OptiMOS™-T2 Power-Transistor

AEC Qualified

RoHS

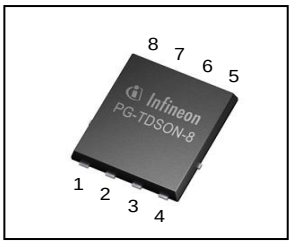
Product Summary

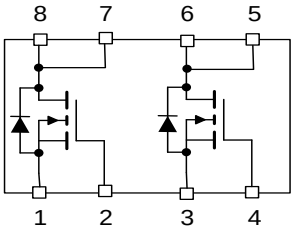
V_{DS}	100	V
$R_{DS(on),max}$ [3]	61	mΩ
I_D	16	A

Features

- Dual N-channel Normal Level - Enhancement mode
- AEC Q101 qualified
- MSL1 up to 260°C peak reflow
- 175°C operating temperature
- RoHS compliant
- 100% Avalanche tested

PG-TDSON-8





Type	Package	Marking
IPG16N10S4-61	PG-TDSON-8	4N1061

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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current one channel active	I_D	T_C=25 °C, V_{GS}=10 V	16	A
		T_C=100 °C, V_{GS}=10 V [1]	11	
Pulsed drain current [1] one channel active	$I_{D,pulse}$	-	64	
Avalanche energy, single pulse [1, 3]	E_{AS}	I_D=8A	33	mJ
Avalanche current, single pulse [3]	I_{AS}	-	10	A
Gate source voltage	V_{GS}	-	±20	V
Power dissipation one channel active	P_{tot}	T_C=25 °C	29	W
Operating and storage temperature	T_j, T_{stg}	-	-55 ... +175	°C

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics[1]						
Thermal resistance, junction - case	R_{thJC}	-	-	-	5.2	K/W
SMD version, device on PCB	R_{thJA}	minimal footprint	-	100	-	
		6 cm^2 cooling area[2]	-	60	-	
Electrical characteristics, at T_j=25 °C, unless otherwise specified						
Static characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=1mA	100	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=9µA	2.0	2.8	3.5	
Zero gate voltage drain current[3]	I_{DSS}	V_{DS}=100V, V_{GS}=0V, T_j=25°C	-	0.01	1	µA
		V_{DS}=100V, V_{GS}=0V, T_j=125°C[2]	-	1	100	
Gate-source leakage current[3]	I_{GSS}	V_{GS}=20V, V_{DS}=0V	-	-	100	nA
Drain-source on-state resistance[3]	$R_{DS(on)}$	V_{GS}=10V, I_D=16A	-	53	61	mΩ

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics[1)]						
Input capacitance[3)]	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1MHz	-	374	580	pF
Output capacitance[3)]	C_{oss}		-	120	240	
Reverse transfer capacitance[3)]	C_{rss}		-	10	20	
Turn-on delay time	$t_{d(on)}$	V_{DD}=50V, V_{GS}=10V, I_D=16A, R_G=11Ω	-	3	-	ns
Rise time	t_r		-	1	-	
Turn-off delay time	$t_{d(off)}$		-	5	-	
Fall time	t_f		-	5	-	
Gate Charge Characteristics[1, 3)]						
Gate to source charge	Q_{gs}	V_{DD}=50V, I_D=16A, V_{GS}=0 to 10V	-	2.0	3.0	nC
Gate to drain charge	Q_{gd}		-	1.3	2.6	
Gate charge total	Q_g		-	5.4	9.5	
Gate plateau voltage	$V_{plateau}$		-	5.4	-	V
Reverse Diode						
Diode continous forward current[1)] one channel active	I_S	T_C=25°C	-	-	16	A
Diode pulse current[1)] one channel active	$I_{S,pulse}$		-	-	64	
Diode forward voltage	V_{SD}	V_{GS}=0V, I_F=16A, T_j=25°C	-	1.0	1.3	V
Reverse recovery time[1)]	t_{rr}	V_R=50V, I_F=I_S, di_F/dt=100A/µs	-	50	-	ns
Reverse recovery charge[1, 3)]	Q_{rr}		-	70	-	nC

