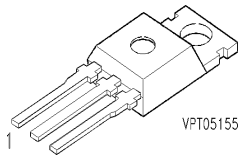
SIEMENS

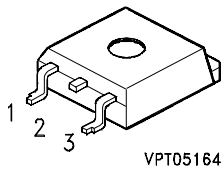
Preliminary data

SPB70N10L
SPP70N10L

SIPMOS® Power Transistor

- N-Channel
- Enhancement mode
- Avalanche rated
- Logic Level
- d*v*/d*t* rated
- 175°C operating temperature





Pin 1	Pin 2	Pin 3
G	D	S

Type	V_{DS}	I_D	$R_{DS(on)}$	@ V_{GS}	Package	Ordering Code
SPB70N10L	100 V	70 A			P-TO263-3-2	Q67040-S4170
SPP70N10L			0.025 Ω	V_{GS} = 4.5 V	P-TO220-3-1	Q67040-S4175
			0.016 Ω	V_{GS} = 10 V		

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

Parameter	Symbol	Value	Unit
Continuous drain current	I_D		A
T_C = 25 °C		70	
T_C = 100 °C		50	
Pulsed drain current	I_{Dpulse}	280	
T_C = 25 °C			
Avalanche energy, single pulse	E_{AS}	1000	mJ
I_D = 70 A, V_{DD} = 25 V, R_{GS} = 25 Ω			
Avalanche current,periodic limited by T_{jmax}	I_{AR}	70	A
Avalanche energy,periodic limited by $T_{j(max)}$	E_{AR}	25	mJ
Reverse diode d*v*/d*t*	d*v*/d*t*	6	kV/µs
I_S = 70 A, $V_{DD} \leq V_{(BR)DSS}$, d*i*/d*t* = 200 A/µs,			
T_{jmax} = 175 °C			
Gate source voltage	V_{GS}	±14	V
Gate source peak voltage , $t_p \leq$ 100µs	V_{gs}	±20	
Power dissipation	P_{tot}	250	W
T_C = 25 °C			
Operating temperature	T_j	-55 ... +175	°C
Storage temperature	T_{stg}	-55 ... +175	
IEC climatic category; DIN IEC 68-1		55/175/56	

Electrical Characteristics

Parameter at T_j = 25 °C, unless otherwise specified	Symbol	Values			Unit
		min.	typ.	max.	
Thermal Characteristics					
Thermal resistance, junction - case	R_{thJC}	-	tbd	0.6	K/W
Thermal resistance, junction - ambient	R_{thJA}	-	62.5	-	
SMD version, device on PCB:	R_{thJA}				
@ min. footprint		-	tbd	-	
@ 6 cm^2 cooling area[1)]		-	tbd	-	

Static Characteristics

Drain- source breakdown voltage V_{GS} = 0 V, I_D = 0.25 mA	$V_{(BR)DSS}$	100	-	-	V
Gate threshold voltage, V_{GS} = V_{DS} I_D = 240 µA	$V_{GS(th)}$	1.2	1.6	2	
Zero gate voltage drain current	I_{DSS}				µA
V_{DS} = 100 V, V_{GS} = 0 V, T_j = 25 °C		-	0.1	1	
V_{DS} = 100 V, V_{GS} = 0 V, T_j = 150 °C		-	-	100	
Gate-source leakage current V_{GS} = 20 V, V_{DS} = 0 V	I_{GSS}	-	10	100	nA
Drain-Source on-state resistance	$R_{DS(on)}$				Ω
V_{GS} = 4.5 V, I_D = 50 A		-	0.014	0.025	
V_{GS} = 10 V, I_D = 50 A		-	0.01	0.016	

