I_F=I_S, di_F/dt = 100 A/µs	Q_{rr}	-	0.08	0.12	µC

Power dissipation

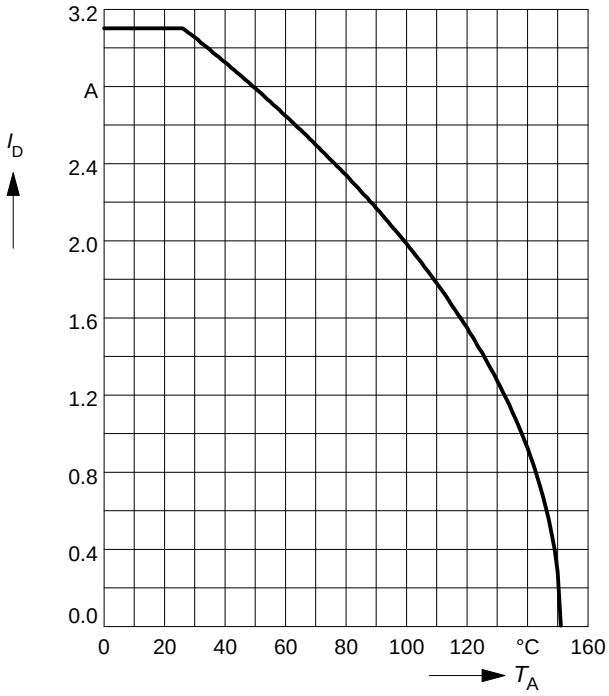
$P_{tot} = f(T_A)$



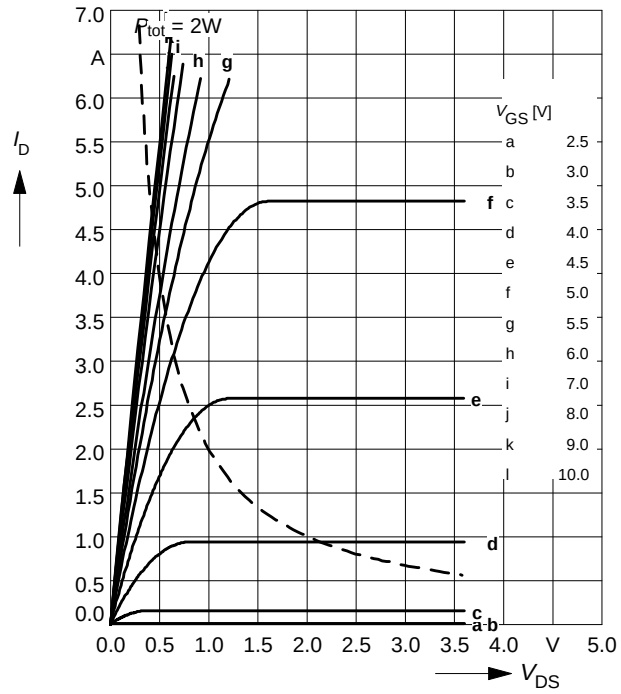
Drain current

$I_D = f(T_A)$

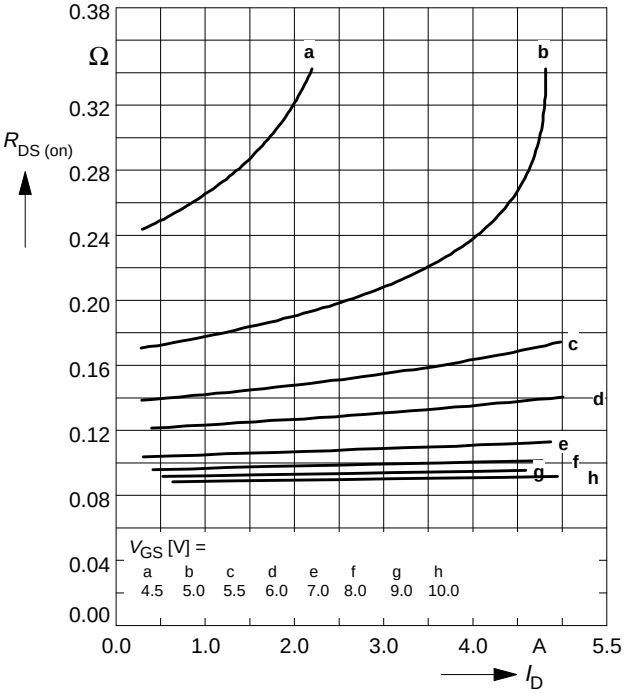
parameter: $V_{GS} \geq 10$ V



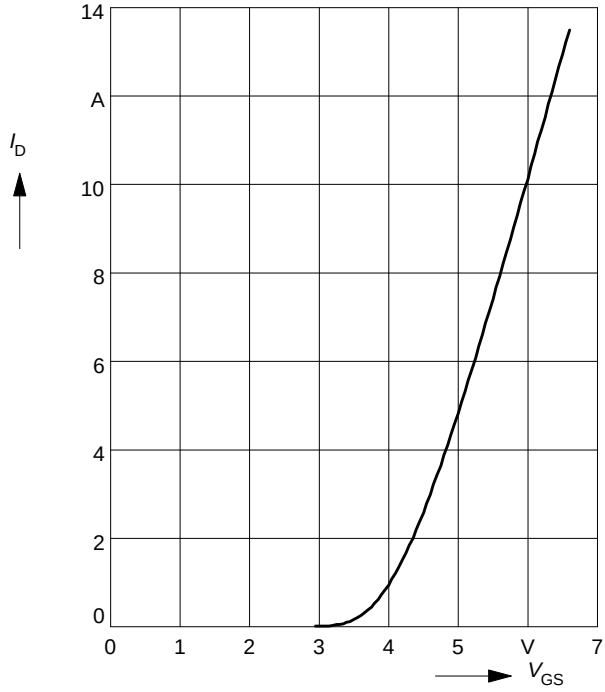