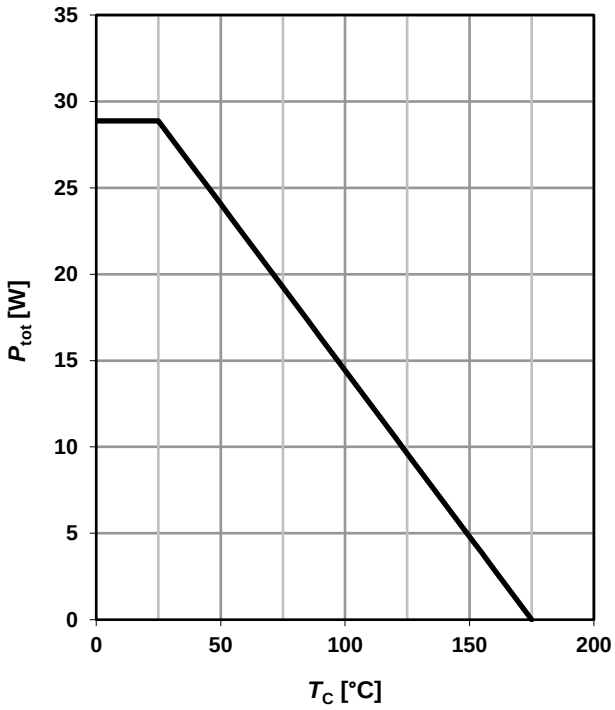
[1)] Specified by design. Not subject to production test.

[2)] Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm^2 (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

[3)] Per channel

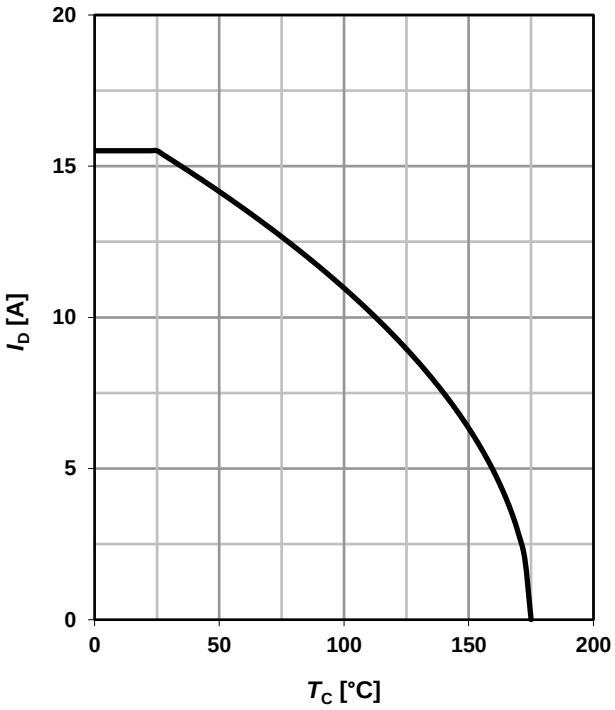
1 Power dissipation

$P_{tot} = f(T_C)$; $V_{GS} \geq 6$ V; one channel active



2 Drain current

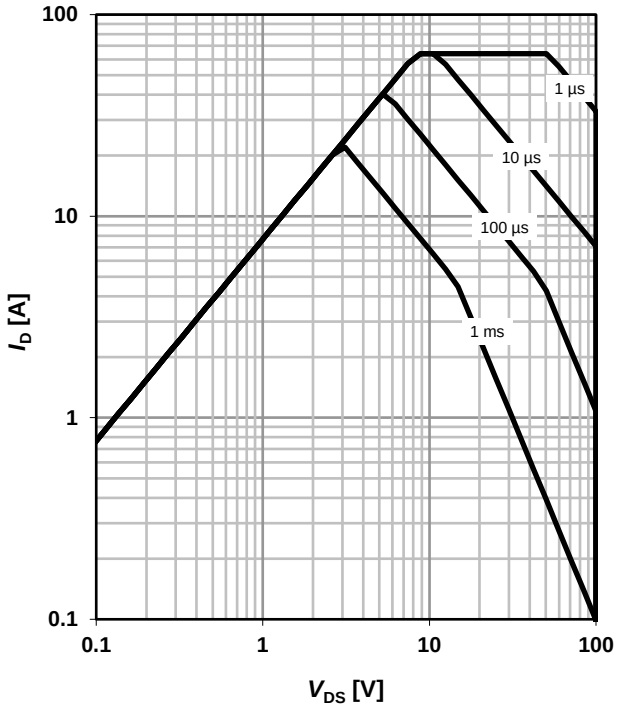
$I_D = f(T_C)$; $V_{GS} \geq 6$ V; one channel active



