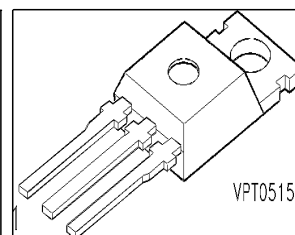


Features

- ## Product Summary

VPT05164



Pin 1	Pin 2	Pin 3
G	D	S

Parameter	Symbol	Value	Unit
Continuous drain current $T_C = 25\text{ °C}$, ¹⁾ $T_C = 100\text{ °C}$	I_D	80 80	A
Pulsed drain current $T_C = 25\text{ °C}$	I_{Dpulse}	320	
Avalanche energy, single pulse $I_D = 80\text{ A}$, $V_{DD} = 25\text{ V}$, $R_{GS} = 25\text{ }\Omega$	E_{AS}	700	
Avalanche energy, periodic limited by T_{jmax}	E_{AR}	30	
Reverse diode dv/dt $I_S = 80\text{ A}$, $V_{DS} = 24\text{ V}$, $di/dt = 200\text{ A}/\mu\text{s}$, $T_{jmax} = 175\text{ °C}$	dv/dt	6	kV/ μs
Gate source voltage	V_{GS}	± 20	V
Power dissipation $T_C = 25\text{ °C}$	P_{tot}	300	W
Operating and storage temperature	T_j , T_{stg}	-55... +175	°C
IEC climatic category; DIN IEC 68-1		55/175/56	

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Characteristics

Thermal resistance, junction - case	R_{thJC}	-	-	0.5	K/W
Thermal resistance, junction - ambient, leded	R_{thJA}	-	-	62	
SMD version, device on PCB:	R_{thJA}				
@ min. footprint		-	-	62	
@ 6 cm ² cooling area ²⁾		-	-	40	

Electrical Characteristics, at $T_j = 25\text{ }^{\circ}\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Static Characteristics

Drain- source breakdown voltage $V_{GS} = 0 \text{ V}$, $I_D = 0.25 \text{ mA}$	$V_{(BR)DSS}$	30	-	-	V
Gate threshold voltage, $V_{GS} = V_{DS}$ $I_D = 240 \text{ }\mu\text{A}$	$V_{GS(th)}$	1.2	1.6	2	
Zero gate voltage drain current $V_{DS} = 30 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_j = 25 \text{ }^\circ\text{C}$ $V_{DS} = 30 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_j = 150 \text{ }^\circ\text{C}$	I_{DSS}		0.1 -	1 100	μA
Gate-source leakage current $V_{GS} = 20 \text{ V}$, $V_{DS} = 0 \text{ V}$	I_{GSS}	-	10	100	nA
Drain-Source on-state resistance $V_{GS} = 4.5 \text{ V}$, $I_D = 80 \text{ A}$ $V_{GS} = 10 \text{ V}$, $I_D = 80 \text{ A}$	$R_{DS(on)}$	- -	0.0053 0.0033	0.008 0.006	Ω

¹current limited by bond wire

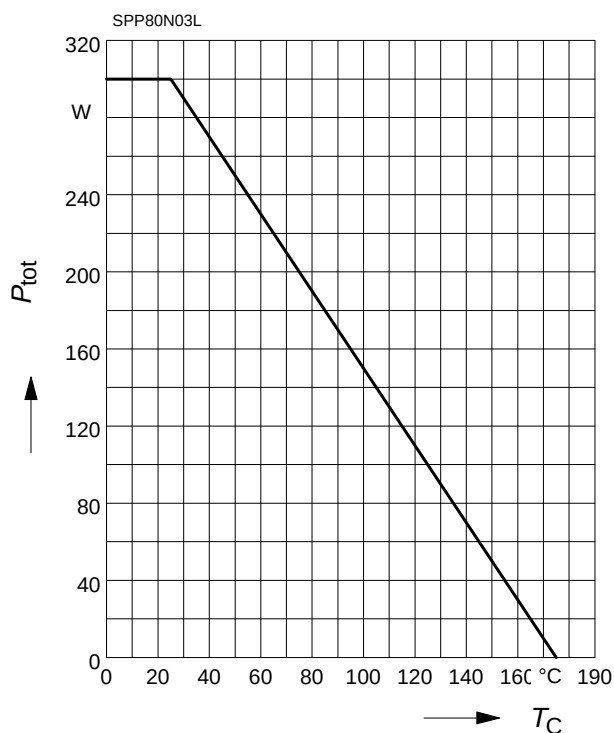
² Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6 cm² (one layer, 70μm thick) copper area for drain connection. PCB is vertical without blown air.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Gate to source charge $V_{DD} = 24\text{ V}$, $I_D = 80\text{ A}$	Q_{gs}	-	11	17	nC
Gate to drain charge $V_{DD} = 24\text{ V}$, $I_D = 80\text{ A}$	Q_{gd}	-	62	93	
Gate charge total $V_{DD} = 24\text{ V}$, $I_D = 80\text{ A}$, $V_{GS} = 0\text{ to }10\text{ V}$	Q_g	-	145	220	
Gate plateau voltage $V_{DD} = 24\text{ V}$, $I_D = 80\text{ A}$	$V_{(\text{plateau})}$	-	3.68	-	V