1 Device on 50mm*50mm*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 at T_j = 25 °C, unless otherwise specified	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$, I_D = 50 A	g_{fs}	30	65	-	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	-	3630	4540	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	-	640	800	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	-	345	430	
Turn-on delay time V_{DD} = 30 V, V_{GS} = 4.5 V, I_D = 70 A, R_G = 1.3 Ω	$t_{d(on)}$	-	70	105	ns
Rise time V_{DD} = 30 V, V_{GS} = 4.5 V, I_D = 70 A, R_G = 1.3 Ω	t_r	-	250	375	
Turn-off delay time V_{DD} = 30 V, V_{GS} = 4.5 V, I_D = 70 A, R_G = 1.3 Ω	$t_{d(off)}$	-	250	375	
Fall time V_{DD} = 30 V, V_{GS} = 4.5 V, I_D = 70 A, R_G = 1.3 Ω	t_f	-	95	145	

Electrical Characteristics

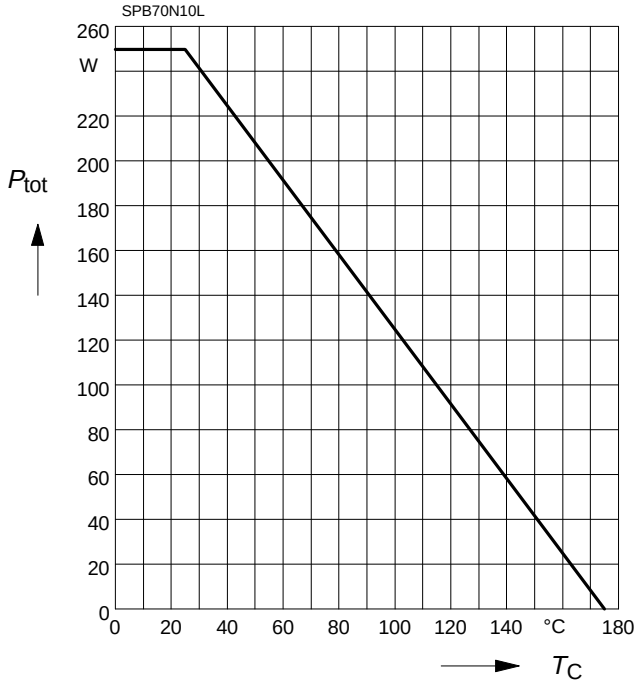
Parameter at T_j = 25 °C, unless otherwise specified	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Gate charge at threshold V_{DD} = 80 V, I_D≥0,1 A, V_{GS} = 0 to 1 V	$Q_{G(th)}$	-	10	15	nC
Gate charge at V_{gs}=5V V_{DD} = 80 V, I_D = 70 A , V_{GS} = 0 to 5 V	$Q_{g(5)}$	-	74	110	
Gate charge total V_{DD} = 80 V, I_D = 70 A, V_{GS} = 0 to 10 V	Q_g	-	160	240	nC
Gate plateau voltage V_{DD} = 80 V, I_D = 70 A	$V_{(plateau)}$	-	3.22	-	V

Reverse Diode

Inverse diode continuous forward current T_C = 25 °C	I_S	-	-	70	A
Inverse diode direct current,pulsed T_C = 25 °C	I_{SM}	-	-	280	
Inverse diode forward voltage V_{GS} = 0 V, I_F = 140 A	V_{SD}	-	1.2	1.8	V
Reverse recovery time V_R = 80 V, I_F=I_S , di_F/dt = 100 A/µs	t_{rr}	-	100	150	ns
Reverse recovery charge V_R = 80 V, I_F=I_S , di_F/dt = 100 A/µs	Q_{rr}	-	600	900	nC

