

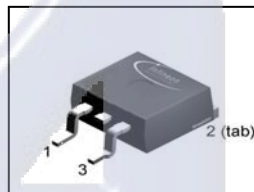
SPB80N06S-08**SPI80N06S-08, SPP80N06S-08****SIPMOS® Power-Transistor****Features**

- N-channel - Enhancement mode
- Automotive AEC Q101 qualified
- MSL1 up to 260°C peak reflow
- 175°C operating temperature
- Avalanche test
- Repetive Avalanche up to $T_{jmax} = 175\text{ °C}$
- dv/dt rated

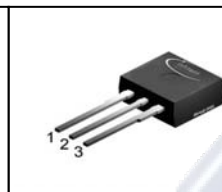
Product Summary

V_{DS}	55	V
$R_{DS(on),max}$ (SMD version)	7.7	mΩ
I_D	80	A

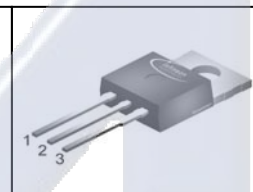
P-TO263-3-2



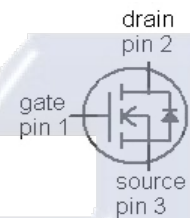
P-TO262-3-1



P-TO220-3-1



Type	Package	Ordering Code	Marking
SPB80N06S-08	P-TO263-3-2	Q67060-S6185	1N0608
SPI80N06S-08	P-TO262-3-1	Q67060-S6187	1N0608
SPP80N06S-08	P-TO220-3-1	Q67060-S6186	1N0608

**Maximum ratings**, at $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current ¹⁾	I_D	$T_C = 25\text{ °C}$, $V_{GS} = 10\text{ V}$	80	A
		$T_C = 100\text{ °C}$, $V_{GS} = 10\text{ V}$	80	
Pulsed drain current ²⁾	$I_{D,pulse}$	$T_C = 25\text{ °C}$	320	
Avalanche energy, single pulse	E_{AS}	$I_D = 80\text{ A}$, $R_{GS} = 25\text{ Ω}$, $V_{DD} = 25\text{ V}$	700	mJ
Avalanche energy, periodic ²⁾	E_{AR}	$T_j \leq 175\text{ °C}$	30	
Reverse diode dv/dt ²⁾	dv/dt	$I_D = 80\text{ A}$, $V_{DS} = 40\text{ V}$, $di/dt = 200\text{ A/μs}$, $T_{j,max} = 175\text{ °C}$	6	kV/μs
Gate source voltage	V_{GS}		±20	V
Power dissipation	P_{tot}	$T_C = 25$		

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Parameter	Symbol	Conditions	Values			Unit	
			min.	typ.	max.		
Thermal characteristics²⁾							
Thermal resistance, junction - case	R_{thJC}		-	0.38	0.5	K/W	
Thermal resistance, junction - ambient, leaded	R_{thJA}		-	-	62		
SMD version, device on PCB	R_{thJA}	minimal footprint	-	-	62		
		6 cm ² cooling area ³⁾	-	-	40		
Electrical characteristics, at $T_j=25\text{ °C}$, unless otherwise specified							
Static characteristics							
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=1\text{ mA}$	55	-	-	V	
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=240\text{ }\mu\text{A}$	2.1	3.0	4		
Zero gate voltage drain current	I_{DSS}	$V_{DS}=25\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ °C}$	-	0.1	1	μA	
		$V_{DS}=25\text{ V}, V_{GS}=0\text{ V}, T_j=150\text{ °C}^{2)}$	-	10	100		
Gate-source leakage current	I_{GSS}	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$	-	10	100	nA	
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=80\text{ A}$	-	6.5	8	m Ω	
		$V_{GS}=10\text{ V}, I_D=80\text{ A}$ SMD version	-	6.2	7.7		
Transconductance ²⁾	g_{fs}	$ V_{DS} >2 I_D R_{DS(on)max}, I_D=80\text{ A}$	-	73	-	S	

footnote on page 3

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Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic characteristics²⁾

Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=25\text{ V},$ $f=1\text{ MHz}$	-	3660	-	pF
Output capacitance	C_{oss}		-	1075	-	
Reverse transfer capacitance	C_{rss}		-	540	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=30\text{ V}, I_D=80\text{ A},$ $V_{GS}=10\text{ V}, R_G=2.4\ \Omega$	-	22	-	ns
Rise time	t_r		-	53	-	
Turn-off delay time	$t_{d(off)}$		-	54	-	
Fall time	t_f		-	32	-	

Gate Charge Characteristics²⁾

Gate to source charge	Q_{gs}	$V_{DD}=44\text{ V}, I_D=80\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$	-	19	-	nC
Gate to drain charge	Q_{gd}		-	62	-	
Gate charge total	Q_g		-	125	187	
Gate plateau voltage	$V_{plateau}$		-	5.4	-	V

Reverse Diode²⁾

Diode continuous forward current	I_S	$T_C=25\text{ °C}$	-	-	80	A
Diode pulse current	$I_{S,pulse}$		-	-	320	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=80\text{ A},$ $T_J=25\text{ °C}$	-	0.9	1.3	V
Reverse recovery time	t_{rr}	$V_R=27.5\text{ V}, I_F=I_S,$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	105	-	ns
Reverse recovery charge	Q_{rr}		-	30	-	

¹⁾ Current is limited by bondwire; with an $R_{thJC}=0.5\text{ K/W}$ the chip is able to carry 132A at 25°C. For detailed information see Application Note APPS071E at www.infineon.com/optimos

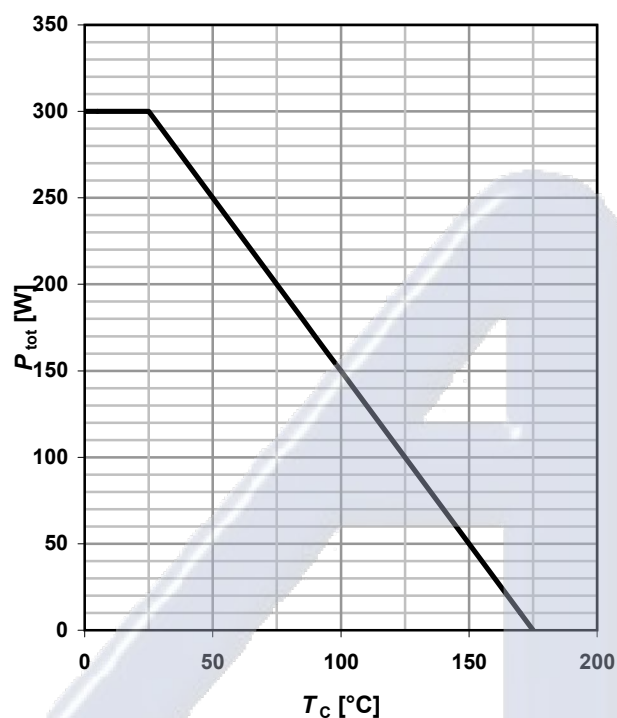
²⁾ Defined by design not subjected to production test

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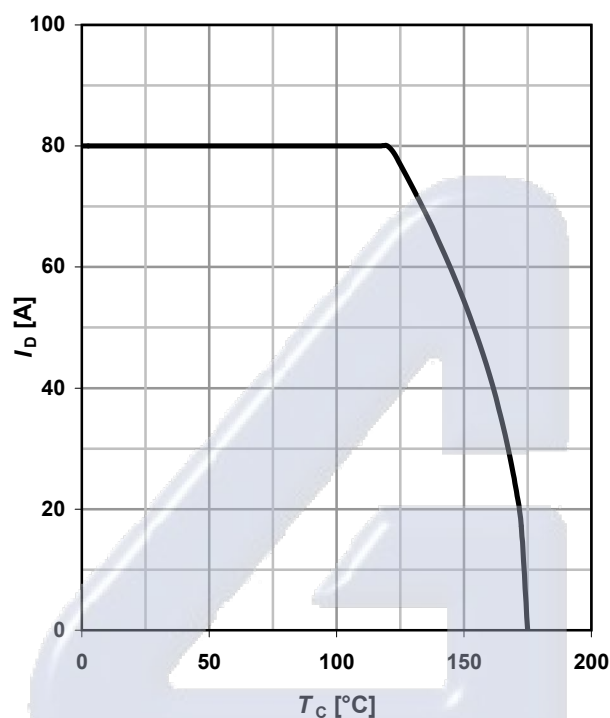
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1 Power dissipation