Inverse diode continuous forward current $T_C = 25\text{ }^{\circ}\text{C}$	I_S	-	-	80	A
Inverse diode direct current,pulsed $T_C = 25\text{ }^{\circ}\text{C}$	I_{SM}	-	-	320	
Inverse diode forward voltage $V_{GS} = 0\text{ V}$, $I_F = 160\text{ A}$	V_{SD}	-	1.1	1.7	V
Reverse recovery time $V_R = 15\text{ V}$, $I_F = I_S$, $di_F/dt = 100\text{ A}/\mu\text{s}$	t_{rr}	-	70	105	ns
Reverse recovery charge $V_R = 15\text{ V}$, $I_F = I_S$, $di_F/dt = 100\text{ A}/\mu\text{s}$	Q_{rr}	-	0.082	0.12	μC

Power Dissipation

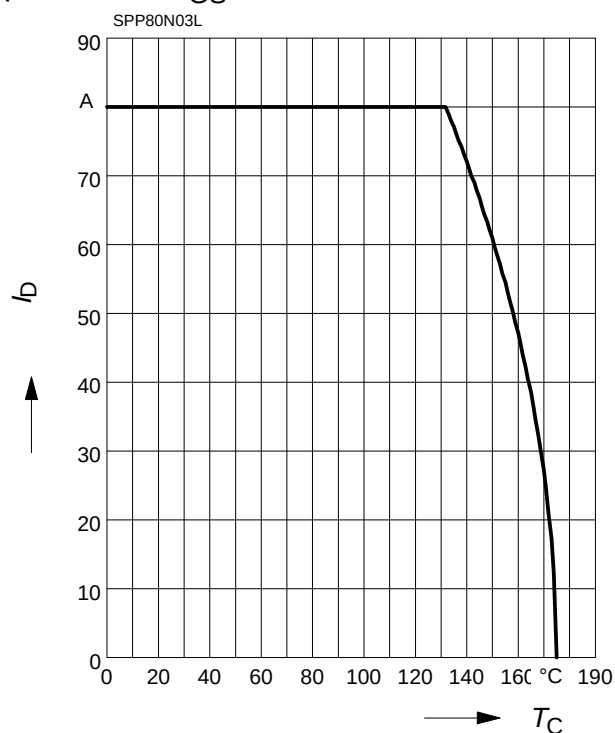
$$P_{\text{tot}} = f(T_C)$$



Drain current

$$I_D = f(T_C)$$

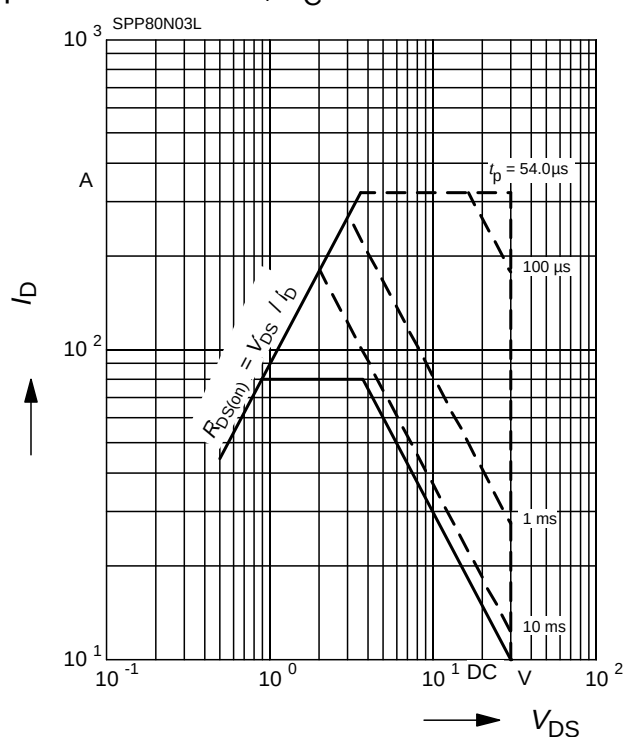
parameter: $V_{GS} \geq 10 \text{ V}$



Safe operating area

$$I_D = f(V_{DS})$$

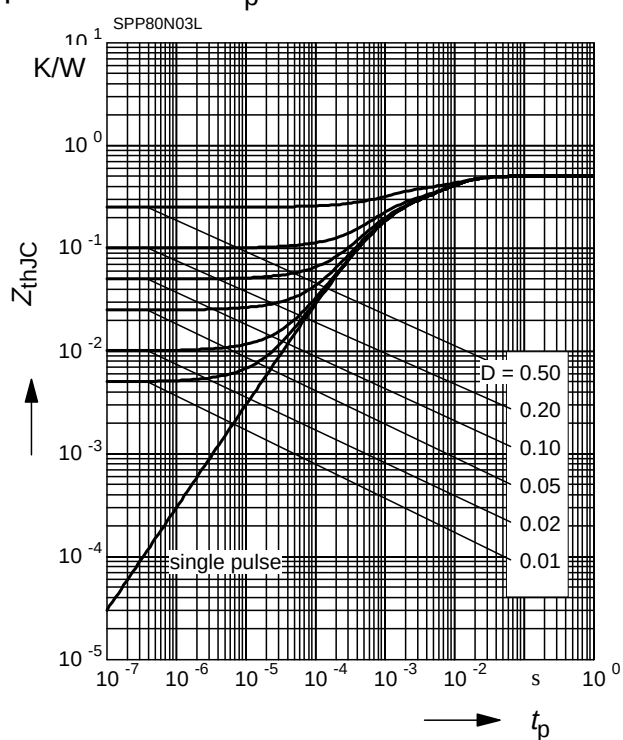
parameter: $D = 0$, $T_C = 25^{\circ}\text{C}$



