Infineon technologies

Preliminary Data

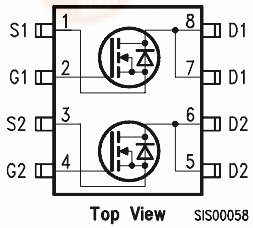
SIPMOS® Small-Signal-Transistor **BSO 305N**

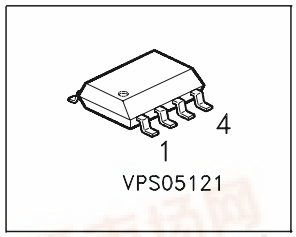
Features

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

Product Summary

Drain source voltage	V_{DS}	30	V
Drain-Source on-state resistance	$R_{DS(on)}$	0.035	Ω
Continuous drain current	I_D	6	A





Type	Package	Ordering Code
BSO 305 N	SO 8	Q67041-S4028

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

Parameter	Symbol	Value	Unit
Continuous drain current, *one channel active* T_C = 25 °C, T_A = 25 °C	I_D	6	A
Pulsed drain current, *one channel active* T_C = 25 °C	I_{Dpulse}	24	
Avalanche energy, single pulse I_D = 6 A, V_{DD} = 25 V, R_{GS} = 25 Ω	E_{AS}	100	mJ
Avalanche current,periodic limited by T_{jmax}	I_{AR}	6	A
Avalanche energy, periodic limited by T_{jmax}	E_{AR}	0.2	mJ
Reverse diode d*v*/d*t* I_S = 6 A, V_{DS} = 24 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, *one channel active* T_C = 25 °C	P_{tot}	2	W
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.	
Characteristics					
Thermal resistance, junction - soldering point	R_{thJS}	-	-	35	K/W
Thermal resistance @ 10 sec., min. footprint	$R_{th(JA)}$	-	-	90	
Thermal resistance @ 10 sec., 6 cm^2 cooling area [1)]	$R_{th(JA)}$	-	-	62.5	

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 = 30 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 = 150 °C	I_{DSS}	 - -	 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} = 4.5 V, I_D = 5 A V_{GS} = 10 V, I_D = 6 A	$R_{DS(on)}$	 - -	 0.033 0.023	 0.05 0.035	Ω

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

Electrical Characteristics

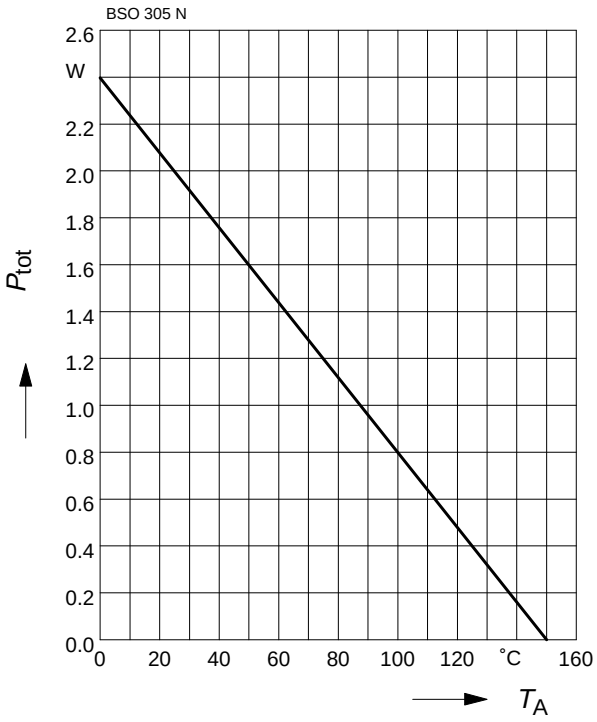
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Transconductance $V_{DS} \leq 2 * I_D * R_{DS(on)max}$, I_D = 6 A	g_{fs}	6	12	-	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	-	650	815	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	-	300	375	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	-	160	200	
Turn-on delay time V_{DD} = 15 V, V_{GS} = 4.5 V, I_D = 5 A, R_G = 9.1 Ω	$t_{d(on)}$	-	16	24	ns
Rise time V_{DD} = 15 V, V_{GS} = 4.5 V, I_D = 5 A, R_G = 9.1 Ω	t_r	-	50	75	ns
Turn-off delay time V_{DD} = 15 V, V_{GS} = 4.5 V, I_D = 5 A, R_G = 9.1 Ω	$t_{d(off)}$	-	15	23	
Fall time V_{DD} = 15 V, V_{GS} = 4.5 V, I_D = 5 A, R_G = 9.1 Ω	t_f	-	22	33	ns