3 Safe operating area

$I_D = f(V_{DS})$; $T_C = 25$°C; $D = 0$; one channel active

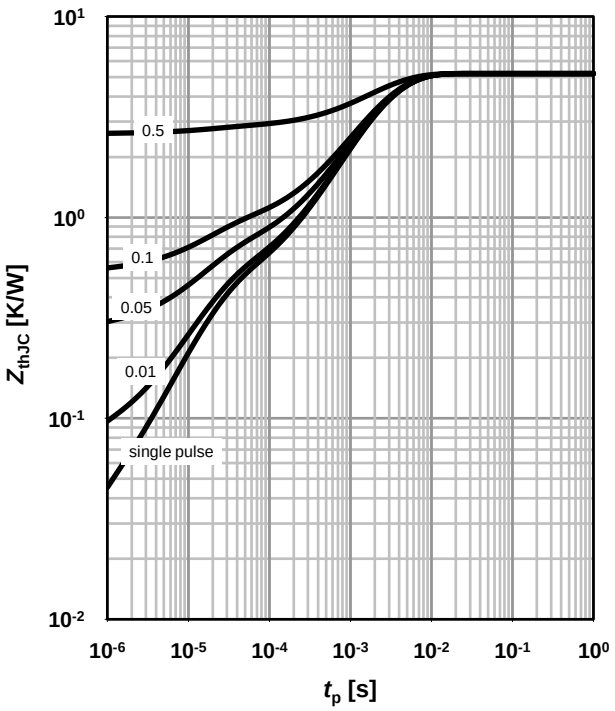
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJC} = f(t_p)$

