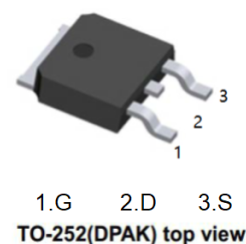


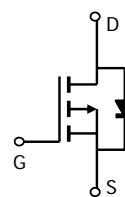
**Features**

- P-Channel
- Enhancement mode
- Avalanche rated
- dv/dt rated
- 175°C operating temperature



**Product Summary**

- $V_{DS}(V) = -60V$
- $R_{DS(on)}=75\ m\Omega$  ( $V_{GS} = -10V$ )
- $I_D = -30A$  ( $V_{GS} = -10V$ )



**Maximum Ratings,at  $T_j = 25\ ^\circ C$ , unless otherwise specified**

Parameter	Symbol	Value	Unit
Continuous drain current $T_C = 25\ ^\circ C$ $T_C = 100\ ^\circ C$	$I_D$	-30 -21.5	A
Pulsed drain current $T_C = 25\ ^\circ C$	$I_D\ puls$	-120	
Avalanche energy, single pulse $I_D = -30\ A$ , $V_{DD} = -25\ V$ , $R_{GS} = 25\ \Omega$	$E_{AS}$ mJ	250	mJ
Avalanche energy, periodic limited by $T_{jmax}$	$E_{AR}$	12.5	
Reverse diode dv/dt $I_S = -30\ A$ , $V_{DS} = -48\ V$ , $di/dt = 200\ A/\mu s$ , $T_{jmax} = 175\ ^\circ C$	dv/dt	6	kV/ $\mu s$
Gate source voltage	$V_{GS}$	$\pm 20$	V
Power dissipation $T_C = 25\ ^\circ C$	$P_{tot}$ W	125	W
Operating and storage temperature	$T_j, T_{stg}$	-55+175	$^\circ C$
IEC climatic category; DIN IEC 68-1		55/175/56	

**Thermal Characteristics**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Characteristics</b>					
Thermal resistance, junction - case	$R_{thJC}$			1.2	K/W
Thermal resistance, junction - ambient, leaded	$R_{thJA}$			100	
SMD version, device on PCB: @ min. footprint @ 6 cm <sup>2</sup> cooling area <sup>1)</sup>	$R_{thJA}$			75 50	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Static Characteristics</b>					
Drain- source breakdown voltage $V_{GS} = 0\text{ V}$ , $I_D = -250\text{ }\mu\text{A}$	$V_{(BR)DSS}$	-60			V
Gate threshold voltage, $V_{GS} = V_{DS}$ $I_D = -1.7\text{ mA}$	$V_{GS(th)}$	-2.1	-3	-4	
Zero gate voltage drain current $V_{DS} = -60\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_j = 25\text{ }^\circ\text{C}$ $V_{DS} = -60\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_j = 150\text{ }^\circ\text{C}$	$I_{DSS}$		-0.1 -10	-1 -100	$\mu\text{A}$
Gate-source leakage current $V_{GS} = -20\text{ V}$ , $V_{DS} = 0\text{ V}$	$I_{GSS}$		-10	-100	nA
Drain-source on-state resistance $V_{GS} = -10\text{ V}$ , $I_D = -21.5\text{ A}$	$R_{DS(on)}$		69	75	m $\Omega$

