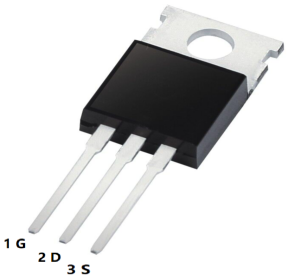
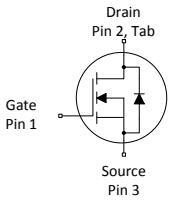
100 V N-Channel MOSFET

Features

- Very low on-resistance $R_{DS(on)}$
- 175 °C operating temperature
- Pb-free lead plating; RoHS compliant
- Ideal for high-frequency switching and synchronous rectification
- V_{DS} = 100V
- I_D =137A
- $R_{DS(ON)}$ (at V_{GS}=10V) < 4.5mΩ





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

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Continuous drain current	I_D			137 105	A	T_C=25 °C[1)] T_C=100 °C
Pulsed drain current[1)]	$I_{D,pulse}$			548	A	T_C=25 °C
Avalanche energy, single pulse	E_{AS}			340	mJ	I_D=100 A, R_{GS}=25 Ω
Gate source voltage	V_{GS}	-20		20	V	
Power dissipation	P_{tot}			214	W	T_C=25 °C
Operating and storage temperature	T_j, T_{stg}	-55		175	°C	IEC climatic category; DIN IEC 68-1: 55/175/56

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Thermal resistance, junction - case	R_{thJC}			0.7	K/W	
Thermal resistance, junction - ambient, minimal footprint	R_{thJA}			62	K/W	
Thermal resistance, junction - ambient, 6 cm^2 cooling area[2)]	R_{thJA}			50	K/W	

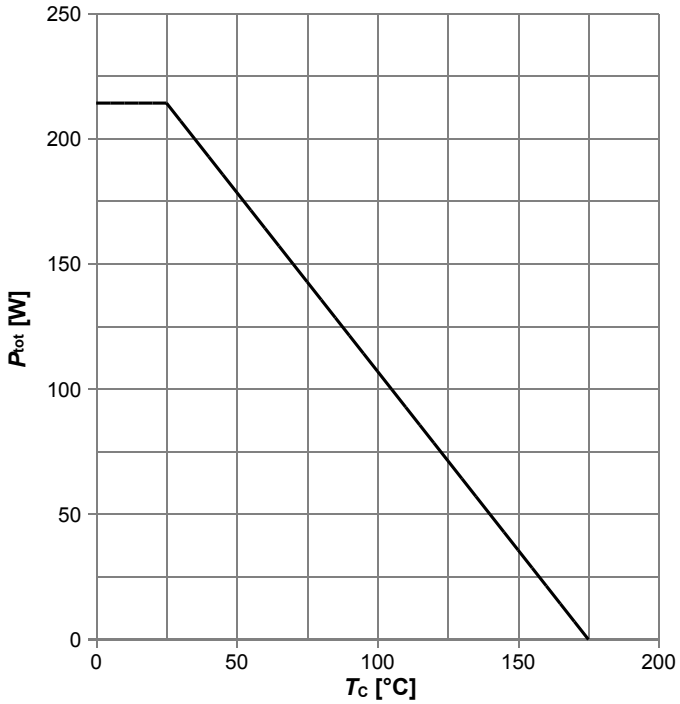
Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Drain-source breakdown voltage	$V_{(BR)DSS}$	100			V	V_{GS}=0 V, I_D=1 mA
Gate threshold voltage	$V_{GS(th)}$	2	2.7	3.5	V	V_{DS}=V_{GS}, I_D=150 µA
Zero gate voltage drain current	I_{DSS}		0.1 10	1 100	µA	V_{DS}=100 V, V_{GS}=0 V, T_j=25 °C V_{DS}=100 V, V_{GS}=0 V, T_j=125 °C
Gate-source leakage current	I_{GSS}		1	100	nA	V_{GS}=20 V, V_{DS}=0 V
Drain-source on-state resistance	$R_{DS(on)}$		3.9 4.7	4.5 7.7	mΩ	V_{GS}=10 V, I_D=100 A V_{GS}=6 V, I_D=50 A
Gate resistance	R_G		1.4		Ω	
Transconductance	g_{fs}	73	145		S	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=100 A

[1)] See Diagram 3
[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.

