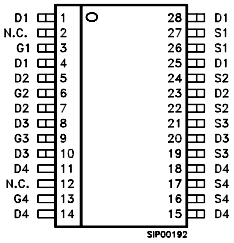
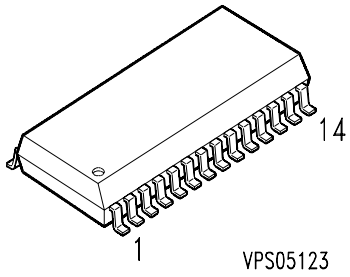
SIPMOS ® Power Transistor





- Quad-channel
- Enhancement mode
- Logic level
- Avalanche-rated
- d*v*/d*t* rated

Type	V_{DS}	I_D	$R_{DS(on)}$	Package	Ordering Code
BUZ 100SL-4	55 V	7.4 A	0.023 Ω	P-DSO-28	C67078-S. . . .- . .

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current *one channel active* T_A = 25 °C	I_D	7.4	A
Pulsed drain current *one channel active* T_A = 25 °C	I_{Dpuls}	29.6	
Avalanche energy, single pulse I_D = 7.4 A, V_{DD} = 25 V, R_{GS} = 25 Ω L = 13.8 mH, T_j = 25 °C	E_{AS}	380	mJ
Reverse diode d*v*/d*t* I_S = 7.4 A, V_{DS} = 40 V, di_F/dt = 200 A/µs T_{jmax} = 175 °C	d*v*/d*t*	6	kV/µs
Gate source voltage	V_{GS}	± 14	V
Power dissipation ,*one channel active* T_A = 25 °C	P_{tot}	2.4	W
Operating temperature	T_j	-55 ... + 175	°C
Storage temperature	T_{stg}	-55 ... + 175	
IEC climatic category, DIN IEC 68-1		55 / 175 / 56	

Thermal Characteristics

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

1) Device on 50mm*50mm*1.5mm epoxy PCB FR4 with 6 cm^2 (one layer,70µm thick) copper area for Drain connection. 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	$V_{(BR)DSS}$	55	-	-	V
Gate threshold voltage V_{GS}=V_{DS}, I_D = 130 µA	$V_{GS(th)}$	1.2	1.6	2	
Zero gate voltage drain current V_{DS} = 55 V, V_{GS} = 0 V, T_j = -40 °C V_{DS} = 55 V, V_{GS} = 0 V, T_j = 25 °C V_{DS} = 55 V, V_{GS} = 0 V, T_j = 150 °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-resistance V_{GS} = 5 V, I_D = 7.4 A	$R_{DS(on)}$	-	0.019	0.023	Ω