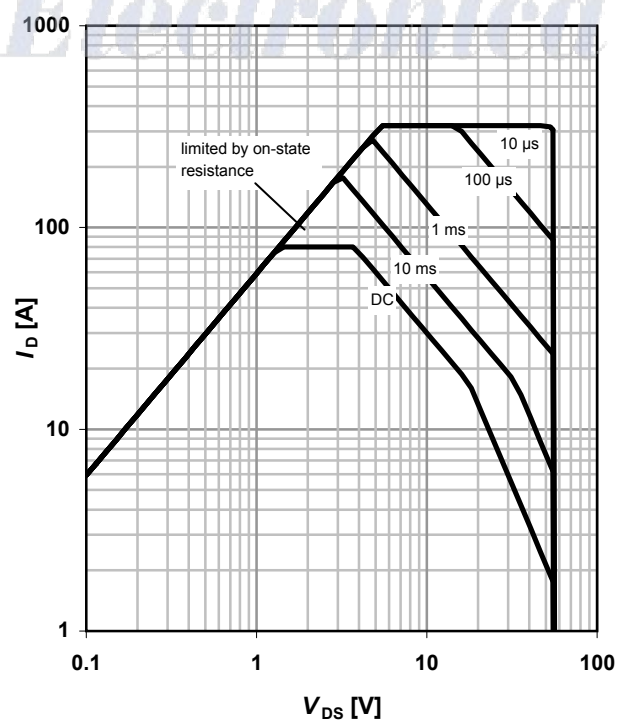
$$P_{\text{tot}} = f(T_C)$$

**2 Drain current**

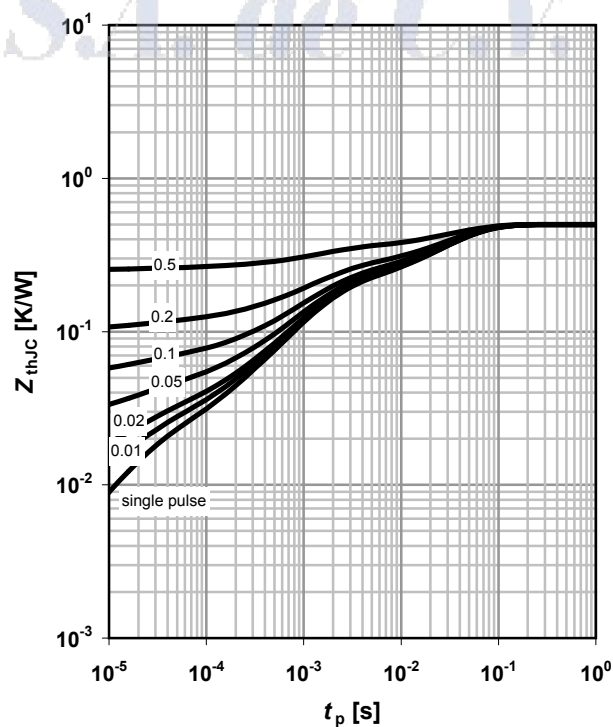
$$I_D = f(T_C); V_{GS} \geq 10 \text{ V}$$