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

Parameter at T_j = 25 °C, unless otherwise specified	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Gate charge at threshold V_{DD} = 24 V, I_D = 0.1 A, V_{GS} = 0 to 1 V	$Q_{G(th)}$	-	0.9	1.4	nC
Gate charge at V_{gs}=5V V_{DD} = 24 V, I_D = 6 A , V_{GS} = 0 to 5 V	$Q_{g(5)}$	-	16	24	
Gate charge total V_{DD} = 24 V, I_D = 6 A, V_{GS} = 0 to 10 V	Q_g	-	25	38	nC
Gate plateau voltage V_{DD} = 24 V, I_D = 6 A	$V_{(plateau)}$	-	3.2		V
Reverse Diode					
Inverse diode continuous forward current T_A = 25 °C	I_S	-	-	6	A
Inverse diode direct current,pulsed T_A = 25 °C	I_{SM}	-	-	24	
Inverse diode forward voltage V_{GS} = 0 V, I_F = 12 A	V_{SD}	-	1.3	1.7	V
Reverse recovery time V_R = 15 V, I_F=I_S , di_F/dt = 100 A/µs	t_{rr}	-	45	70	ns
Reverse recovery charge V_R = 15 V, I_F=I_S , di_F/dt = 100 A/µs	Q_{rr}	-	45	70	µC