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

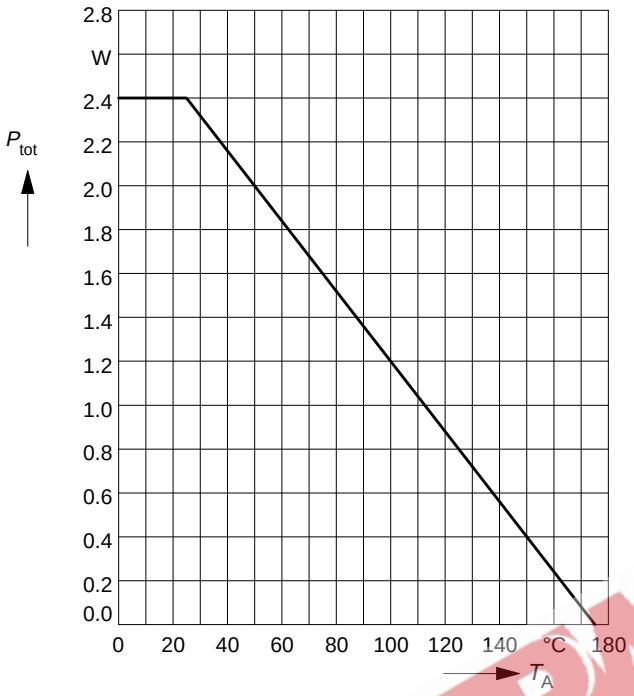
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$, I_D = 7.4 A	g_{fs}	20	-	-	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	-	2130	2660	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	-	600	750	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	-	320	400	
Turn-on delay time V_{DD} = 30 V, V_{GS} = 5 V, I_D = 7.4 A R_G = 2.3 Ω	$t_{d(on)}$	-	37	55	ns
Rise time V_{DD} = 30 V, V_{GS} = 5 V, I_D = 7.4 A R_G = 2.3 Ω	t_r	-	67	100	
Turn-off delay time V_{DD} = 30 V, V_{GS} = 5 V, I_D = 7.4 A R_G = 2.3 Ω	$t_{d(off)}$	-	91	140	
Fall time V_{DD} = 30 V, V_{GS} = 5 V, I_D = 7.4 A R_G = 2.3 Ω	t_f	-	42	65	
Gate charge at threshold V_{DD} = 40 V, $I_D \geq$ 0.1 A, V_{GS} =0 to 1 V	$Q_{g(th)}$	-	3	4.5	nC
Gate charge at 5.0 V V_{DD} = 40 V, I_D = 7.4 A, V_{GS} =0 to 5 V	$Q_{g(5)}$	-	58	86	
Gate charge total V_{DD} = 40 V, I_D = 7.4 A, V_{GS} =0 to 10 V	$Q_{g(total)}$	-	93	140	
Gate plateau voltage V_{DD} = 40 V, I_D = 7.4 A	$V_{(plateau)}$	-	2.92	-	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	-	-	7.4	A
Inverse diode direct current, pulsed T_A = 25 °C	I_{SM}	-	-	29.6	
Inverse diode forward voltage V_{GS} = 0 V, I_F = 14.8 A	V_{SD}	-	0.9	1.6	V
Reverse recovery time V_R = 30 V, I_F=I_S, di_F/dt = 100 A/µs	t_{rr}	-	75	115	ns
Reverse recovery charge V_R = 30 V, I_F=I_S, di_F/dt = 100 A/µs	Q_{rr}	-	0.21	0.315	µC