Typ. output characteristics
$I_D = f(V_{DS})$
parameter: t_p = 80 µs



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



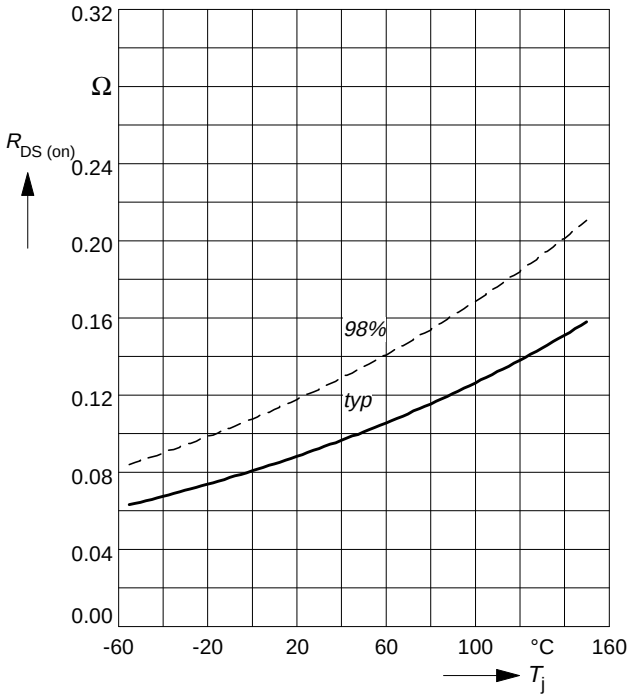
Typ. transfer characteristics $I_D = f(V_{GS})$
parameter: t_p = 80 µs
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