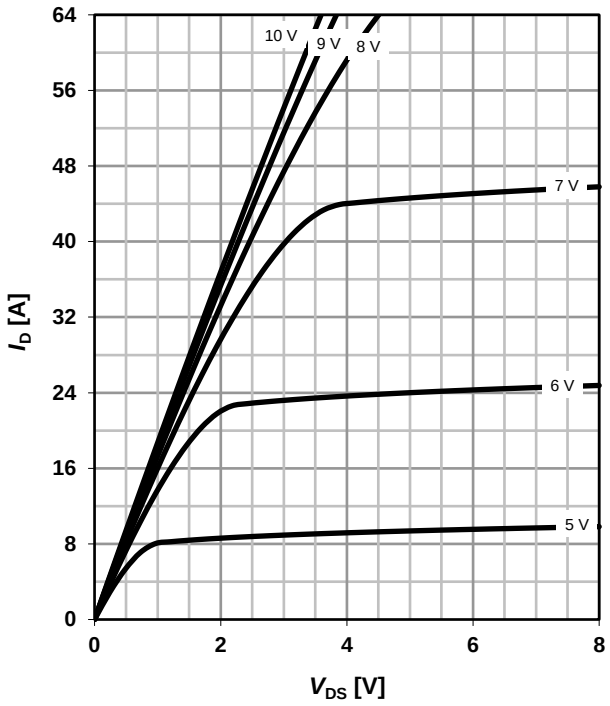
parameter: $D = t_p/T$



5 Typ. output characteristics[3)]

$I_D = f(V_{DS})$; $T_j = 25$ °C

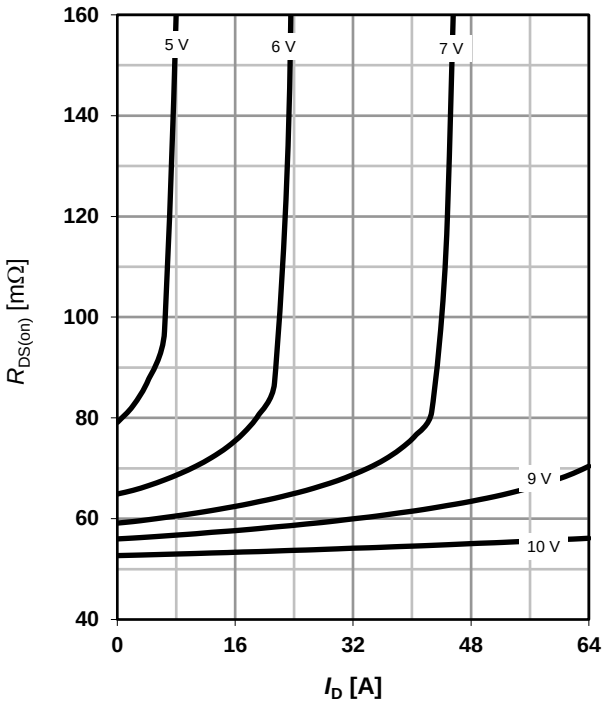
parameter: V_{GS}



6 Typ. drain-source on-state resistance[3)]

$R_{DS(on)} = f(I_D)$; $T_j = 25$ °C

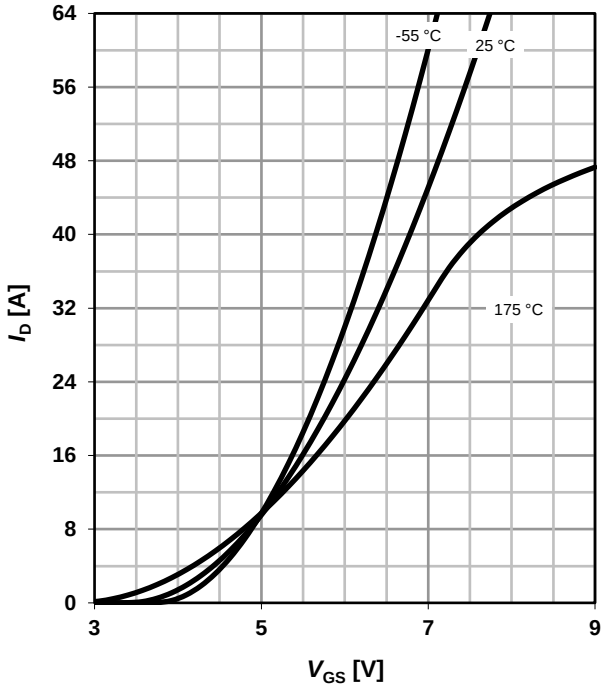
parameter: V_{GS}



7 Typ. transfer characteristics[3)]

$I_D = f(V_{GS})$; $V_{DS} = 6$V

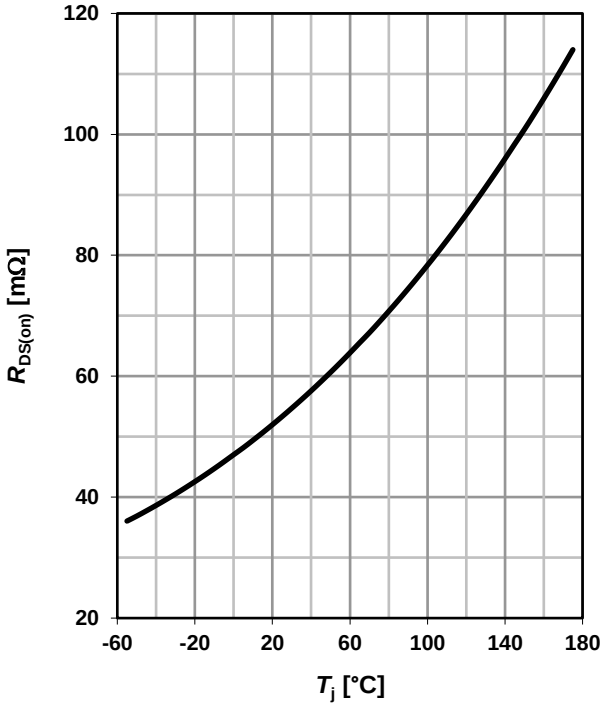