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Input capacitance	C_{iss}		6320	8410	pF	V_{GS}=0 V, V_{DS}=50 V, f=1 MHz
Output capacitance	C_{oss}		1210	1610	pF	V_{GS}=0 V, V_{DS}=50 V, f=1 MHz
Reverse transfer capacitance	C_{rss}		41		pF	V_{GS}=0 V, V_{DS}=50 V, f=1 MHz
Turn-on delay time	$t_{d(on)}$		27		ns	V_{DD}=50 V, V_{GS}=10 V, I_D=50 A, R_G=1.6 Ω
Rise time	t_r		59		ns	V_{DD}=50 V, V_{GS}=10 V, I_D=50 A, R_G=1.6 Ω
Turn-off delay time	$t_{d(off)}$		48		ns	V_{DD}=50 V, V_{GS}=10 V, I_D=50 A, R_G=1.6 Ω
tFall time	t_f		14		ns	V_{DD}=50 V, V_{GS}=10 V, I_D=50 A, R_G=1.6 Ω
Parameter	**Symbol**		**Values**		**Unit**	**Note / Test Condition**
		Min.	**Typ.**	**Max.**		
Gate to source charge	Q_{gs}		30	39	nC	V_{DD}=50 V, I_D=100 A, V_{GS}=0 to 10 V
Gate to drain charge	Q_{gd}		16		nC	V_{DD}=50 V, I_D=100 A, V_{GS}=0 to 10 V
Switching charge	Q_{sw}		27		nC	V_{DD}=50 V, I_D=100 A, V_{GS}=0 to 10 V
Gate charge total	Q_g		88	117	nC	V_{DD}=50 V, I_D=100 A, V_{GS}=0 to 10 V
Gate plateau voltage	$V_{plateau}$		4.7		V	V_{DD}=50 V, I_D=100 A, V_{GS}=0 to 10 V
Output charge	Q_{oss}		122	162	nC	V_{DD}=50 V, V_{GS}=0 V
Parameter	**Symbol**		**Values**		**Unit**	**Note / Test Condition**
		Min.	**Typ.**	**Max.**		
Diode continous forward current	I_S			137	A	T_C=25 °C
Diode pulse current	$I_{S,pulse}$			548	A	T_C=25 °C
Diode forward voltage	V_{SD}		1.0	1.2	V	V_{GS}=0 V, I_F=100 A, T_j=25 °C
Reverse recovery time	t_{rr}		68		ns	V_R=50 V, I_F=I_S, di_F/dt=100 A/µs
Reverse recovery charge	Q_{rr}		135		nC	V_R=50 V, I_F=I_S, di_F/dt=100 A/µs