Power dissipation

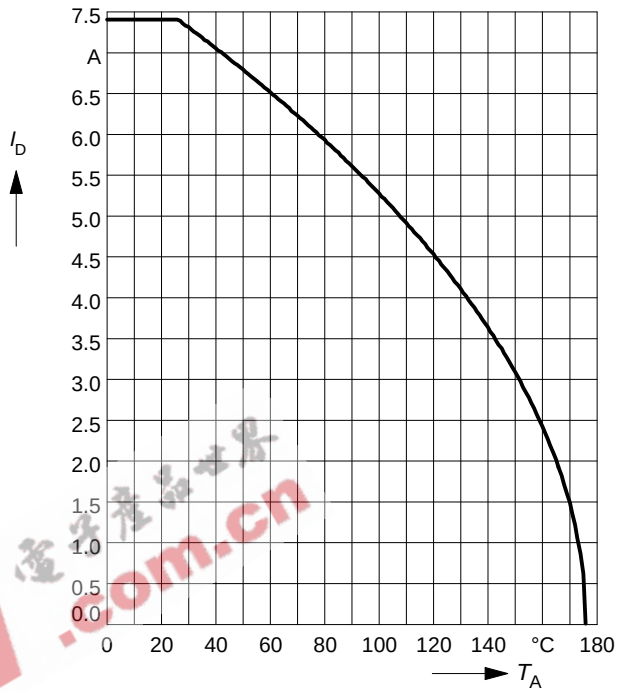
$P_{tot} = f(T_A)$



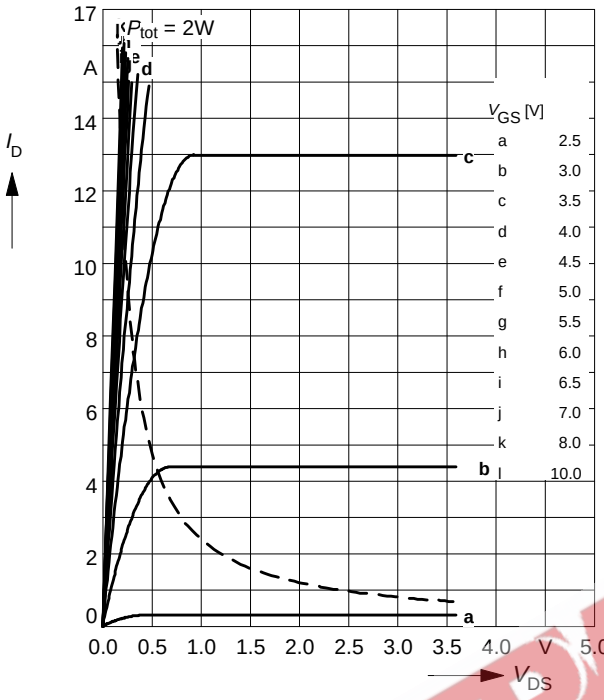
Drain current

$I_D = f(T_A)$

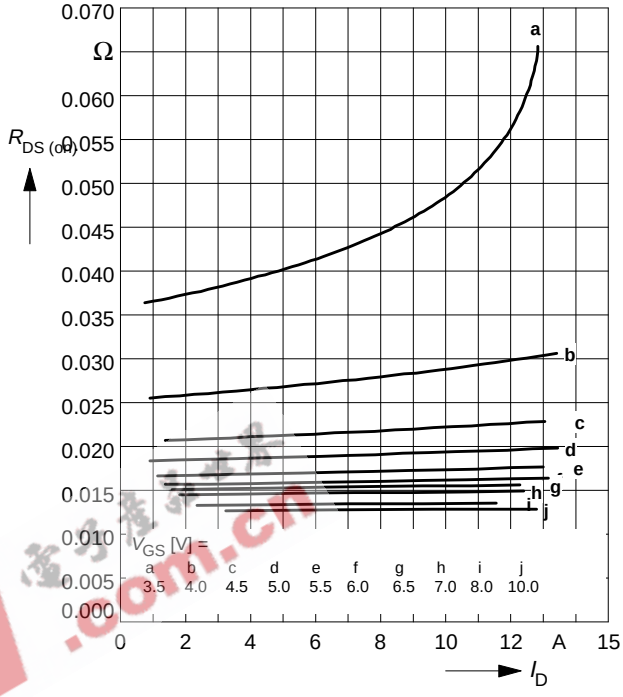
parameter: $V_{GS} \geq 5$ V



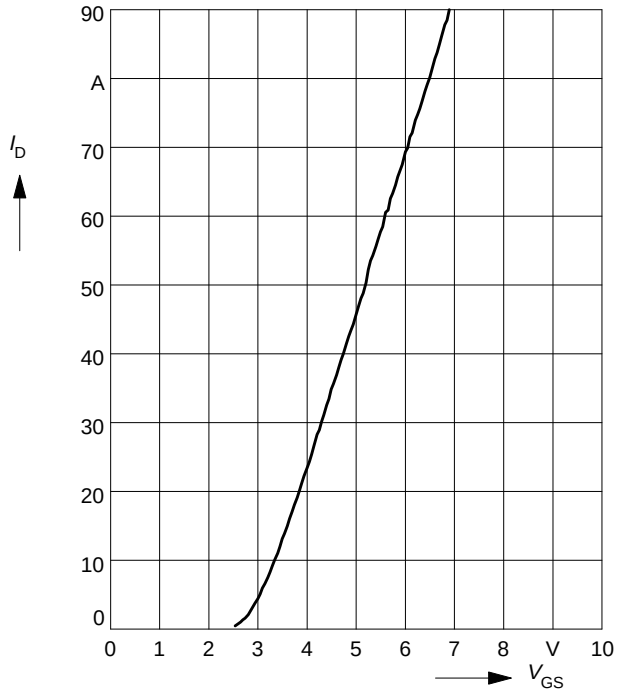
Typ. output characteristics
$I_D = f(V_{DS})$
parameter: t_p = 80 µs , T_j = 25 °C



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



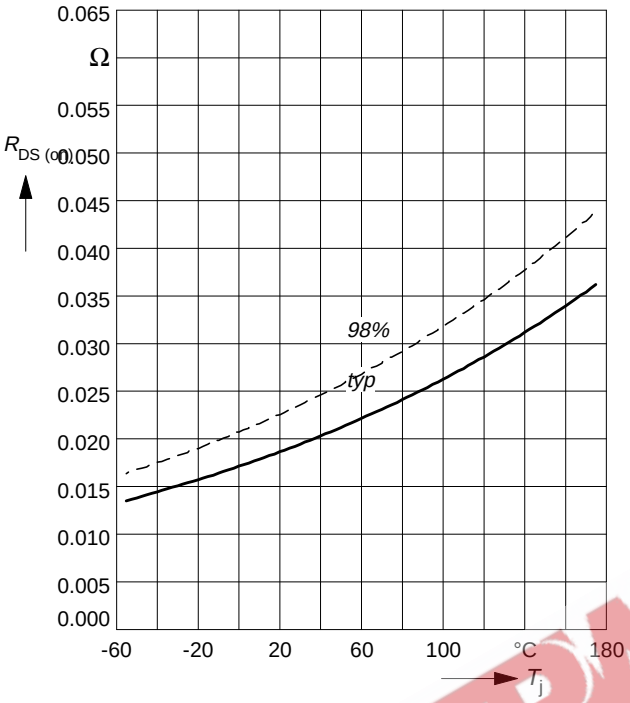
Typ. transfer characteristics $I_D = f(V_{GS})$
parameter: t_p = 80 µs
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