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

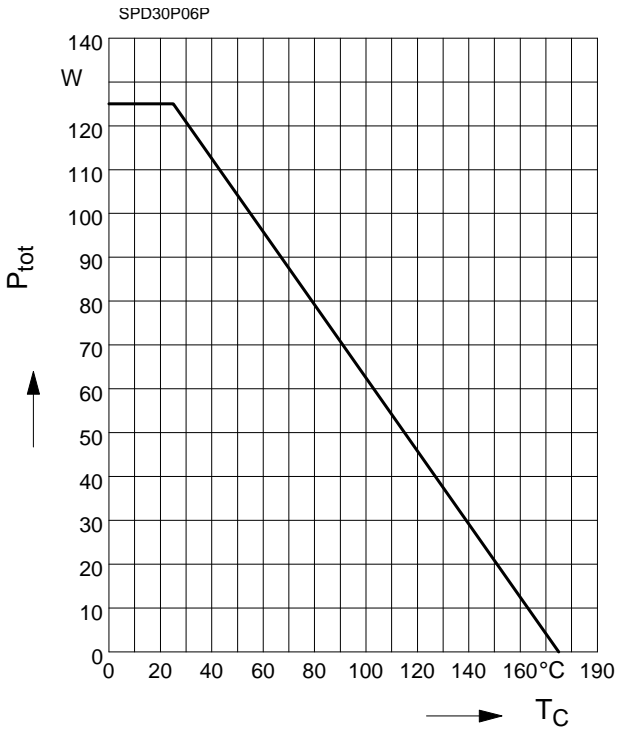
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Dynamic Characteristics</b>					
Transconductance $V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$ , $I_D = -21.5\text{ A}$	$g_{fs}$	5.2	10.4		S
Input capacitance $V_{GS} = 0\text{ V}$ , $V_{DS} = -25\text{ V}$ , $f = 1\text{ MHz}$	$C_{iss}$		1228	1535	pF
Output capacitance $V_{GS} = 0\text{ V}$ , $V_{DS} = -25\text{ V}$ , $f = 1\text{ MHz}$	$C_{oss}$		387	383	
Reverse transfer capacitance $V_{GS} = 0\text{ V}$ , $V_{DS} = -25\text{ V}$ , $f = 1\text{ MHz}$	$C_{rss}$		142	177	
Turn-on delay time $V_{DD} = -30\text{ V}$ , $V_{GS} = -10\text{ V}$ , $I_D = -21.5\text{ A}$ , $R_G = 1.6\ \Omega$	$t_{d(on)}$		13	19.5	ns
Rise time $V_{DD} = -30\text{ V}$ , $V_{GS} = -10\text{ V}$ , $I_D = -21.5\text{ A}$ , $R_G = 1.6\ \Omega$	$t_r$		11	16.5	
Turn-off delay time $V_{DD} = -30\text{ V}$ , $V_{GS} = -10\text{ V}$ , $I_D = -21.5\text{ A}$ , $R_G = 1.6\ \Omega$	$t_{d(off)}$		30	45	
Fall time $V_{DD} = -30\text{ V}$ , $V_{GS} = -10\text{ V}$ , $I_D = -21.5\text{ A}$ , $R_G = 1.6\ \Omega$	$t_f$		20	30	

**Electrical Characteristics, at T<sub>j</sub> = 25 °C, unless**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Dynamic Characteristics</b>					
Gate to source charge V <sub>DD</sub> = -48 V, I <sub>D</sub> = -30 A	Q <sub>gs</sub>		3.7	5.6	nC
Gate to drain charge V <sub>DD</sub> = -48 V, I <sub>D</sub> = -30 A	Q <sub>gd</sub>		13.8	20.7	
Gate charge total V <sub>DD</sub> = -48 V, I <sub>D</sub> = -30 A, V <sub>GS</sub> = 0 to -10 V	Q <sub>g</sub>		32	48	
Gate plateau voltage V <sub>DD</sub> = -48 V, I <sub>D</sub> = -30 A	V <sub>(plateau)</sub>		-5.2		V
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Reverse Diode</b>					
Inverse diode continuous forward current T <sub>C</sub> = 25 °C	I <sub>S</sub>			-30	A
Inverse diode direct current, pulsed T <sub>C</sub> = 25 °C	I <sub>SM</sub>			-120	
Inverse diode forward voltage V <sub>GS</sub> = 0 V, I <sub>F</sub> = -30	V <sub>SD</sub>		-1.3	-1.7	V
Reverse recovery time V <sub>R</sub> = -30 V, I <sub>F</sub> = I <sub>S</sub> , di <sub>F</sub> /dt = 100 A/μs	t <sub>rr</sub>		64.6	97	ns
Reverse recovery charge V <sub>R</sub> = -30 V, I <sub>F</sub> = I <sub>S</sub> , di <sub>F</sub> /dt = 100 A/μs	Q <sub>rr</sub>		153	230	nC