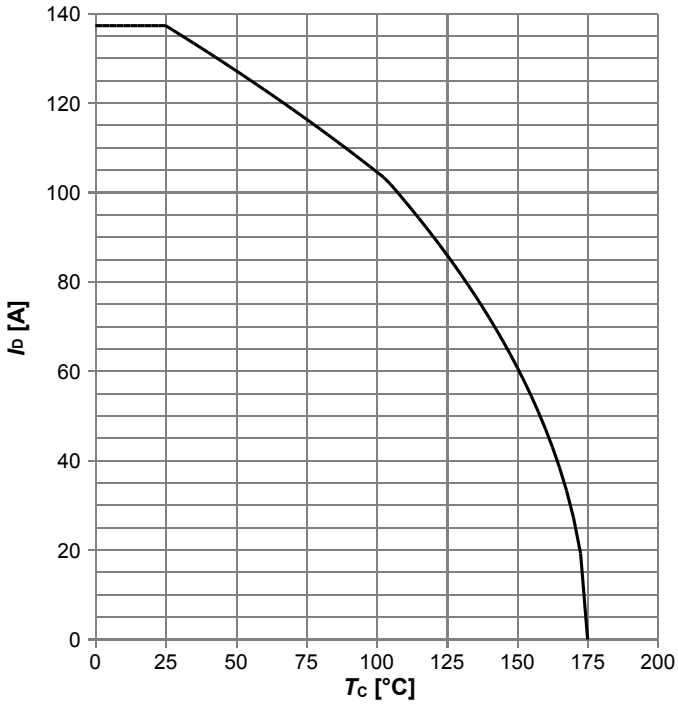
Electrical characteristics diagrams

Diagram 1: Power dissipation



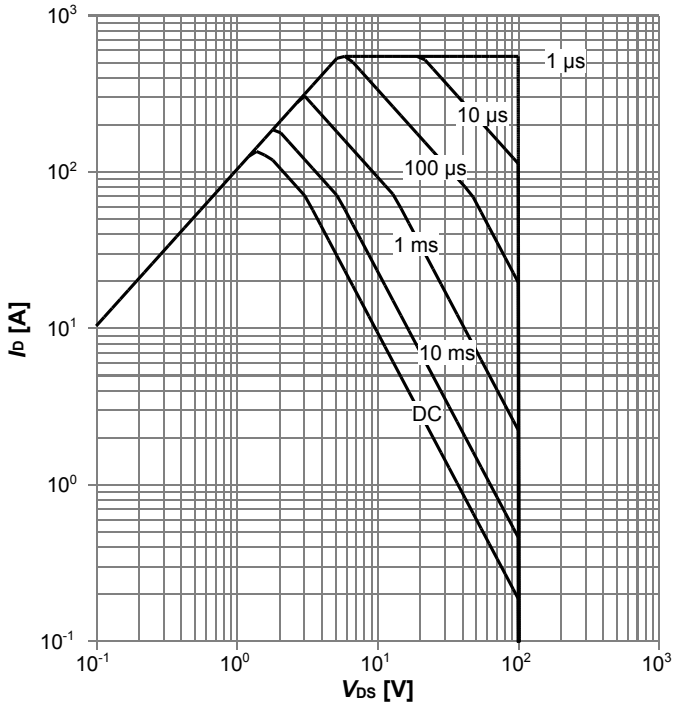
$P_{tot}=f(T_C)$

Diagram 2: Drain current



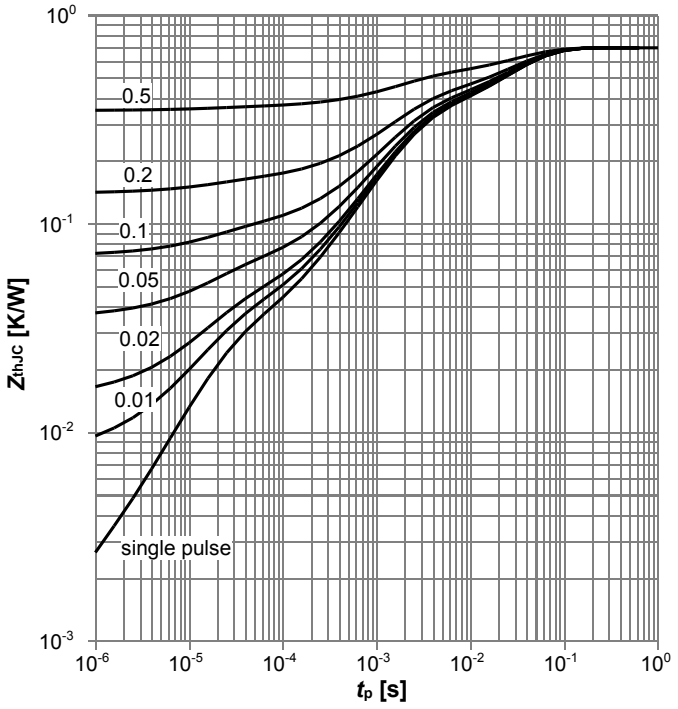
$I_D=f(T_C)$; $V_{GS}\geq 10$ V

Diagram 3: Safe operating area



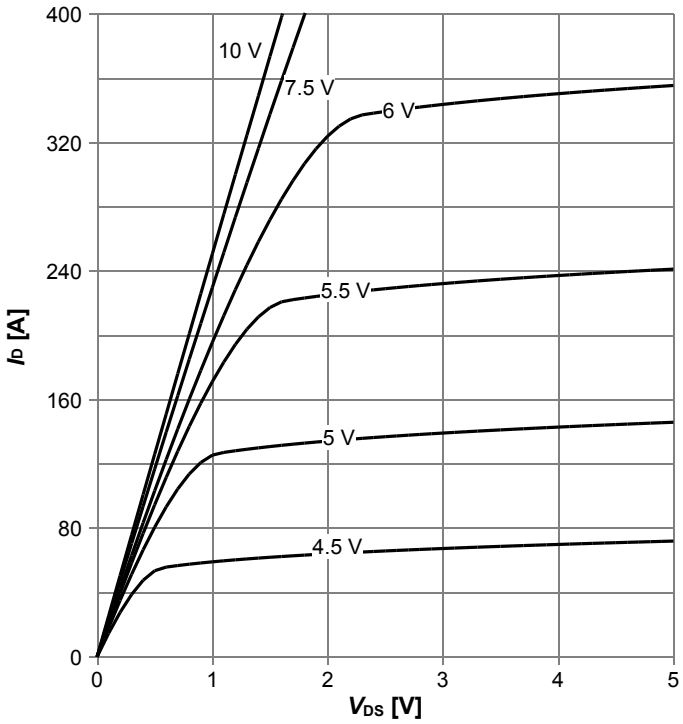