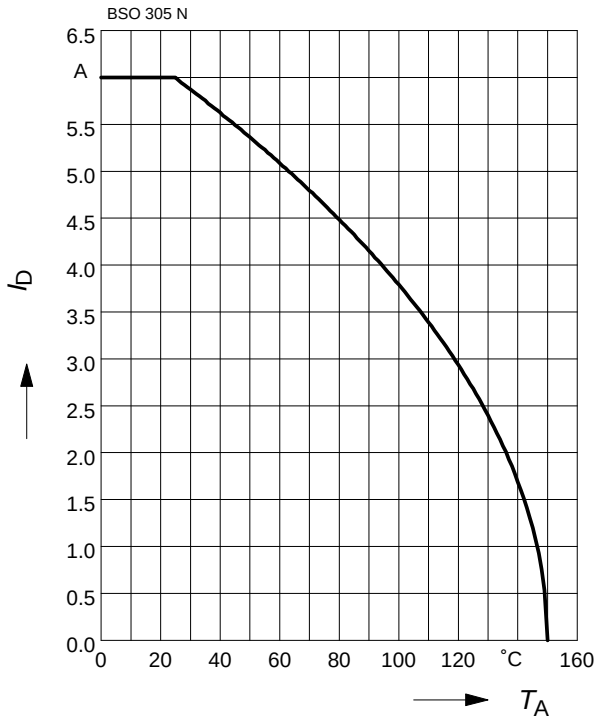
Power dissipation

$P_{tot} = f(T_A)$



Drain current

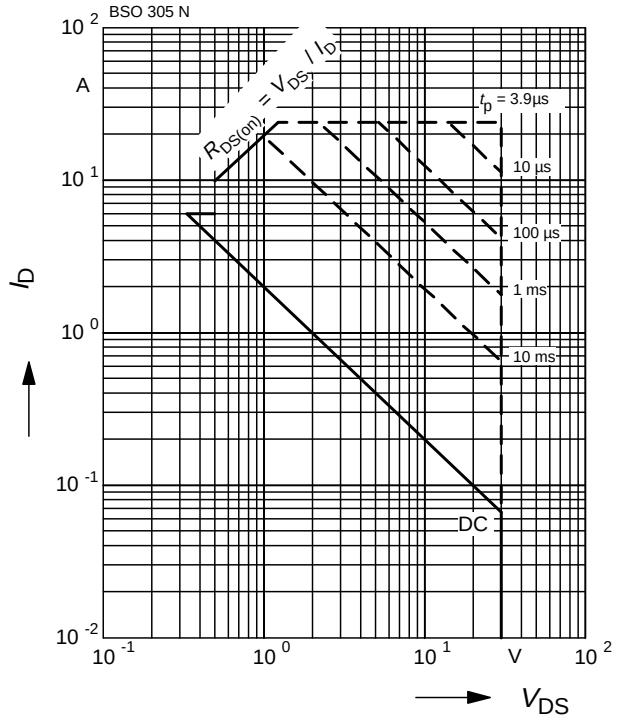
$I_D = f(T_A)$



Safe operating area

$I_D = f(V_{DS})$

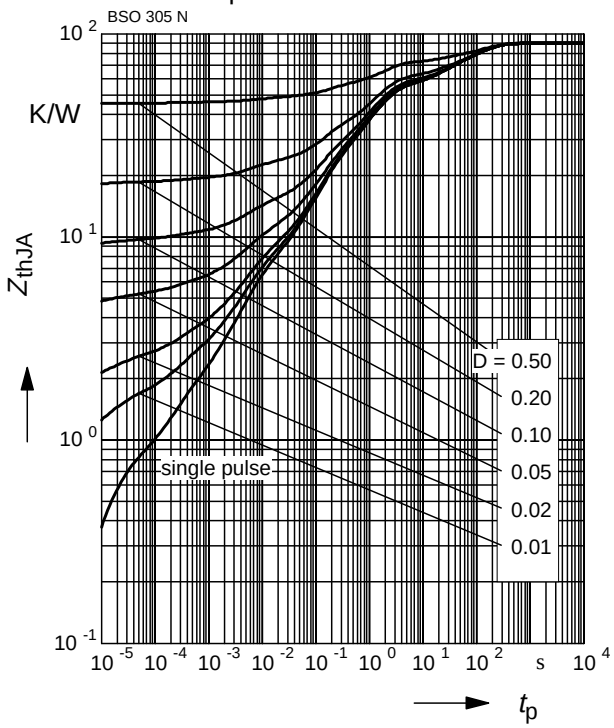
parameter : $D = 0$, $T_A = 25$ °C



Transient thermal impedance

$Z_{thJA} = f(t_p)$

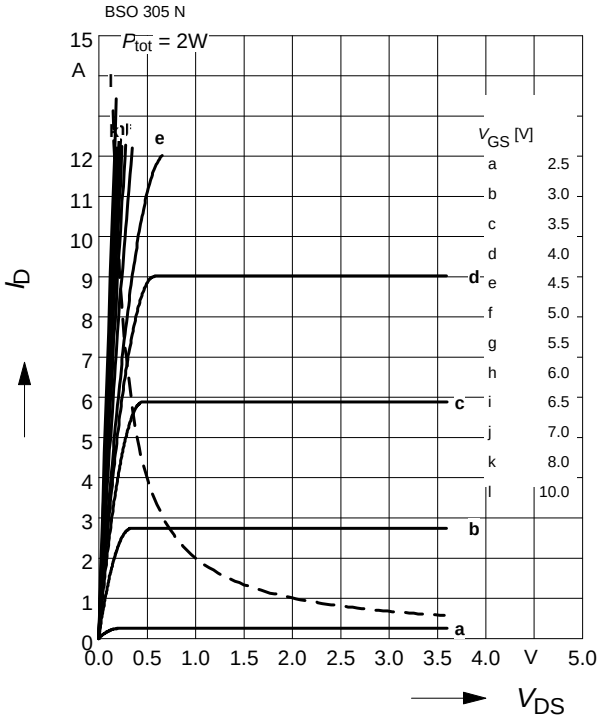
parameter : $D = t_p / T$



Typ. output characteristics

$I_D = f(V_{DS})$

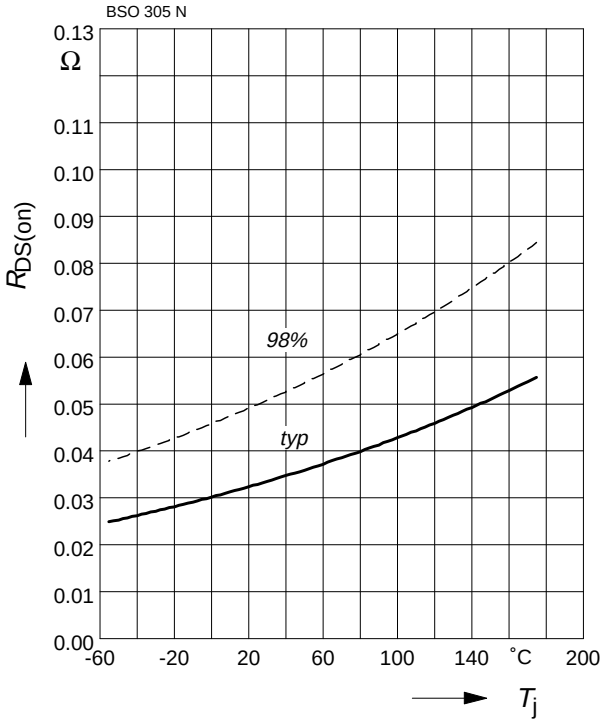