**Power dissipation**

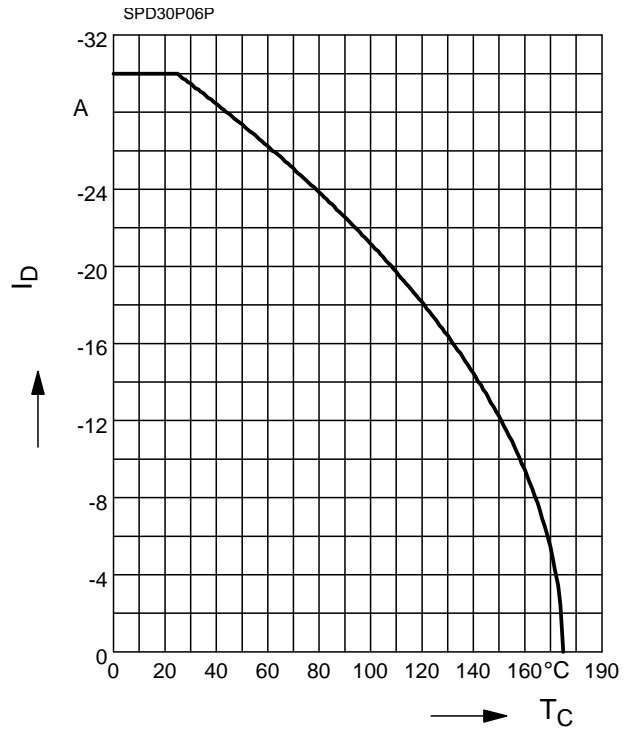
$P_{tot} = f(T_C)$



**Drain current**

$I_D = f(T_C)$

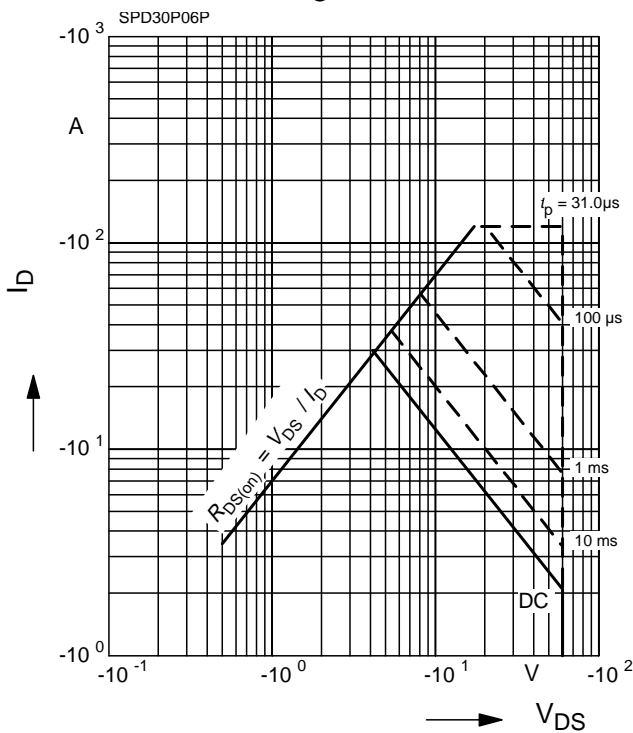
parameter:  $V_{GS} \geq 10\text{ V}$



**Safe operating area**

$I_D = f(V_{DS})$

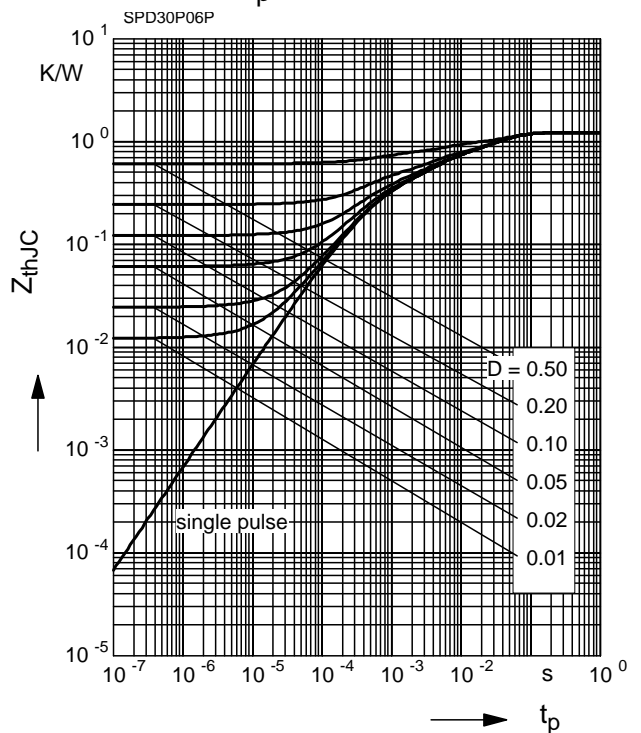
parameter:  $D = 0, T_C = 25\text{ °C}$



**Transient thermal impedance**

$Z_{thJC} = f(t_p)$