$I_D=f(V_{DS})$; $T_C=25$ °C; $D=0$; parameter: t_p

Diagram 4: Max. transient thermal impedance



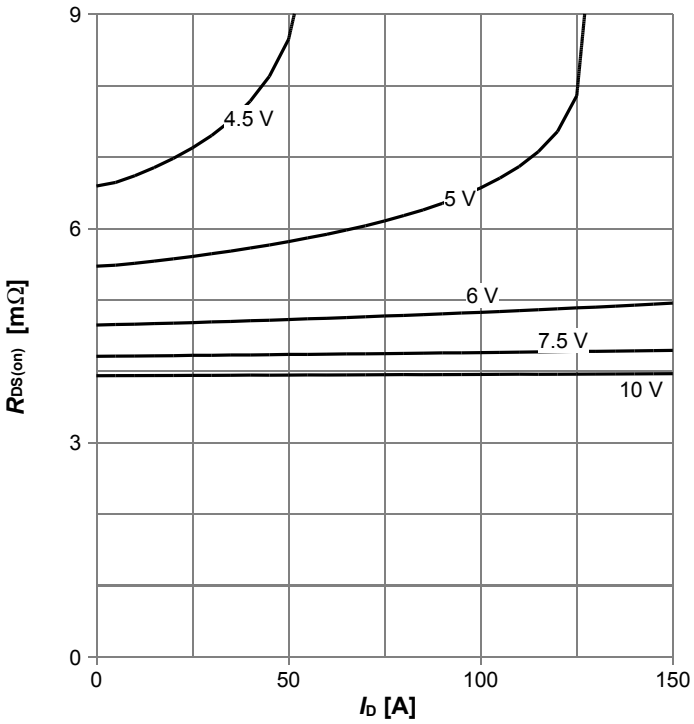
$Z_{thJC}=f(t_p)$; parameter: $D=t_p/T$

Diagram 5: Typ. output characteristics



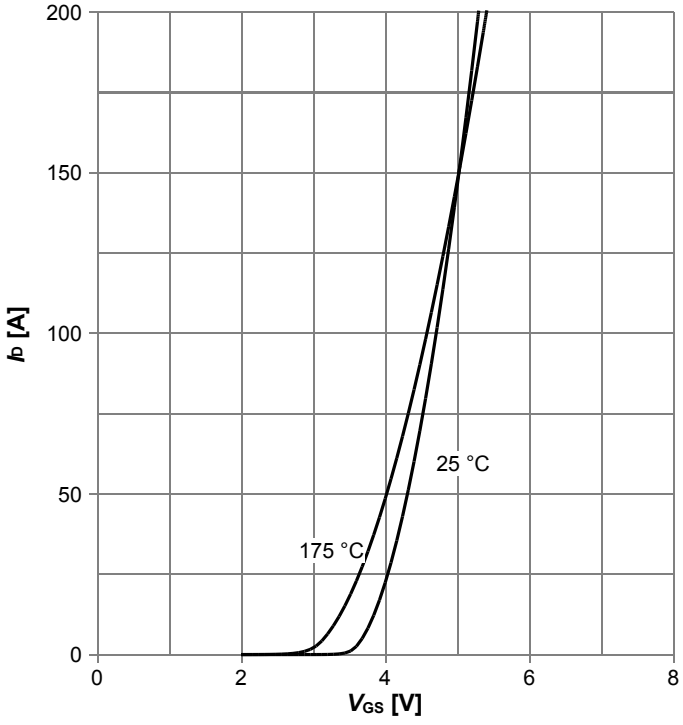
I_D=f(V_{DS}); T_j=25 °C; parameter: V_{GS}