Drain-source on-resistance

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

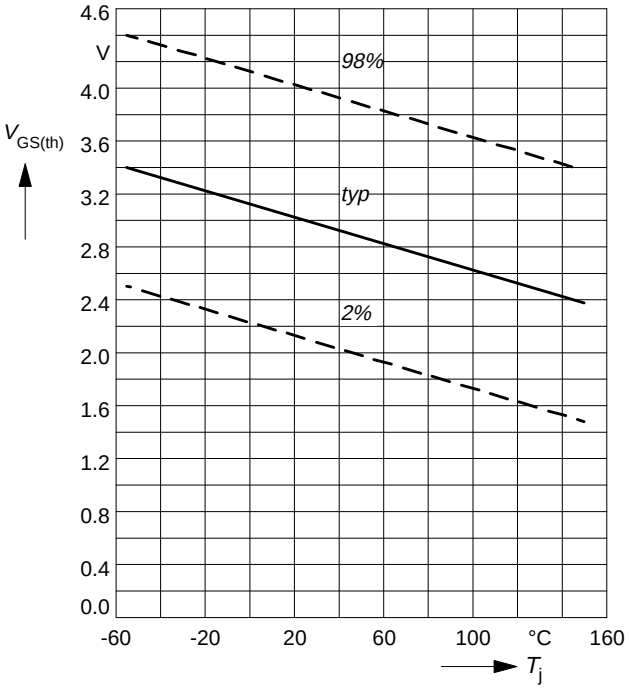
parameter: I_D = 3.1 A, V_{GS} = 10 V



Gate threshold voltage

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

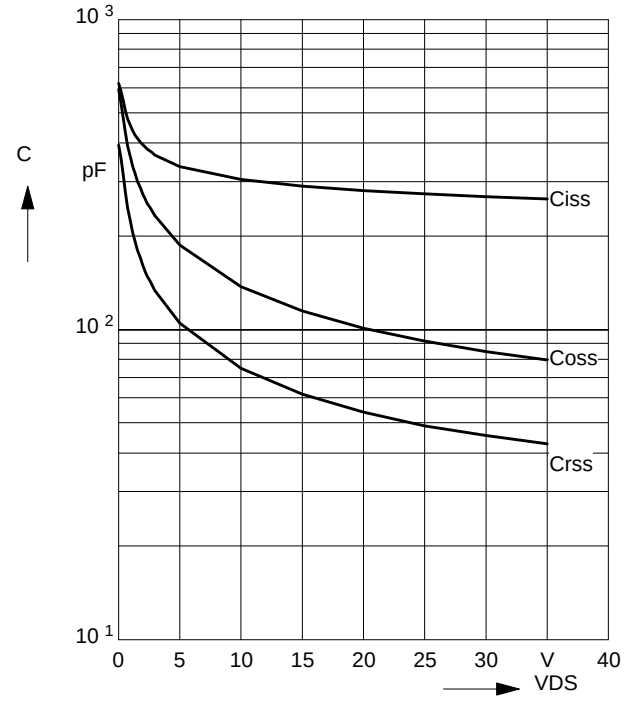
parameter: $V_{GS} = V_{DS}$, I_D = 0.02 mA