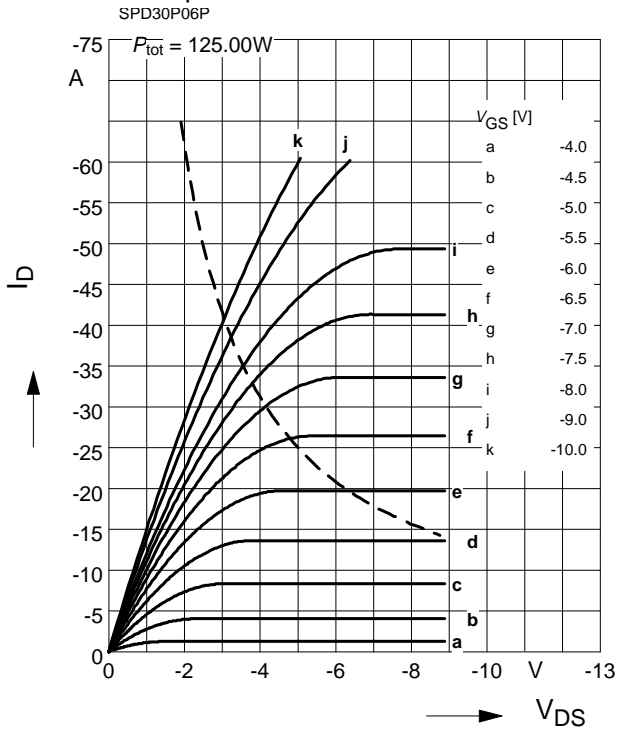
parameter:  $D = t_p/T$



**Typ. output characteristic**

$I_D = f(V_{DS}); T_J = 25^\circ\text{C}$

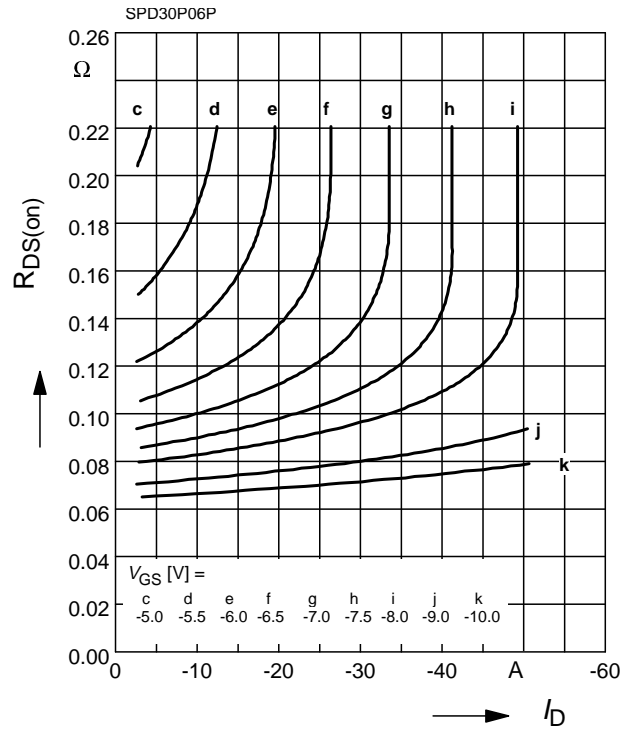
parameter:  $t_p = 80 \mu\text{s}$



**Typ. drain-source-on-resistance**

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

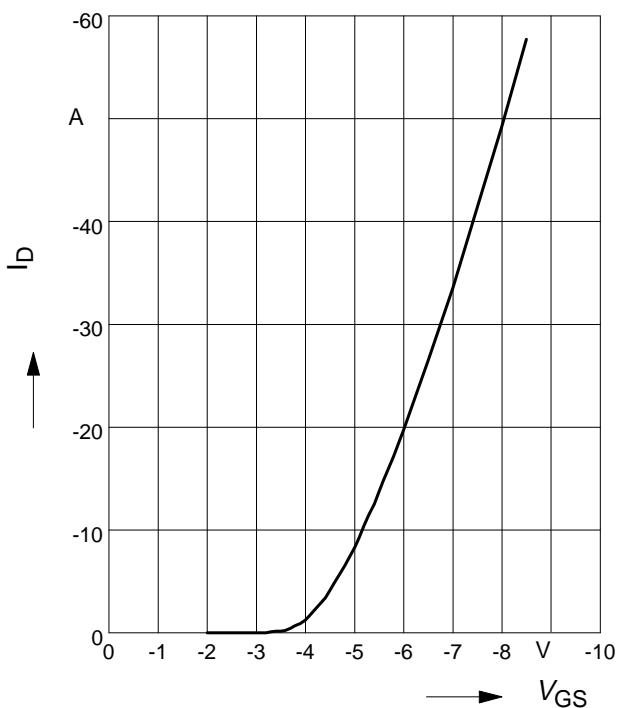