Diagram 6: Typ. drain-source on resistance



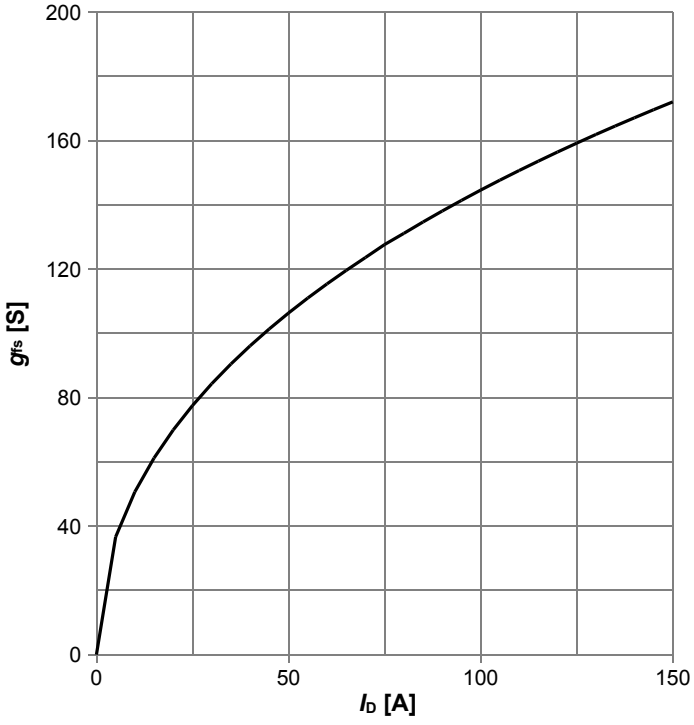
$R_{DS(on)}$=f(I_D); T_j=25 °C; parameter: V_{GS}

Diagram 7: Typ. transfer characteristics



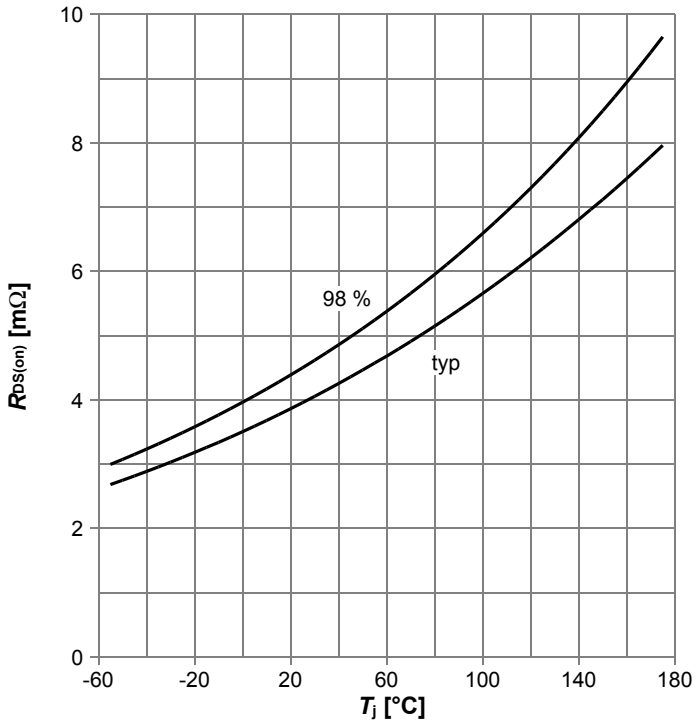
I_D=f(V_{GS}); |V_{DS}|>2|I_D|$R_{DS(on)max}$; parameter: T_j