parameter: T_j



8 Typ. drain-source on-state resistance[3)]

$R_{DS(on)} = f(T_j)$; $I_D = 16$ A; $V_{GS} = 10$ V

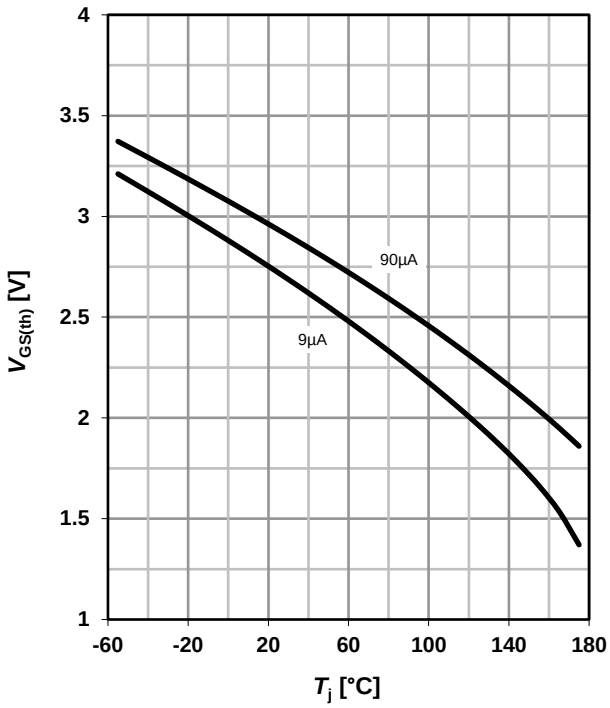
α = 0.4



9 Typ. gate threshold voltage

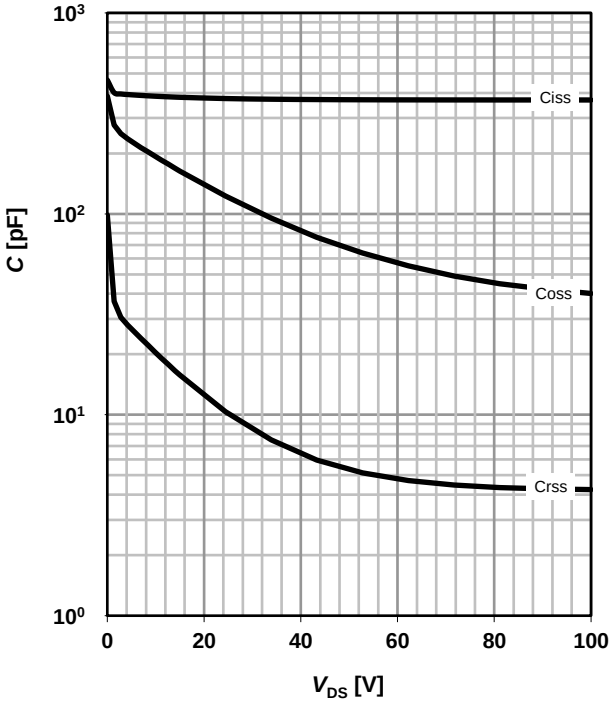
$V_{GS(th)} = f(T_j)$; $V_{GS} = V_{DS}$

parameter: I_D



10 Typ. Capacitances[3)]

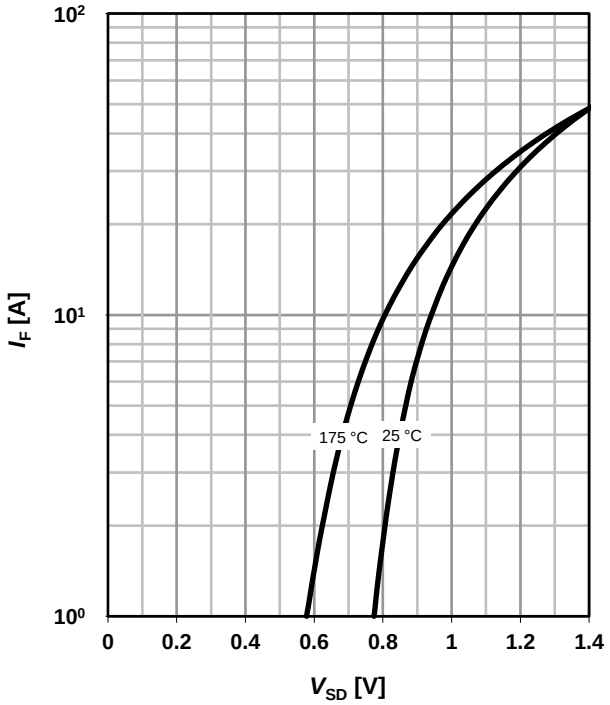
$C = f(V_{DS})$; $V_{GS} = 0$ V; $f = 1$ MHz