parameter:  $V_{GS}$



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

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

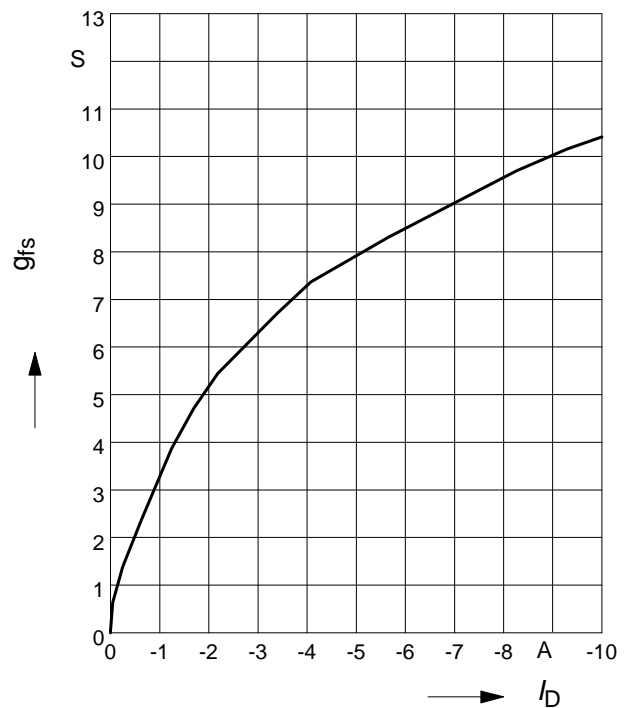
parameter:  $t_p = 80 \mu\text{s}$



**Typ. forward transconductance**

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

parameter:  $g_{fs}$

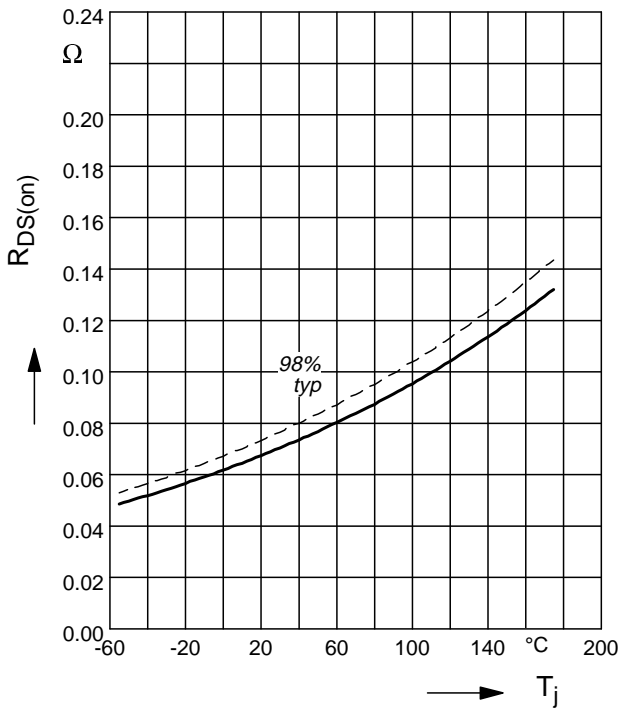