Transient thermal impedance

$$Z_{\text{thJC}} = f(t_p)$$

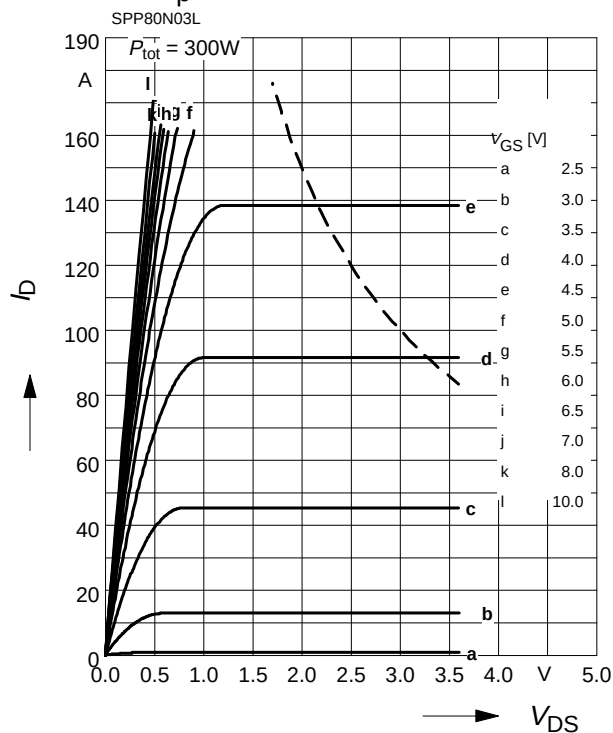
parameter: $D = t_p / T$



Typ. output characteristics

$$I_D = f(V_{DS})$$

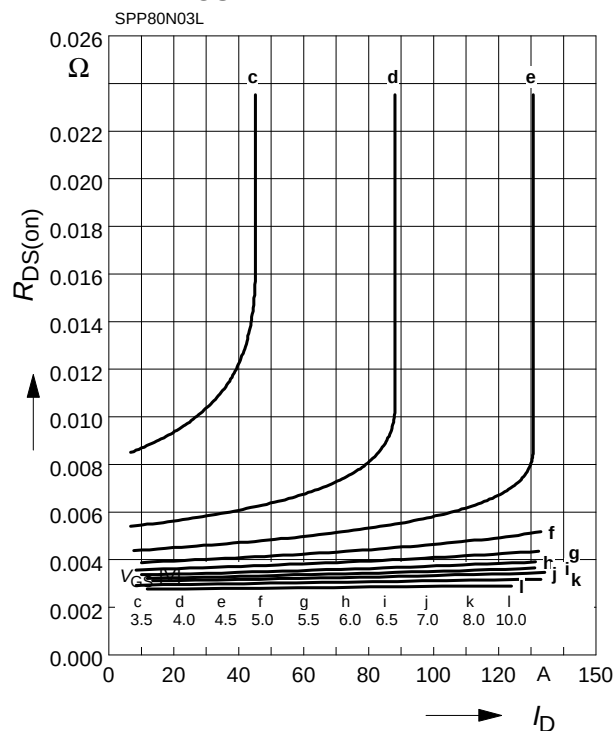
parameter: $t_p = 80 \mu s$



Typ. drain-source-on-resistance

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

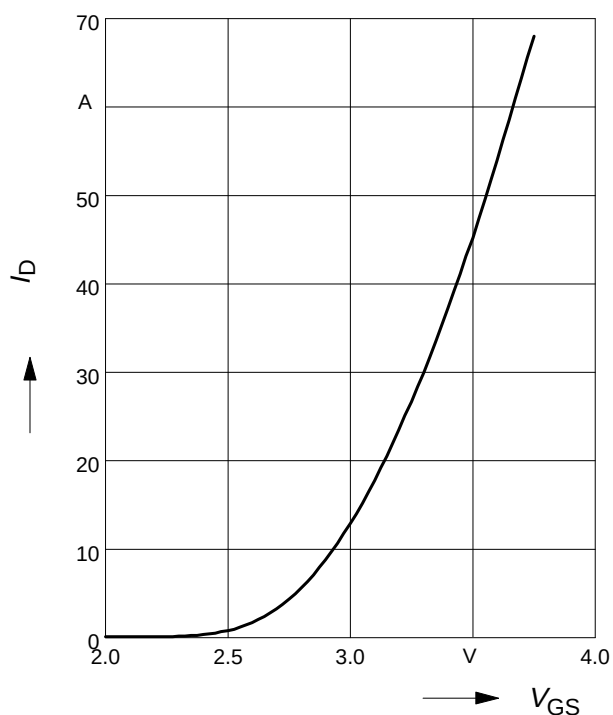
parameter: V_{GS}



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