Diagram 8: Typ. forward transconductance



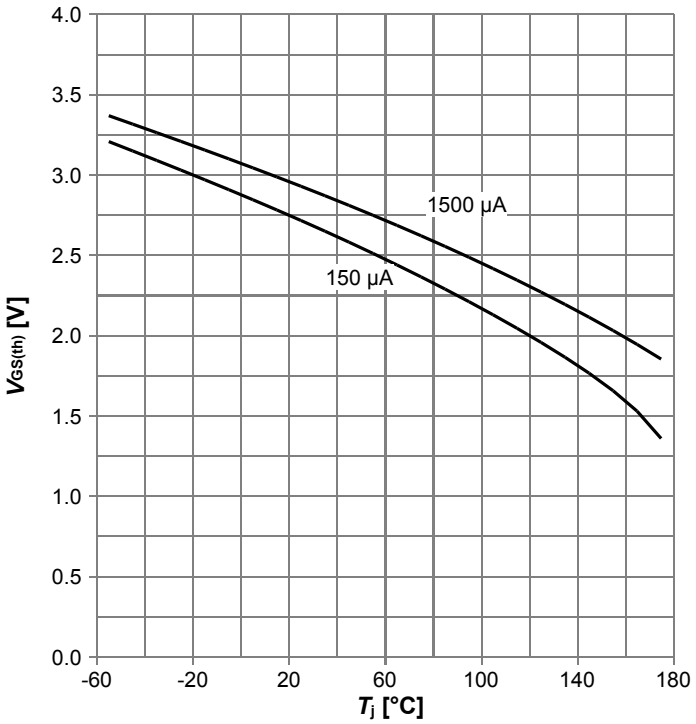
g_{fs}=f(I_D); T_j=25 °C

Diagram 9: Drain-source on-state resistance



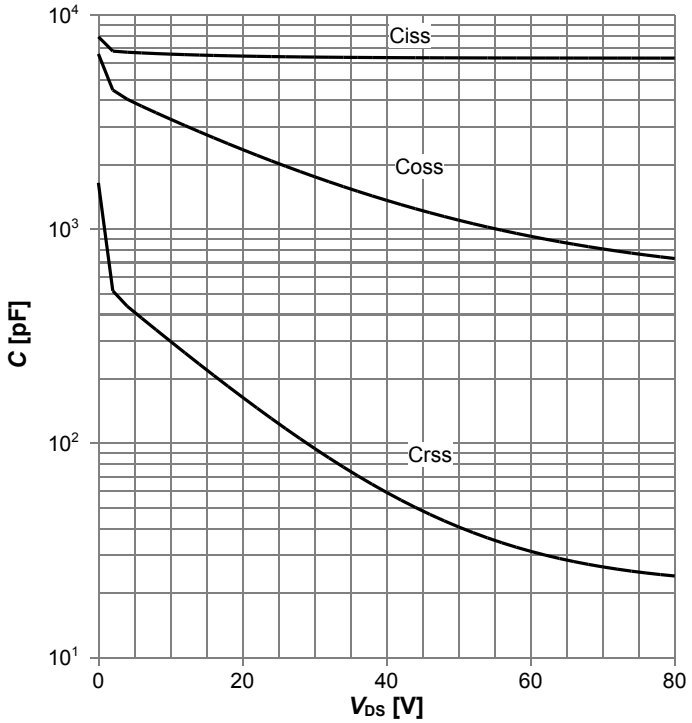
$R_{DS(on)}$=f(T_j); I_D=100 A; V_{GS}=10 V