11 Typical forward diode characteristics[3)]

IF = f(V_{SD})

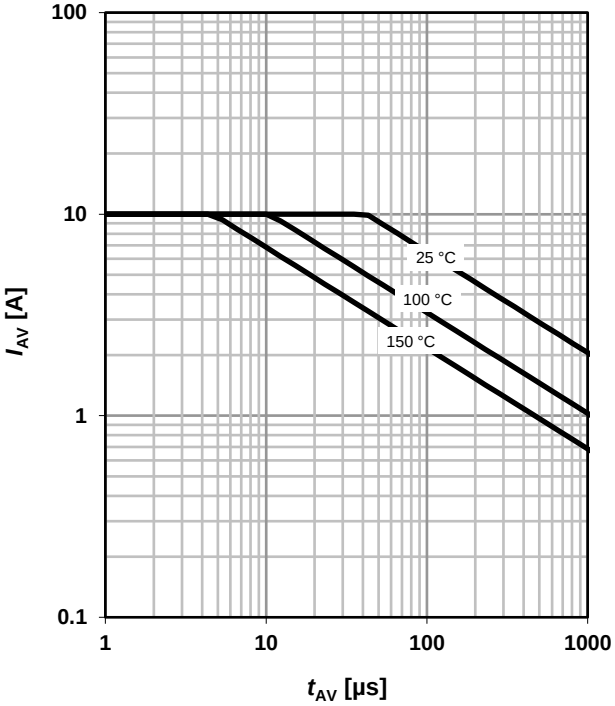
parameter: T_j



12 Avalanche characteristics[3)]

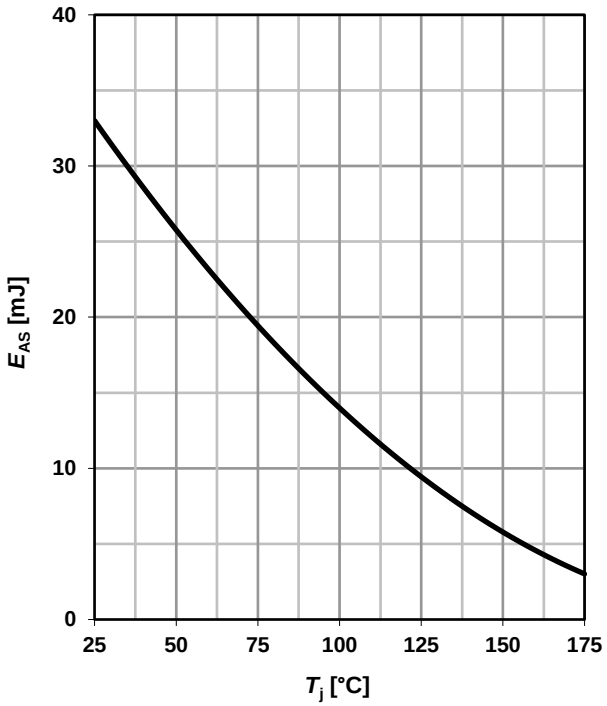
$I_{AS} = f(t_{AV})$

parameter: $T_{j(start)}$



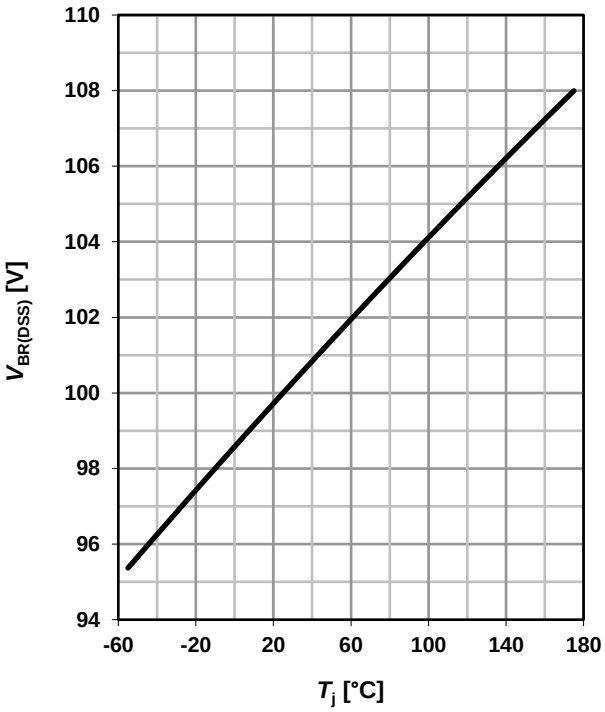
13 Avalanche energy[3)]