parameter: $t_p = 80 \mu s$

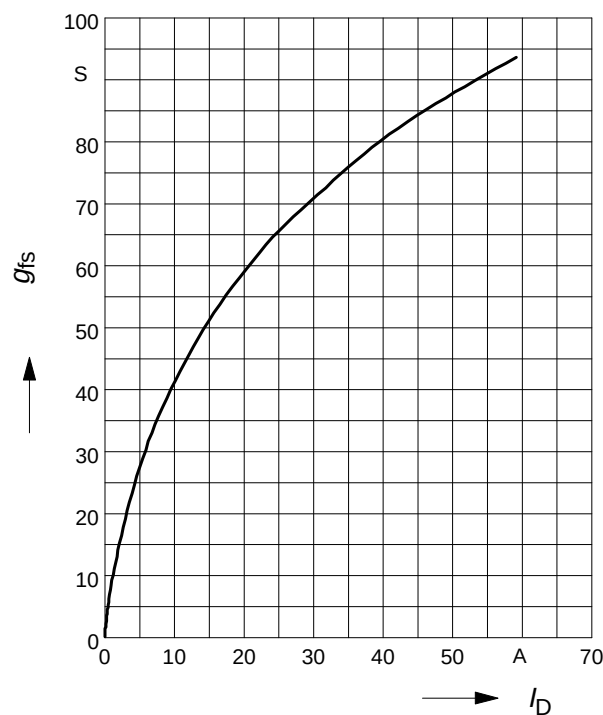
$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$



Typ. forward transconductance

$$g_{fs} = f(I_D); T_j = 25^\circ C$$

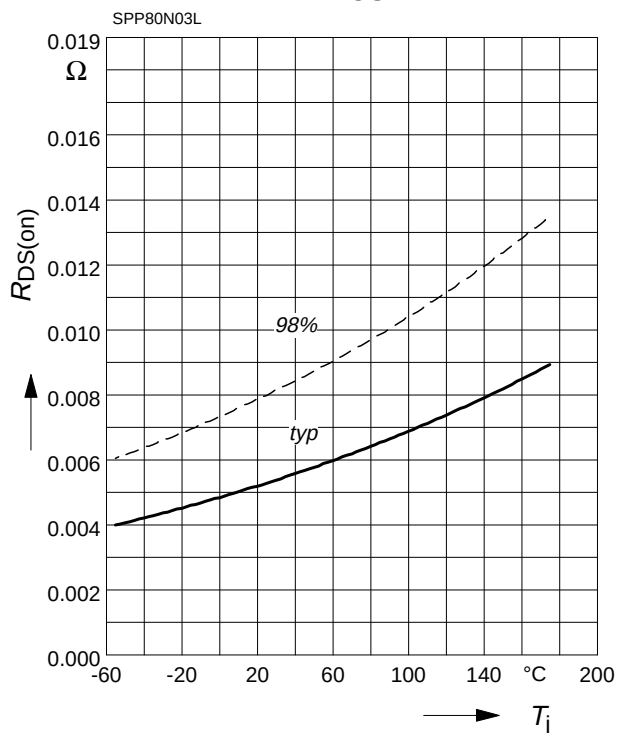
parameter: g_{fs}



Drain-source on-resistance

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

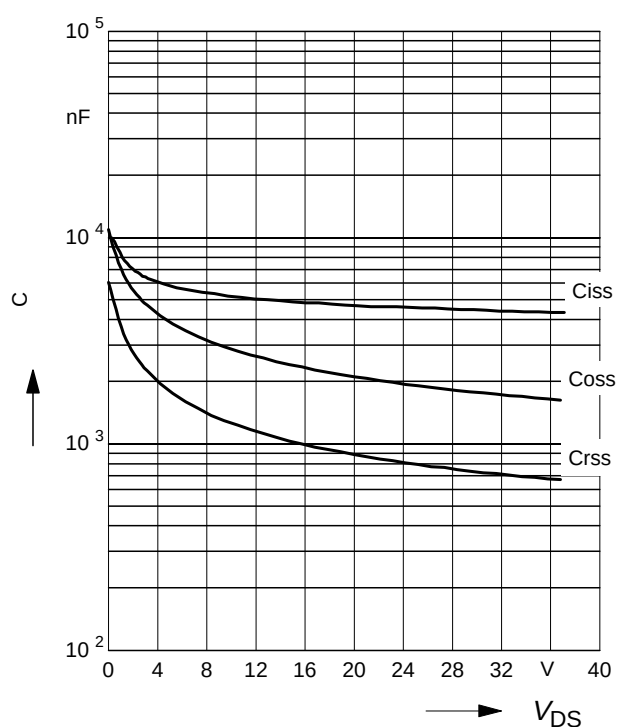
parameter : $I_D = 80 \text{ A}$, $V_{GS} = 4.5 \text{ V}$