Power Dissipation

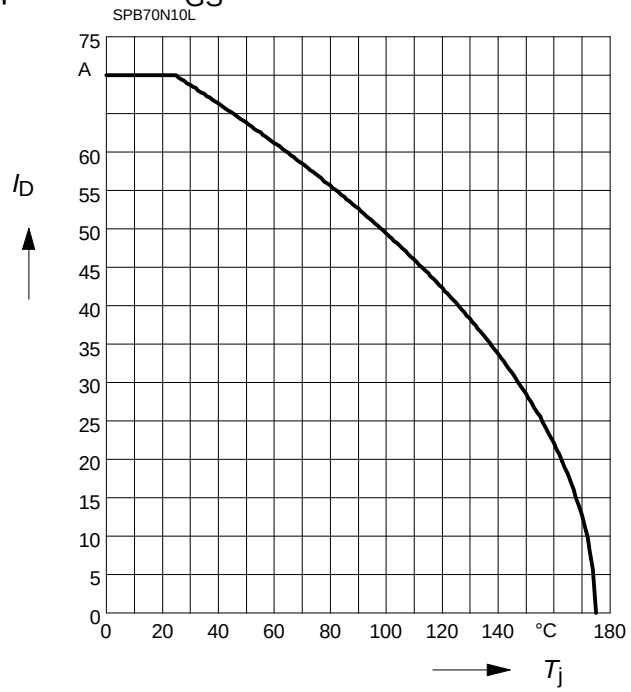
$P_{tot} = f(T_C)$



Drain current

$I_D = f(T_C)$

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



Transient thermal impedance

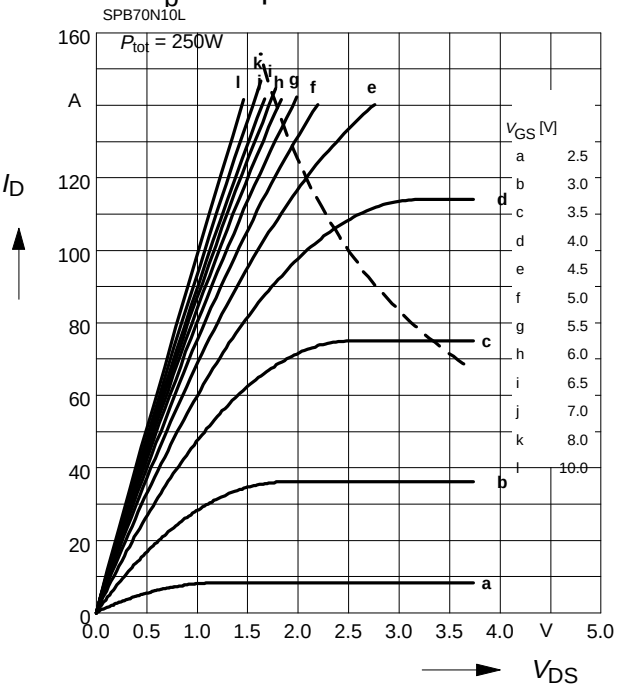
$Z_{thJC} = f(t_p)$

parameter: D = tp/T

Typ. output characteristics

$I_D = f(V_{DS})$

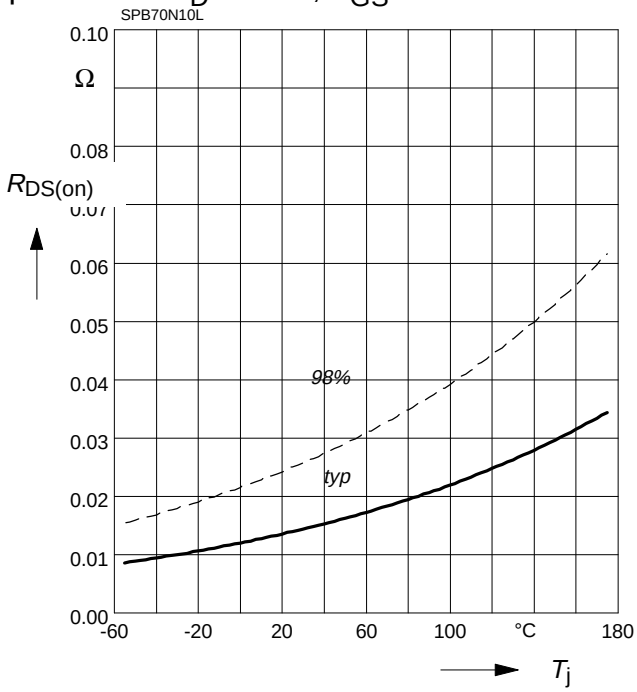
parameter: t_p = 80 µs



Drain-source on-resistance

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