$E_{AS} = f(T_j)$, $I_D = 8A$



14 Drain-source breakdown voltage

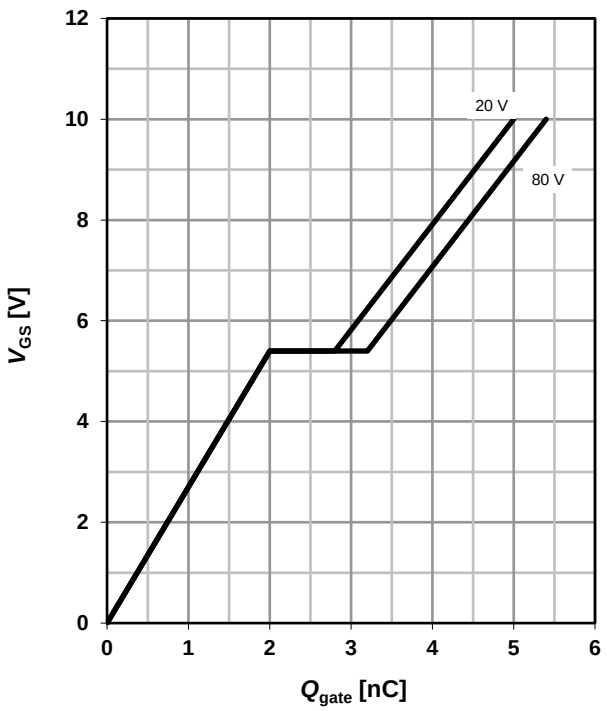
$V_{BR(DSS)} = f(T_j)$; $I_D = 1$ mA



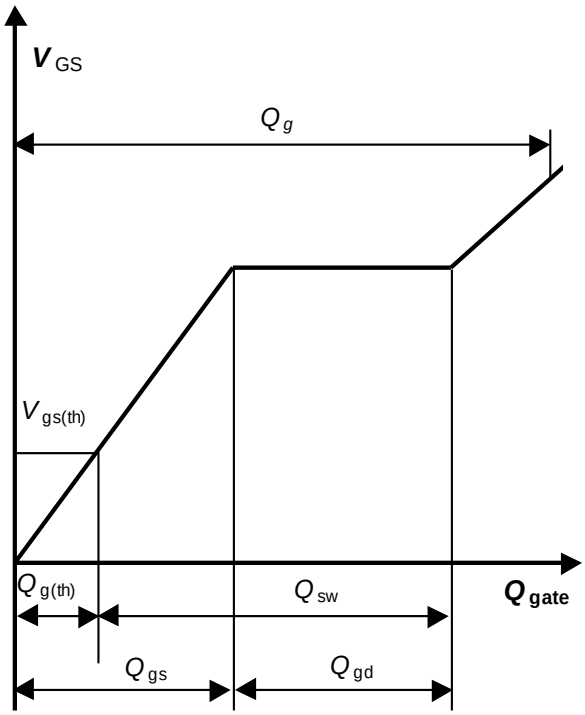
15 Typ. gate charge[3)]

$V_{GS} = f(Q_{gate})$; $I_D = 16$ A pulsed

parameter: V_{DD}



16 Gate charge waveforms



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Revision History

Version	Date	Changes
Revision 1.0	29.11.2011	Final Data Sheet
Revision 1.1	21.07.2014	Update of Coss, Ciss, Qgs, Qtot
Revision 1.2	24.08.2022	Diagram 8 Typ. drain-source on-state resistance: used α value clarified
Revision 1.21	19.08.2024	Package naming updated