Typ. capacitances

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

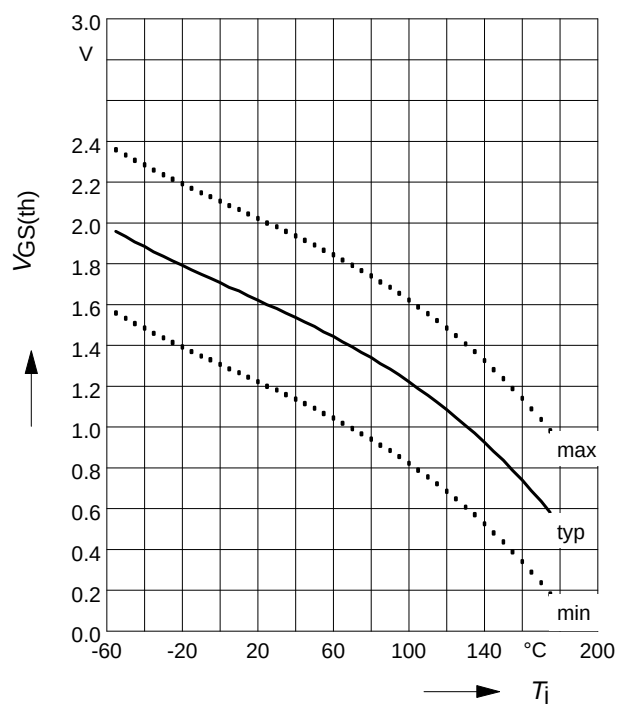
parameter: $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$



Gate threshold voltage

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

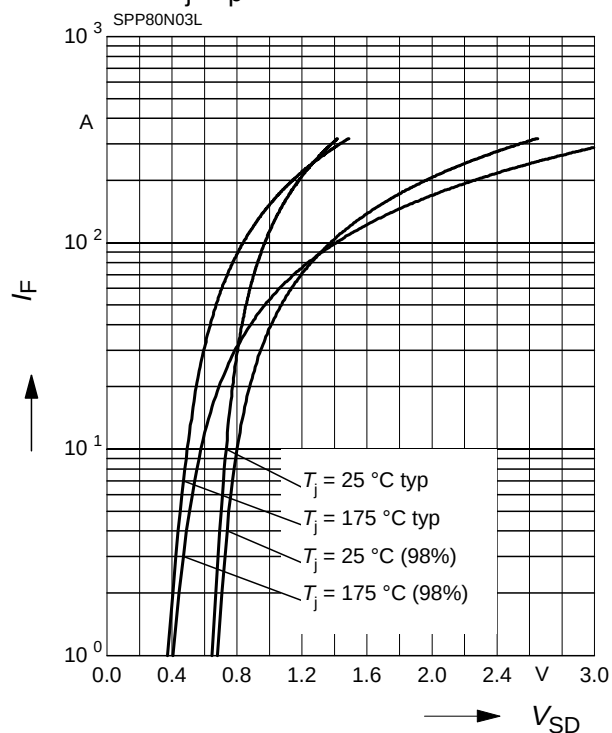
parameter : $V_{GS} = V_{DS}$, $I_D = 240 \mu\text{A}$