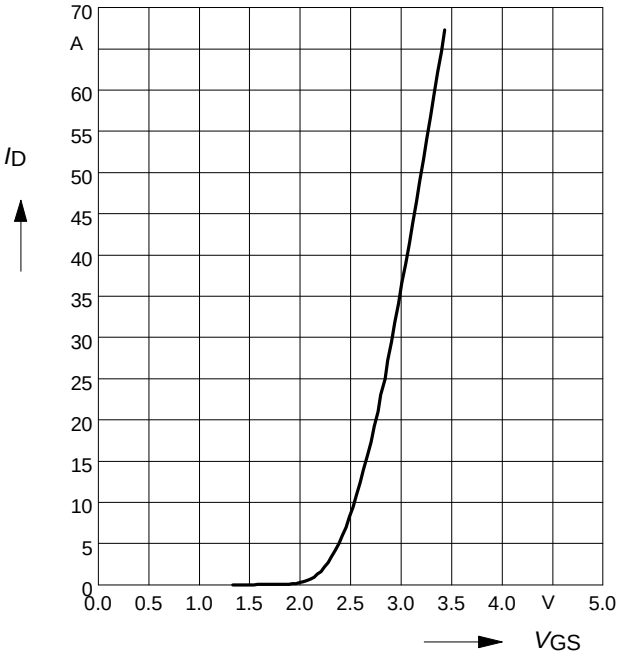
parameter : I_D = 50 A, V_{GS} = 4.5 V



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

parameter: t_p = 80 µs

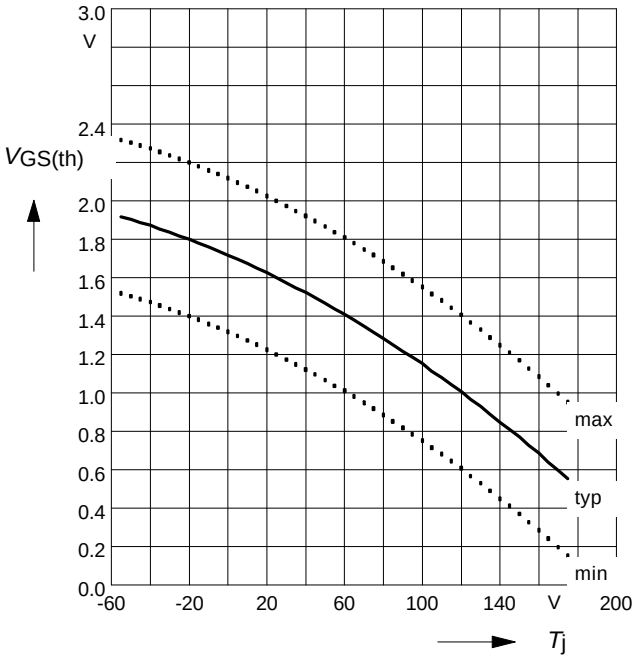
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



Gate threshold voltage

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

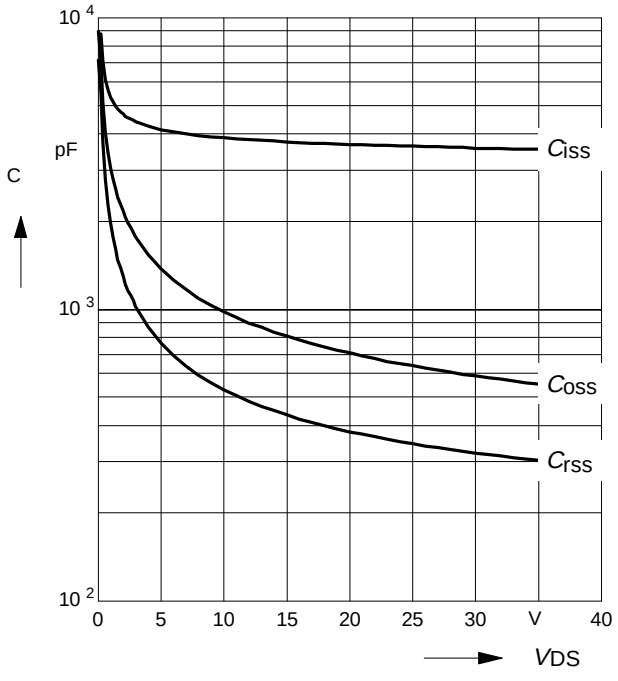
parameter : $V_{GS} = V_{DS}$, I_D = 240 µA