**3 Safe operating area**

$$I_D = f(V_{DS}); T_C = 25^\circ\text{C}; D = 0$$

parameter: t_p **4 Max. transient thermal impedance**

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

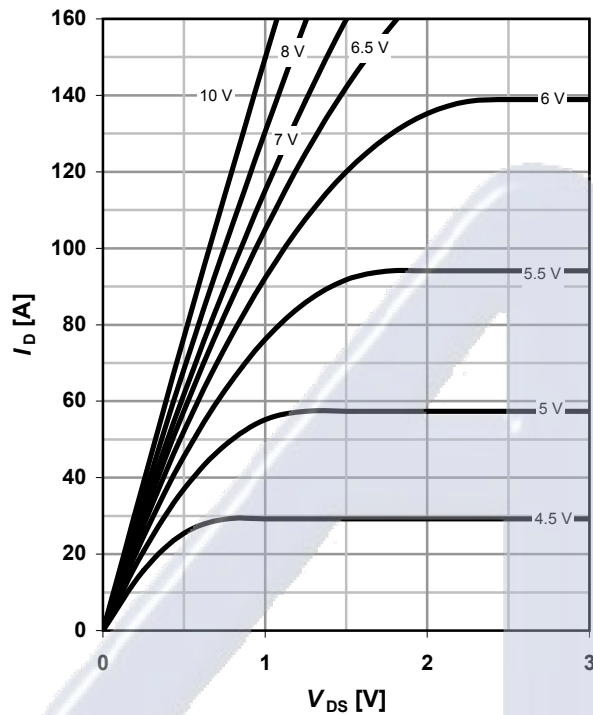
parameter: $D = t_p/T$ 

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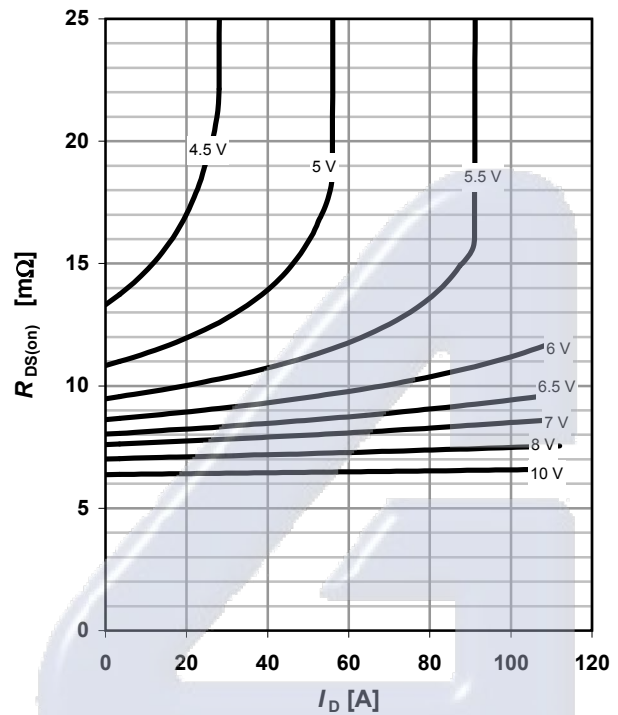
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5 Typ. output characteristics

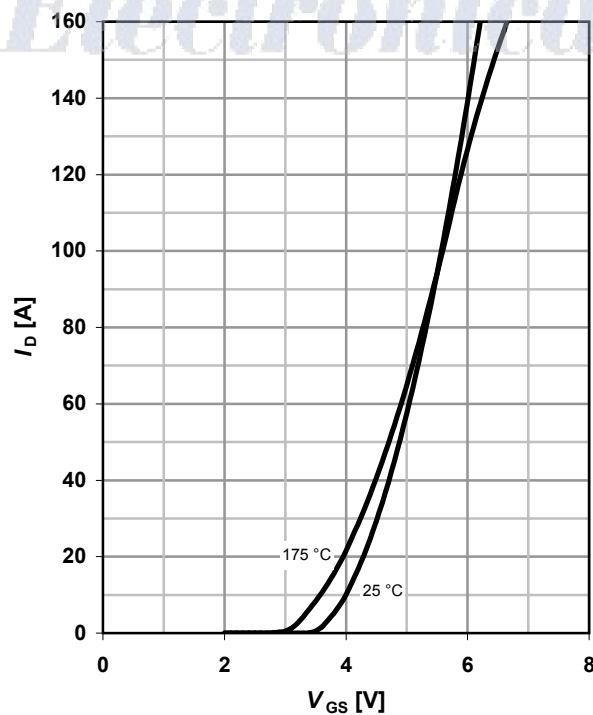
$$I_D = f(V_{DS}); T_j = 25^\circ\text{C}$$