Drain-source on-resistance

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

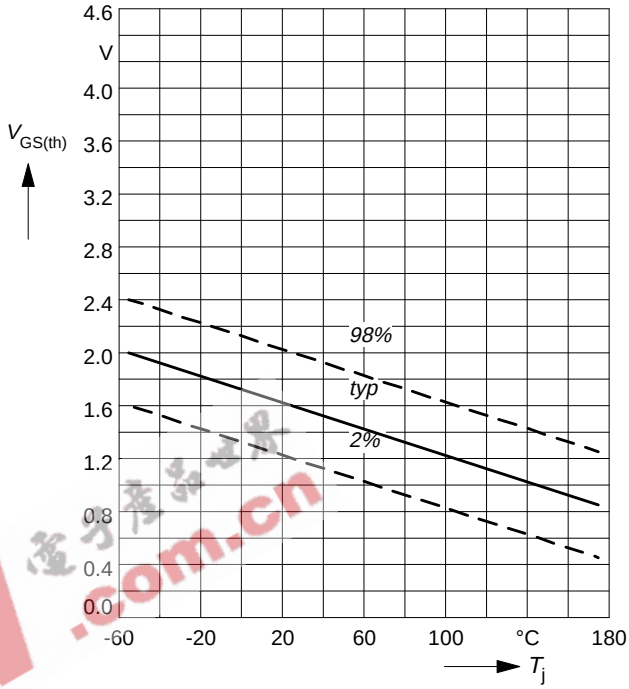
parameter: I_D = 7.4 A, V_{GS} = 5 V



Gate threshold voltage

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

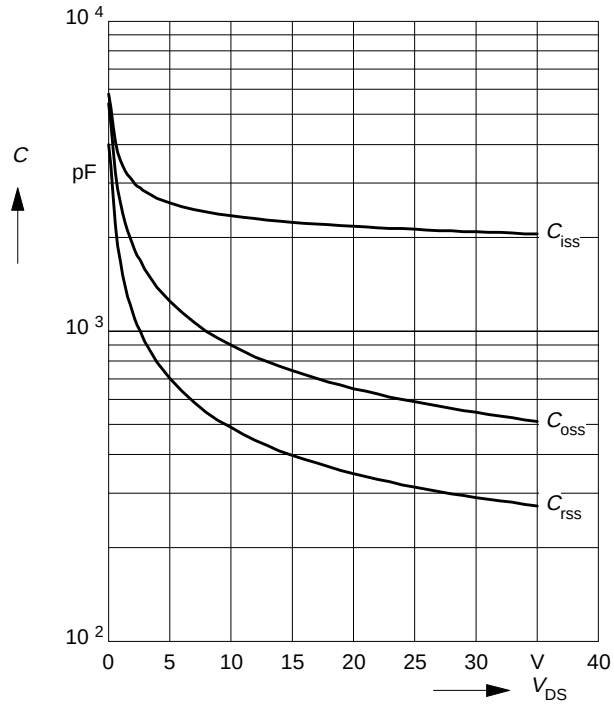
parameter: $V_{GS} = V_{DS}$, I_D = 130 µA