parameter: t_p = 80 µs



Drain-source on-resistance

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

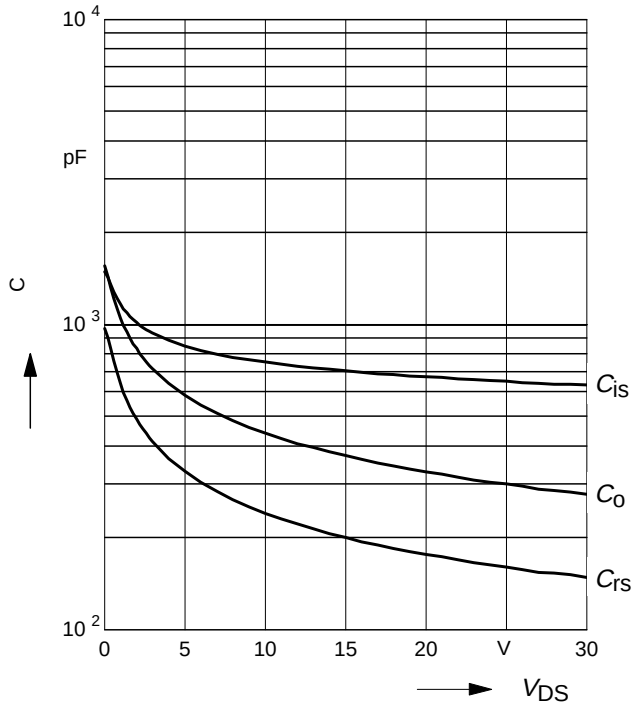
parameter : I_D = 5 A, V_{GS} = 4.5 V



Typ. capacitances

C = f (V_{DS})

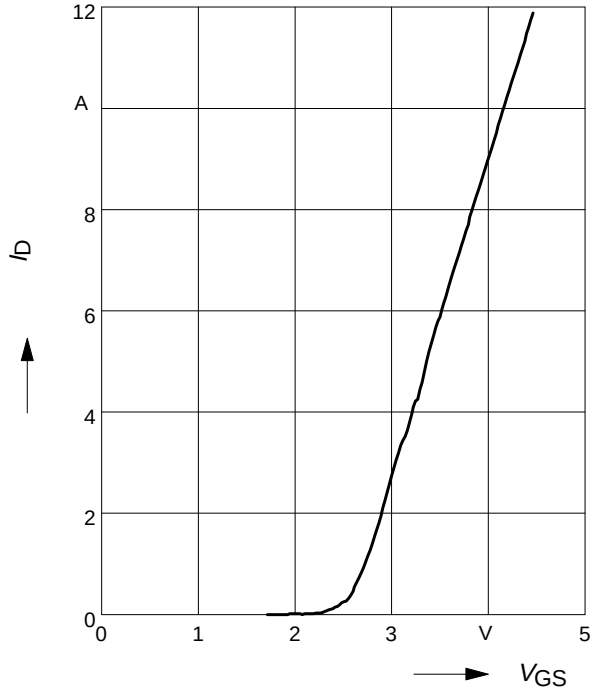
parameter: V_{GS} = 0 V, f = 1 MHz



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

parameter: t_p = 80 µs

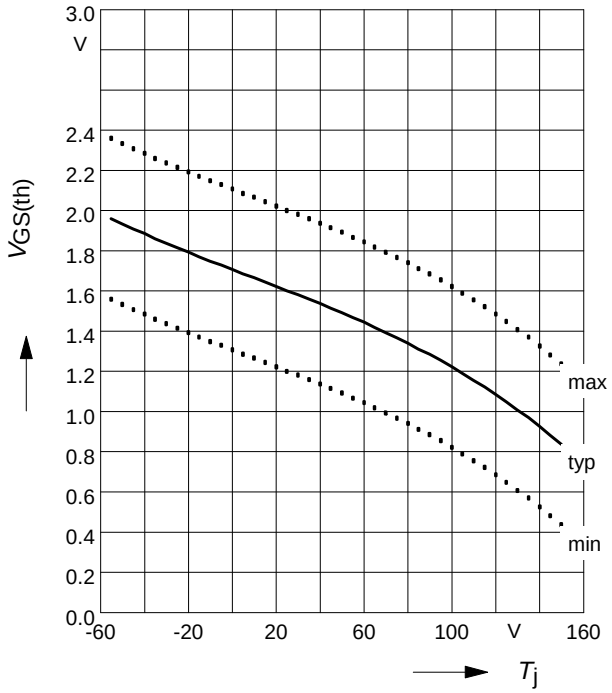
$V_{DS} \geq 2 \times I_D \times R_{DS(on)\,max}$