Forward characteristics of reverse diode

$$I_F = f(V_{SD})$$

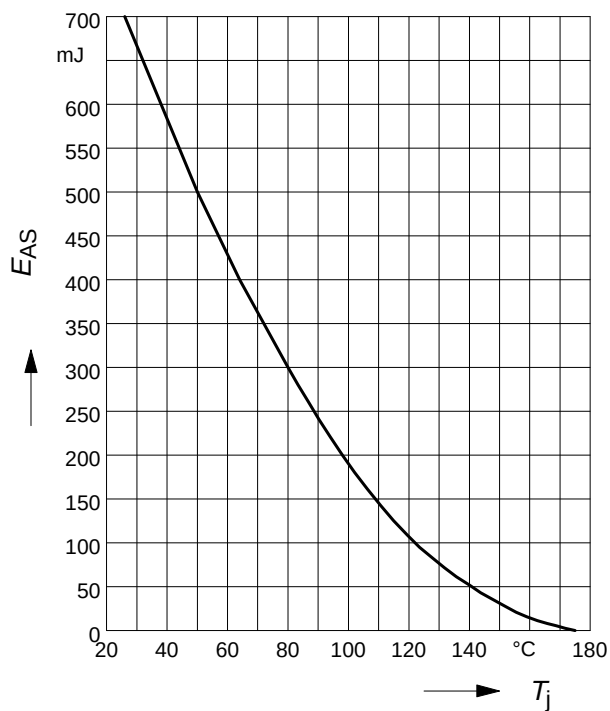
parameter: T_j , $t_p = 80 \mu\text{s}$



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

parameter: $I_D = 80\text{ A}$, $V_{DD} = 25\text{ V}$

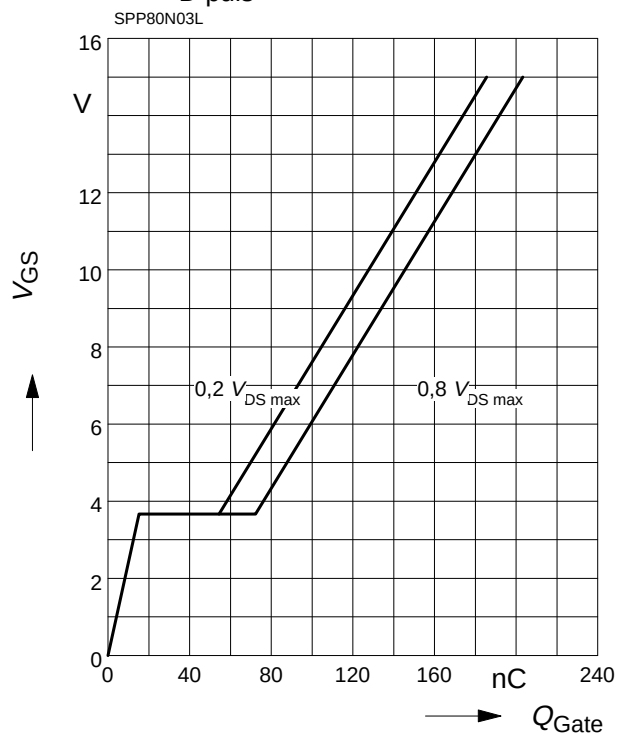
$R_{GS} = 25\ \Omega$



Typ. gate charge

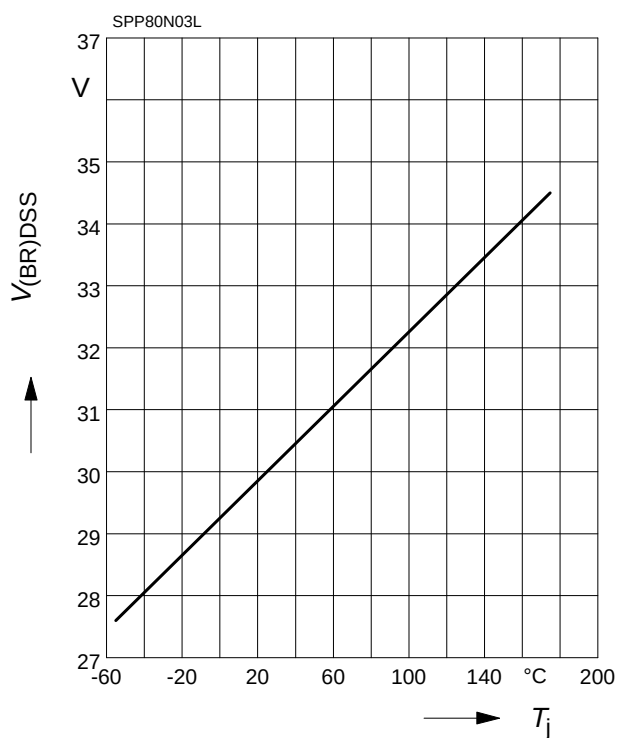
$V_{GS} = f(Q_{Gate})$

parameter: $I_{D\text{ puls}} = 80\text{ A}$



Drain-source breakdown voltage

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



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