parameter: V_{GS} **6 Typ. drain-source on resistance**

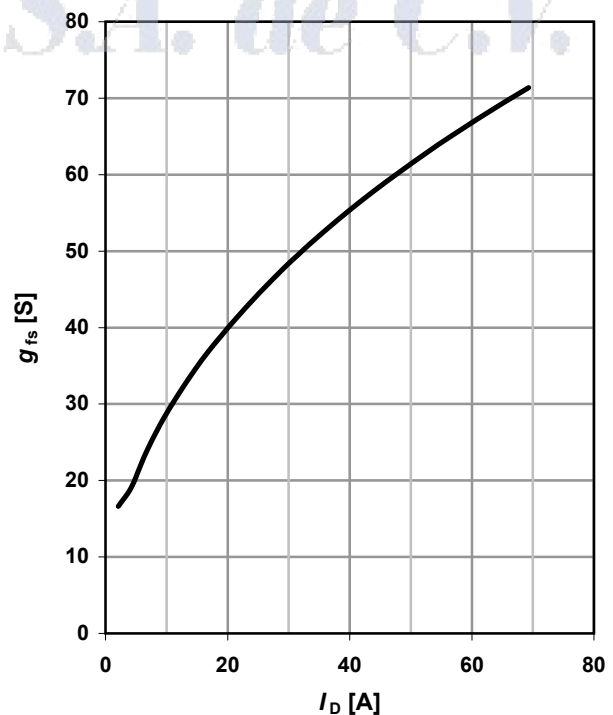
$$R_{DS(on)} = f(I_D); T_j = 25^\circ\text{C}$$

parameter: V_{GS} **7 Typ. transfer characteristics**

$$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)\max}$$

parameter: T_j **8 Typ. forward transconductance**

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

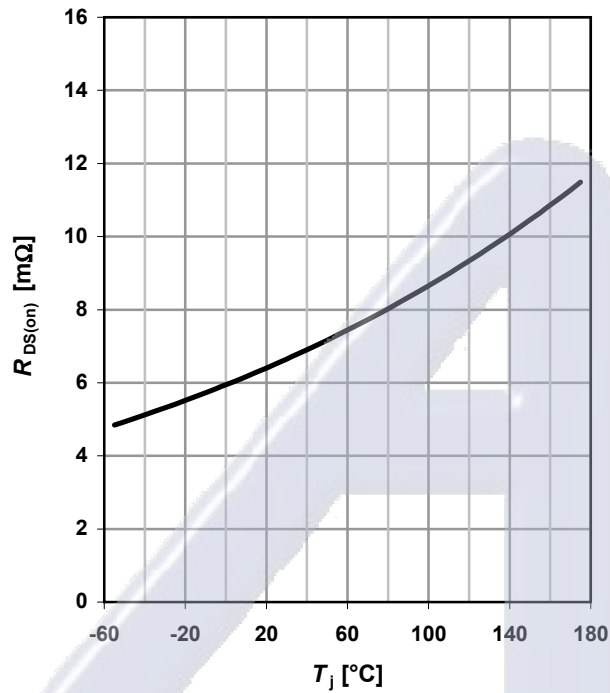


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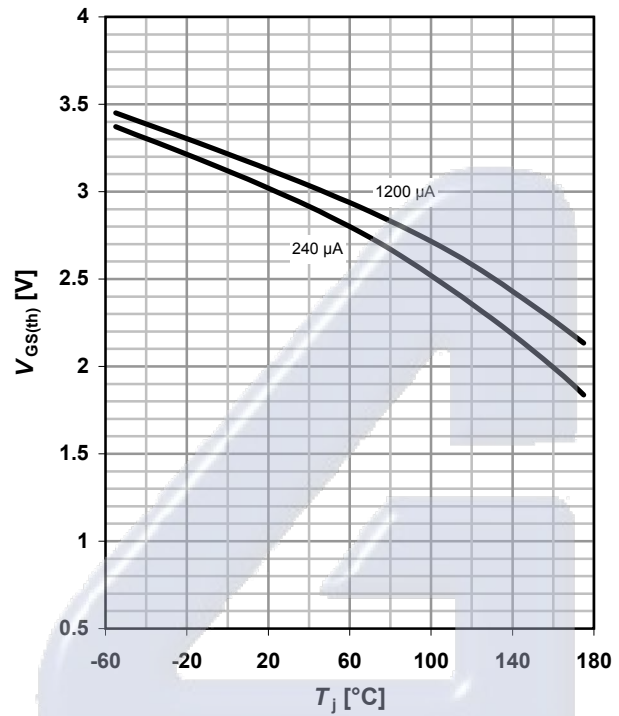
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9 Typical Drain-source on-state resistance