**Drain-source on-state resistance**

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

parameter:  $I_D = -21.5 \text{ A}$ ,  $V_{GS} = -10 \text{ V}$

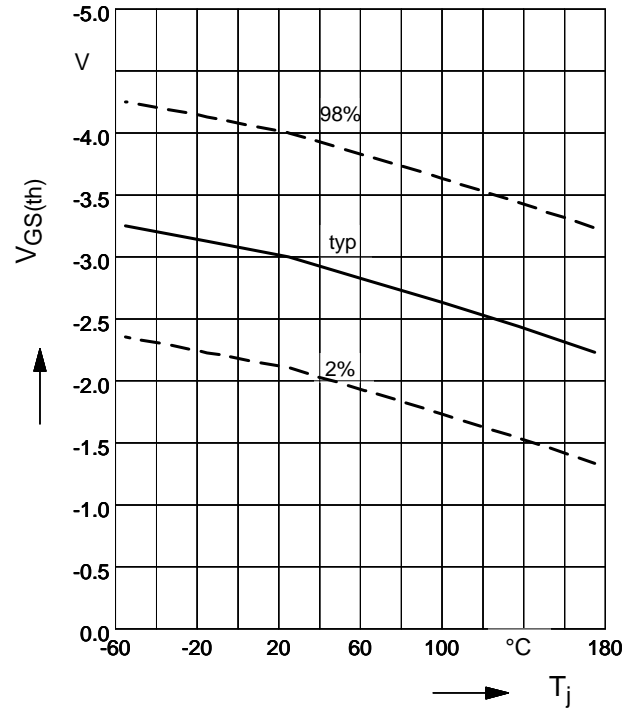
SPD30P06P



**Gate threshold voltage**

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

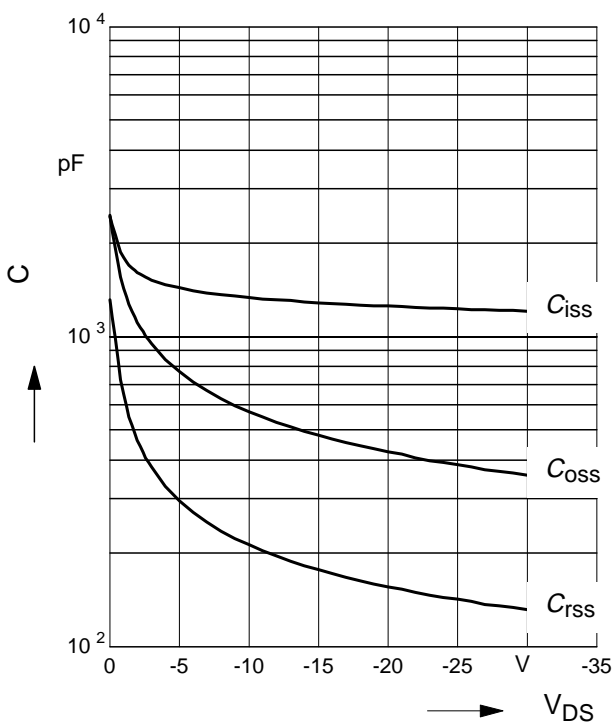
parameter:  $V_{GS} = V_{DS}$ ,  $I_D = -1.7 \text{ mA}$