Typ. capacitances

$C = f(V_{DS})$

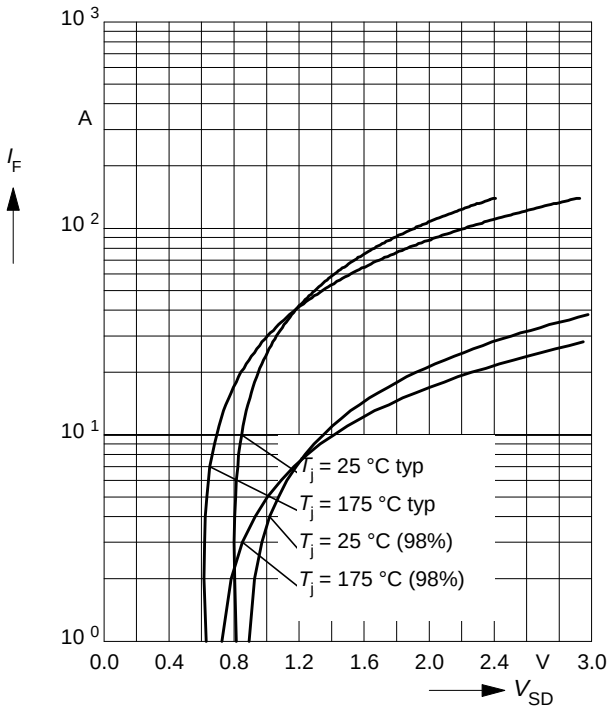
parameter: V_{GS} = 0V, f = 1MHz



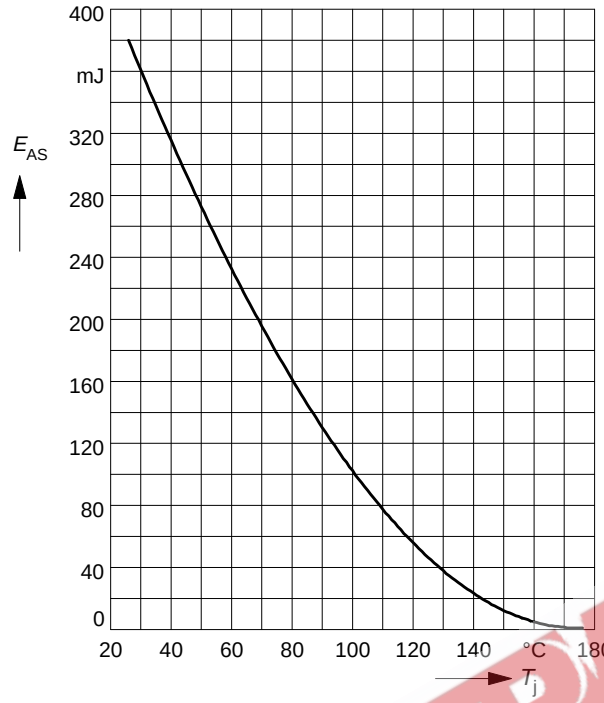
Forward characteristics of reverse diode

$I_F = f(V_{SD})$

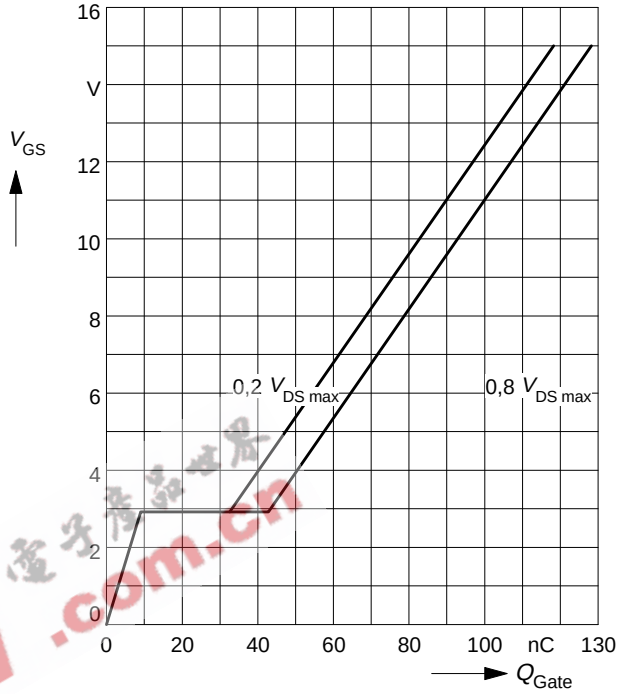
parameter: T_j, t_p = 80 µs



Avalanche energy $E_{AS} = f(T_j)$
parameter: I_D = 7.4 A, V_{DD} = 25 V
R_{GS} = 25 Ω, L = 13.8 mH



Typ. gate charge
$V_{GS} = f(Q_{Gate})$
parameter: $I_{D\ puls}$ = 7 A



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