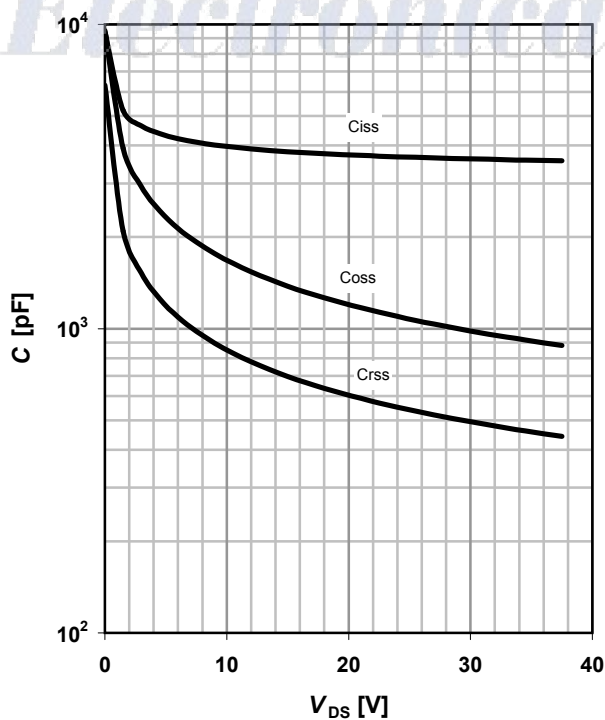
$$R_{DS(on)} = f(T_j); I_D = 80 \text{ A}; V_{GS} = 10 \text{ V}$$

**10 Typ. gate threshold voltage**

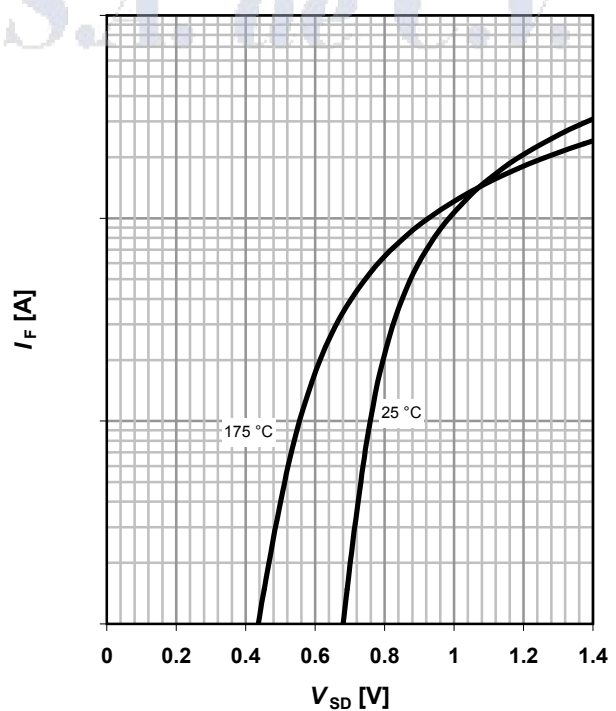
$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$$