Gate threshold voltage

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

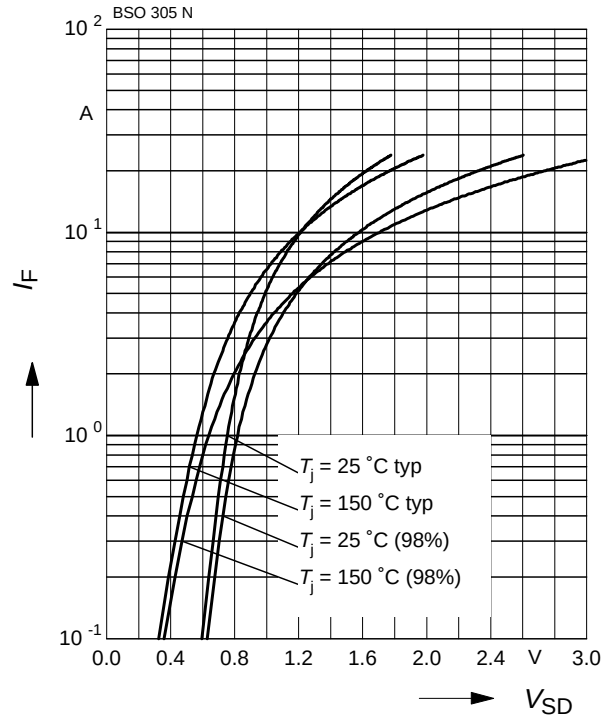
parameter : $V_{GS} = V_{DS}$, I_D = 30 µA



Forward characteristics of reverse diode

$I_F = f(V_{SD})$

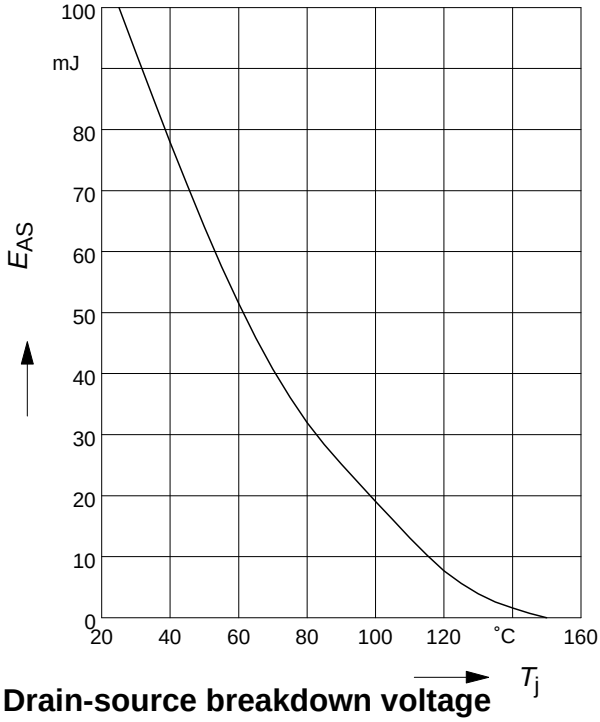
parameter: T_j , t_p = 80 µs



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

parameter: I_D = 6 A, V_{DD} = 25 V

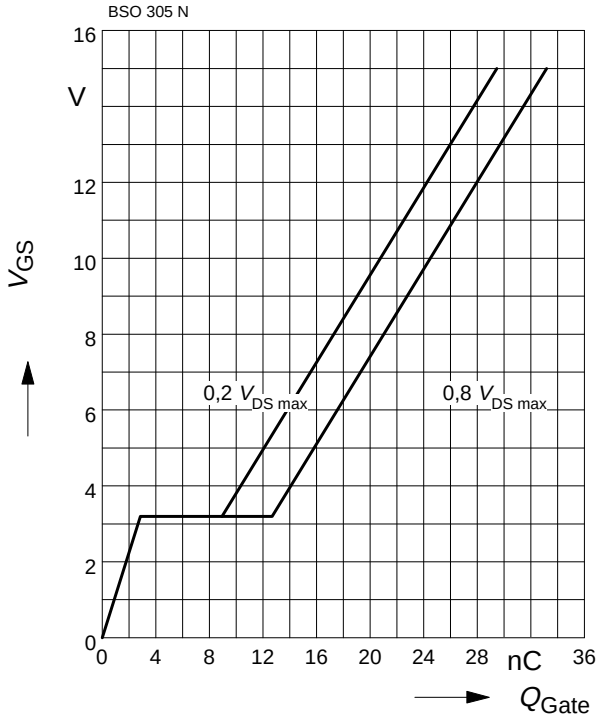
R_{GS} = 25 Ω



Typ. gate charge

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

parameter: $I_{D\ puls}$ = 6 A



Drain-source breakdown voltage

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