**Typ. capacitances**

$C = f(V_{DS})$

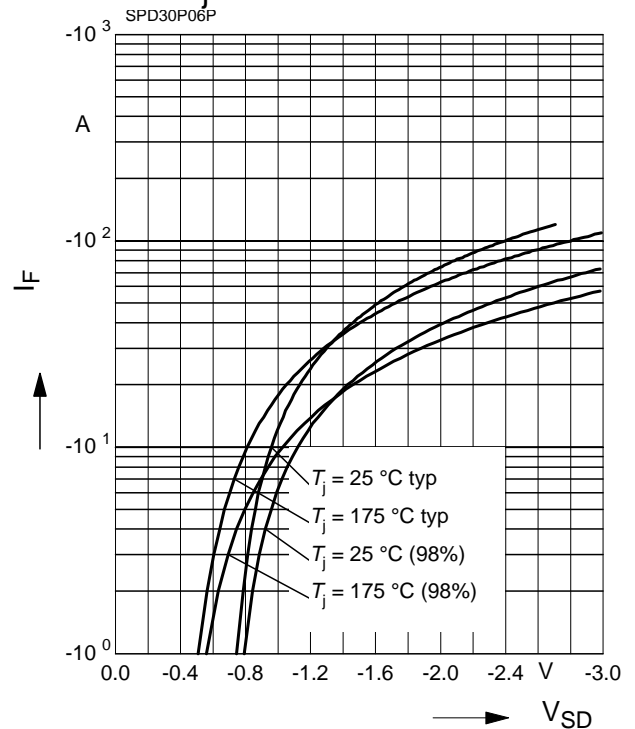
parameter:  $V_{GS}=0\text{V}$ ,  $f=1 \text{ MHz}$



**Forward characteristics of reverse diode**

$I_F = f(V_{SD})$

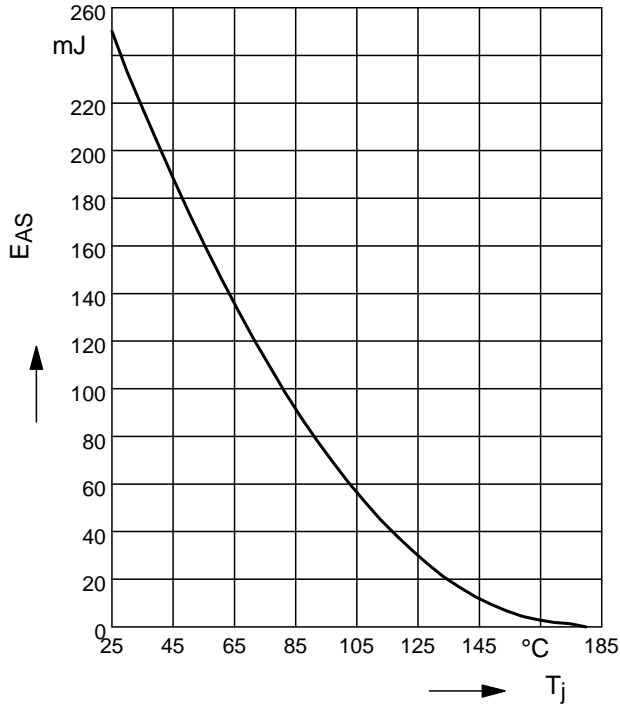
parameter:  $T_j$ ,  $t_p = 80 \mu\text{s}$



**Avalanche energy**

$E_{AS} = f(T_j)$

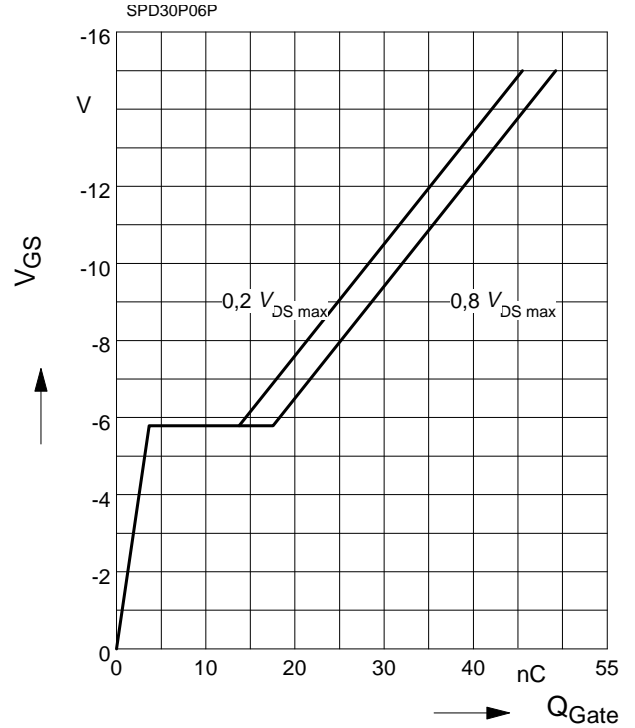
para.:  $I_D = -30\text{ A}$  ,  $V_{DD} = -25\text{ V}$  ,  $R_{GS} = 25\ \Omega$