parameter: I_D **11 Typ. capacitances**

$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$

**12 Forward characteristics of reverse diode**

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

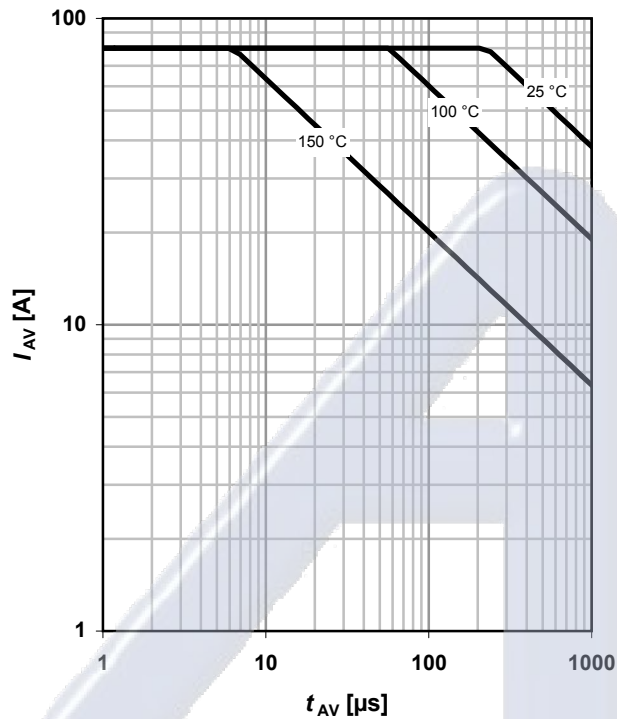
parameter: T_j 

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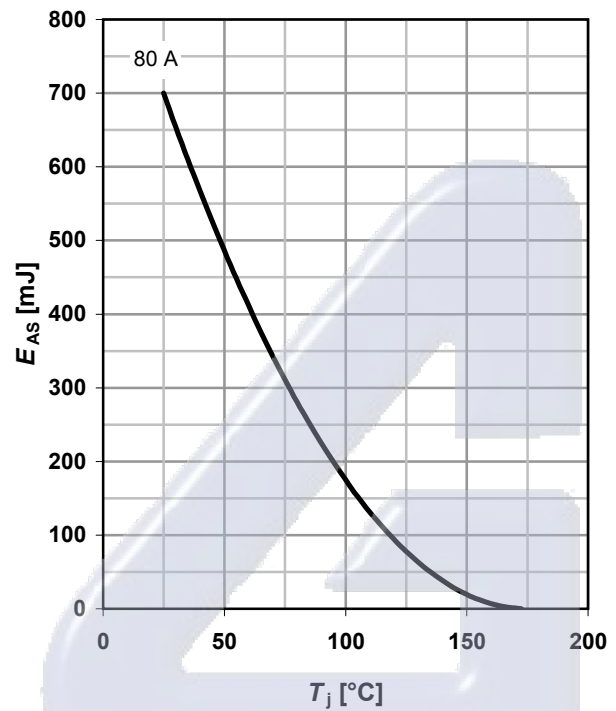
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13 Typ. Avalanche characteristics

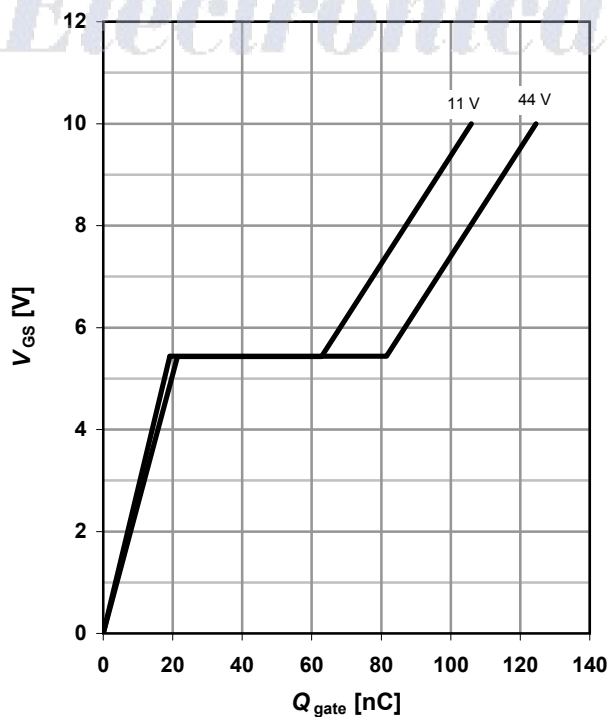
$$I_{AS}=f(t_{AV}); R_{GS}=25\ \Omega$$

parameter: $T_{j(\text{start})}$ **14 Typ. Avalanche Energy**

$$E_{AS}=f(T_j); V_{DD}=25\text{ V}; R_{GS}=25\ \Omega$$

parameter: I_D **15 Typ. gate charge**

$$V_{GS}=f(Q_{gate}); I_D=80\text{ A pulsed}$$

parameter: V_{DD} **16 Drain-source breakdown voltage**

$$V_{BR(DSS)}=f(T_j); I_D=250\ \mu A$$