Typ. capacitances

***C* = f(V_{DS})**

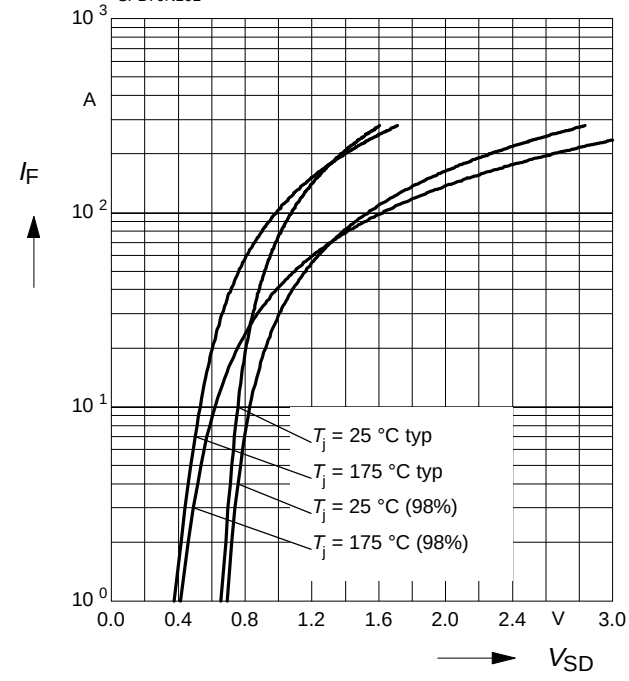
Parameter: V_{GS}=0 V, f=1 MHz



Forward characteristics of reverse diode

$I_F = f(V_{SD})$

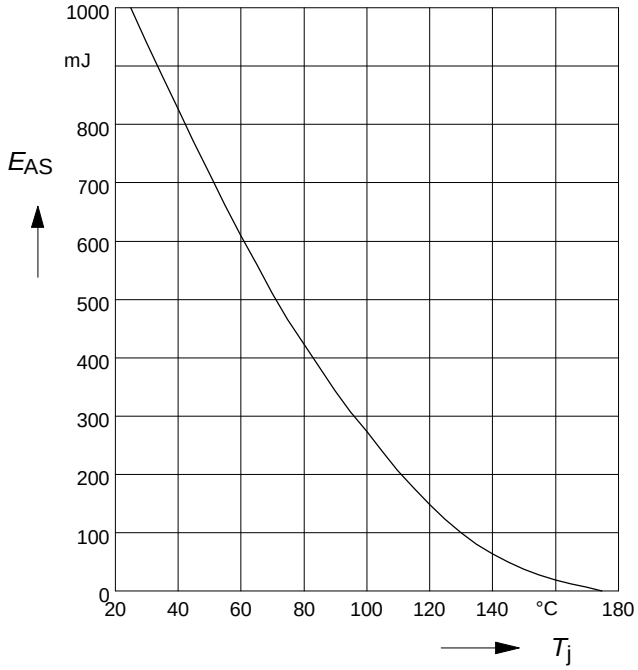
parameter: T_j , tp = 80 µs



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

parameter: I_D = 70 A, V_{DD} = 25 V

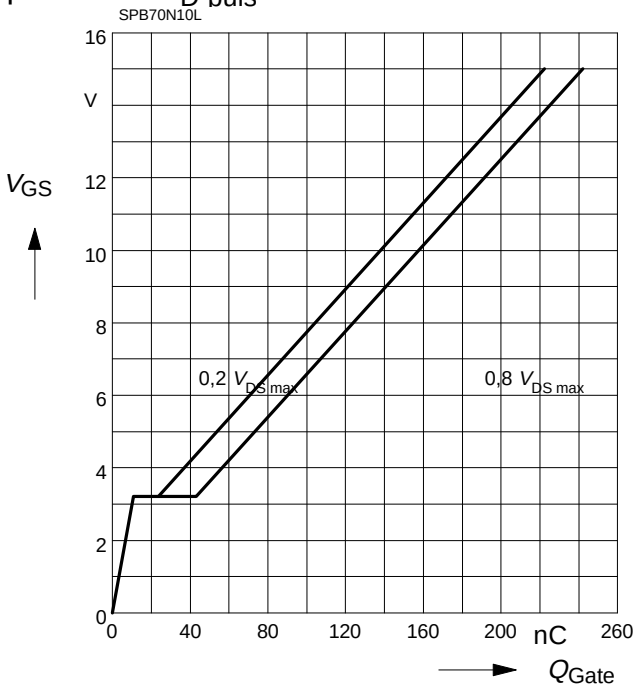
R_{GS} = 25 Ω



Typ. gate charge

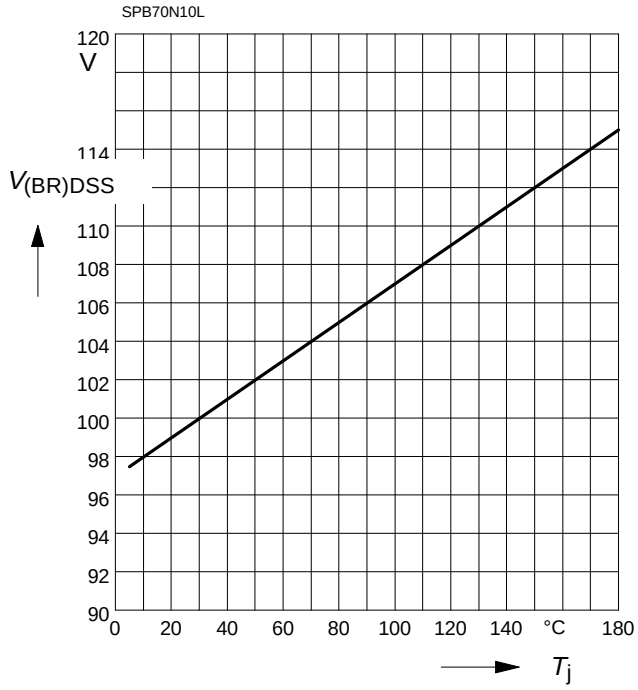
$V_{GS} = f(Q_{Gate})$

parameter: $I_{D\ puls}$ =70A



Drain-source breakdown voltage

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



Edition 7.97
Published by Siemens AG,
Bereich Halbleiter Vetrieb,
Werbung, Balanstraße 73,
81541 München

Attention please!

As far as patents or other rights of third parties are concerned, liability is only assumed for components, not for applications, processes and circuits implemented within components or assemblies.
The information describes a type of component and shall not be considered as warranted characteristics.
Terms of delivery and rights to change design reserved.
For questions on technology, delivery and prices please contact the Semiconductor Group Offices in Germany or the Siemens Companies and Representatives worldwide (see address list).
Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Siemens Office, Semiconductor Group.
Siemens AG is an approved CECC manufacturer.

Packing

Please use the recycling operators known to you. We can also help you - get in touch with your nearest sales office. By agreement we will take packing material back, if it is sorted. You must bear the costs of transport. For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.

Components used in life-support devices or systems must be expressly authorized for such purpose!

Critical components[1] of the Semiconductor Group of Siemens AG, may only be used in life-support devices or systems[2] with the express written approval of the Semiconductor Group of Siemens AG.

1)A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or effectiveness of that device or system.

2)Life support devices or systems are intended (a) to be implanted in the human body, or (b) to support and/or