**Typ. gate charge**

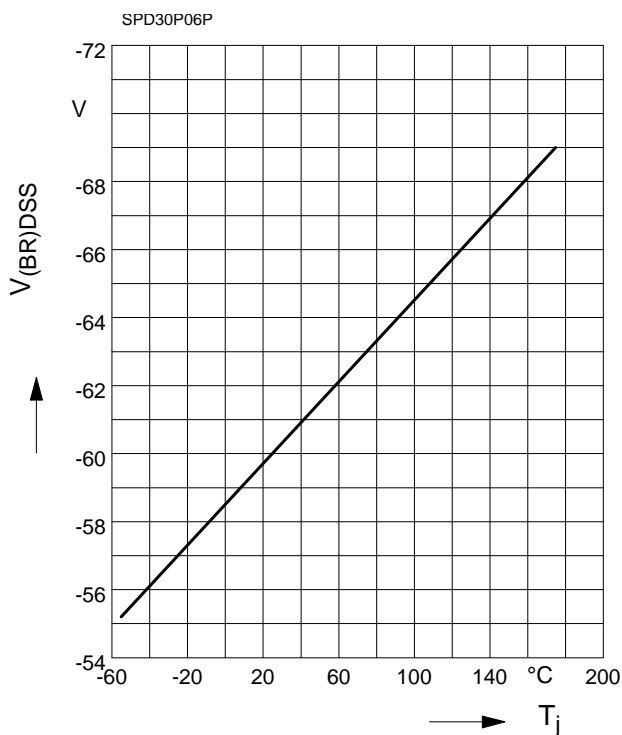
$V_{GS} = f(Q_{Gate})$

parameter:  $I_D = -30\text{ A}$  pulsed



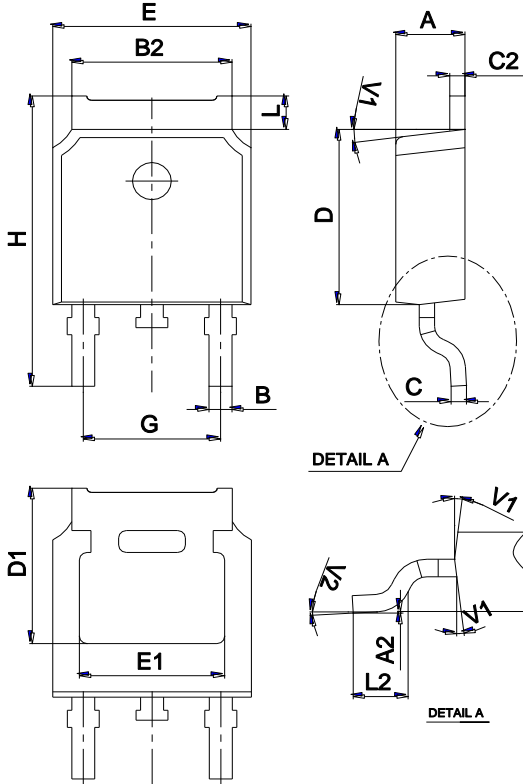
**Drain-source breakdown voltage**

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



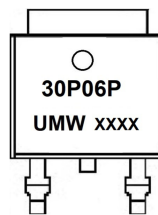


Package Mechanical Data TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2		0°	6°		0°	6°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW SPD30P6PG	TO-252	2500	Tape and reel