Typ. capacitances

$C = f(V_{DS})$

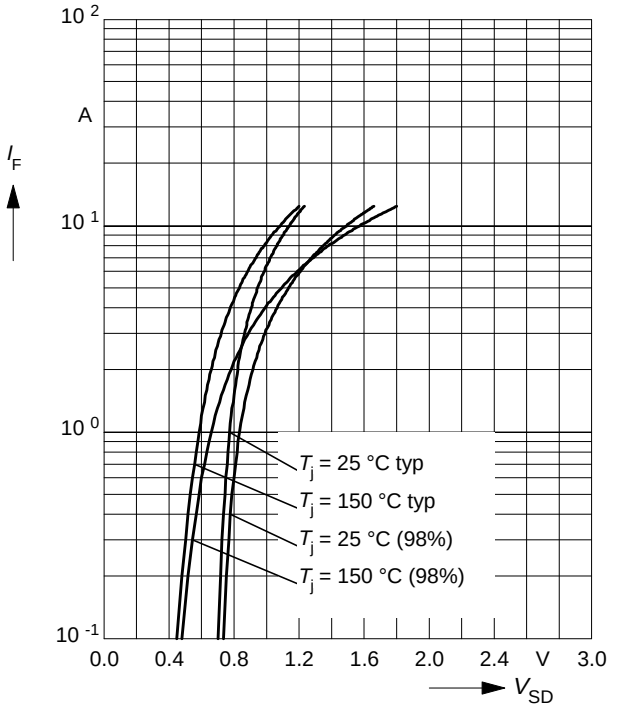
parameter: V_{GS}=0V, f = 1 MHz



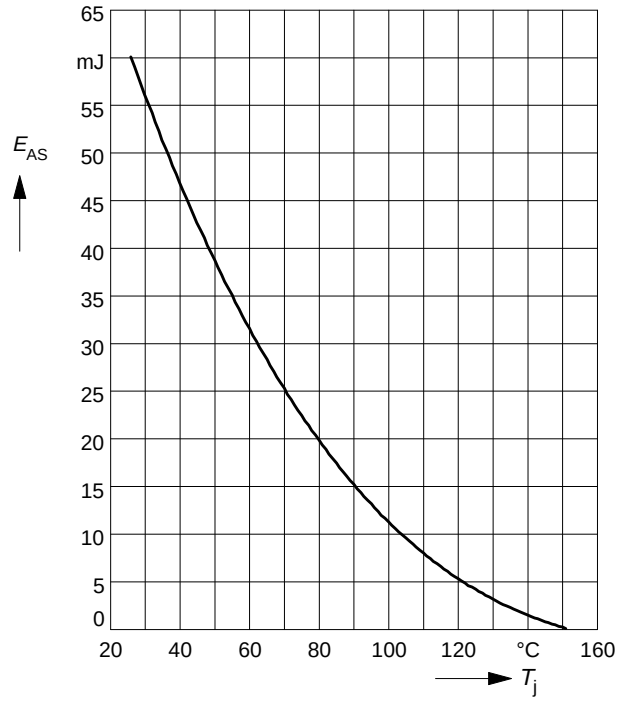
Forward characteristics of reverse diode

$I_F = f(V_{SD})$

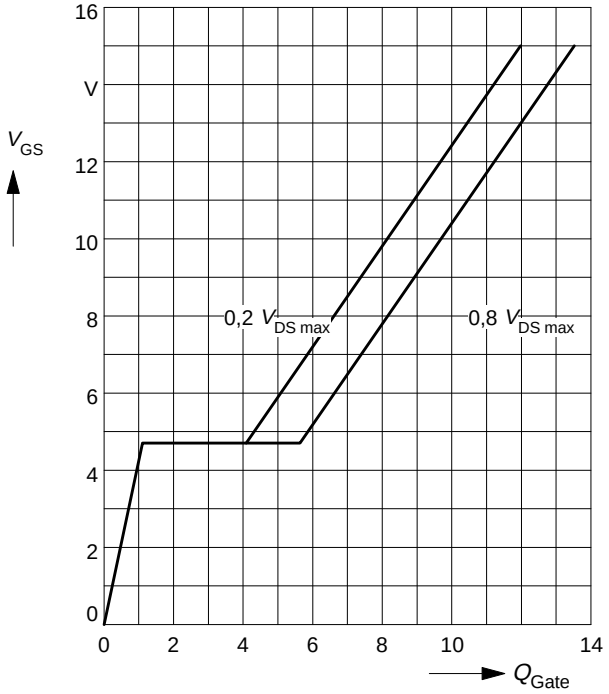
parameter: T_j, t_p = 80 µs



Avalanche energy $E_{AS} = f(T_j)$
parameter: I_D = 3.1 A, V_{DD} = 25 V
R_{GS} = 25 Ω, L = 12.8 mH



Typ. gate charge
$V_{GS} = f(Q_{Gate})$
parameter: $I_{D\ puls}$ = 3 A



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