Diagram 10: Typ. gate threshold voltage



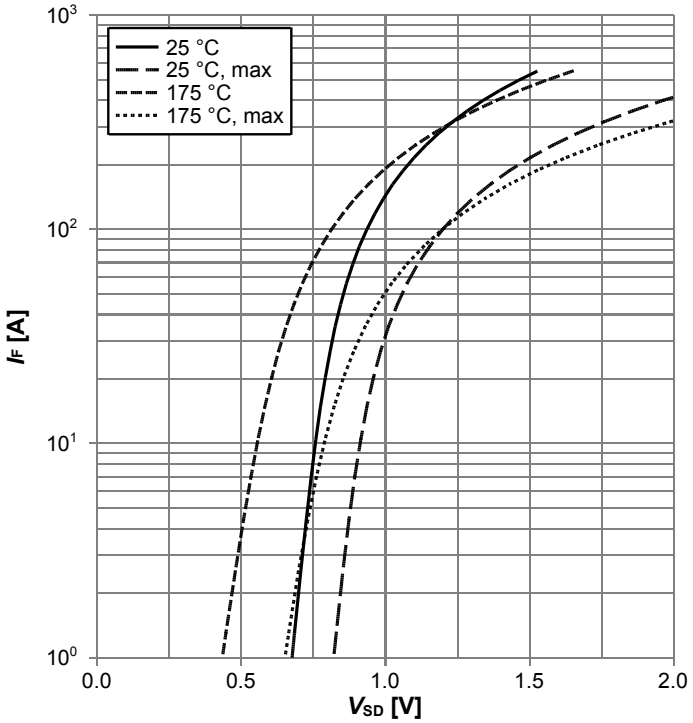
$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}; parameter: I_D

Diagram 11: Typ. capacitances



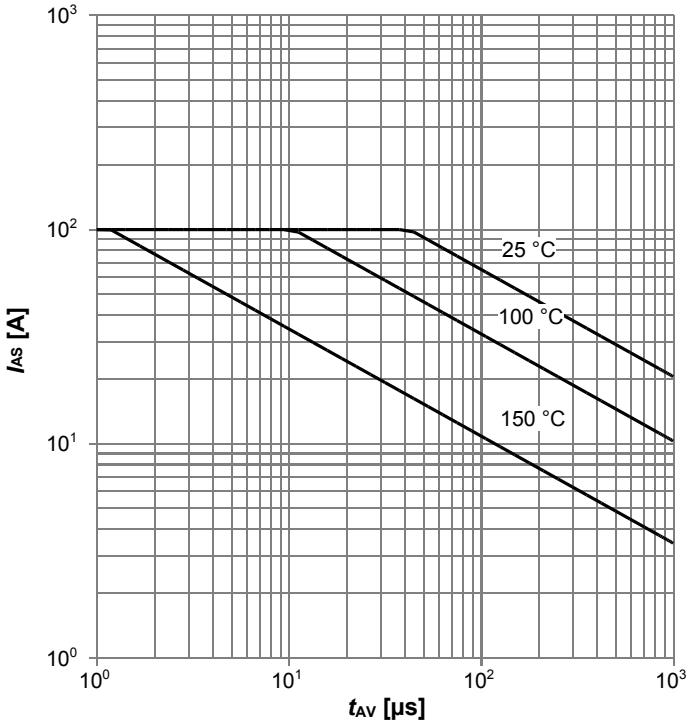
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz

Diagram 12: Forward characteristics of reverse diode



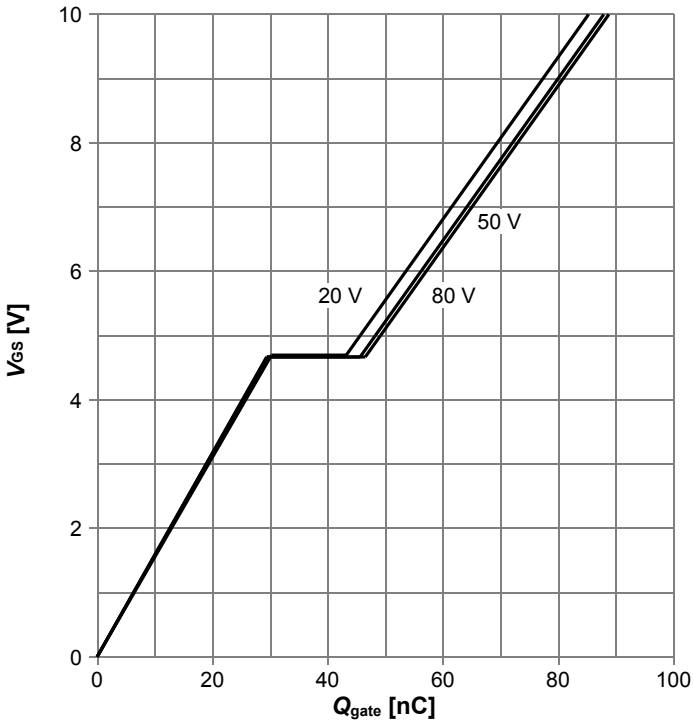
I_F=f(V_{SD}); parameter: T_j

Diagram 13: Avalanche characteristics



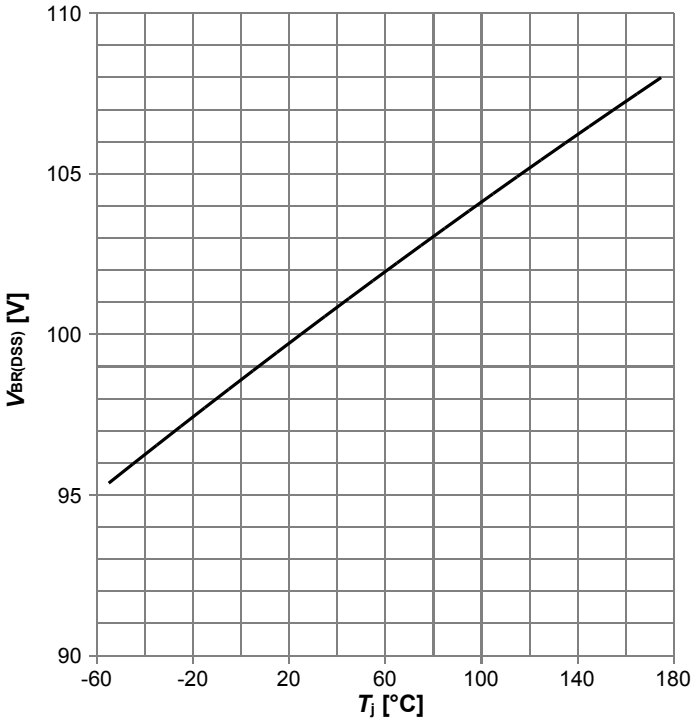
I_{AS}=f(t_{AV}); R_{GS}=25 Ω; parameter: $T_{j(start)}$

Diagram 14: Typ. gate charge

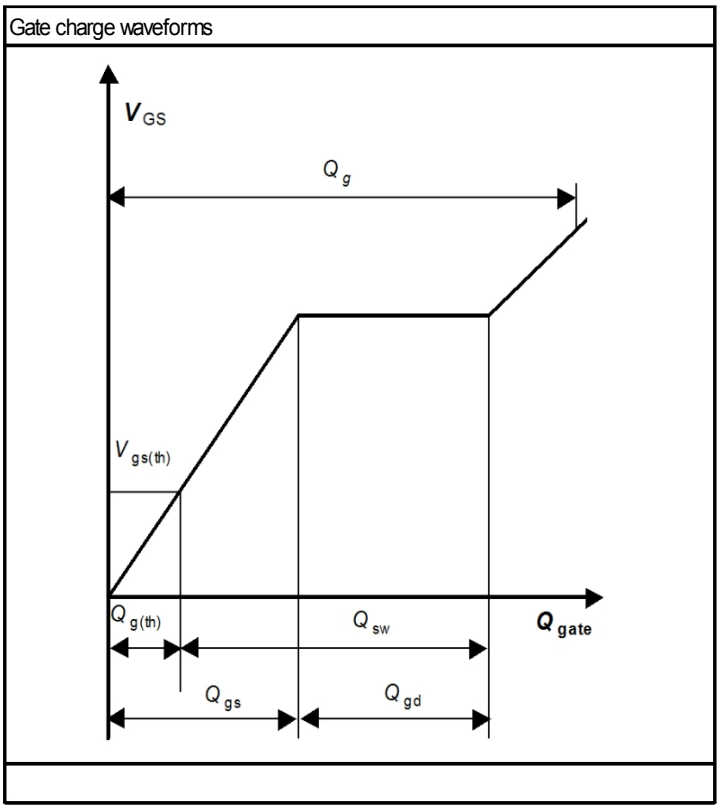


V_{GS}=f(Q_{gate}); I_D=100 A pulsed; parameter: V_{DD}

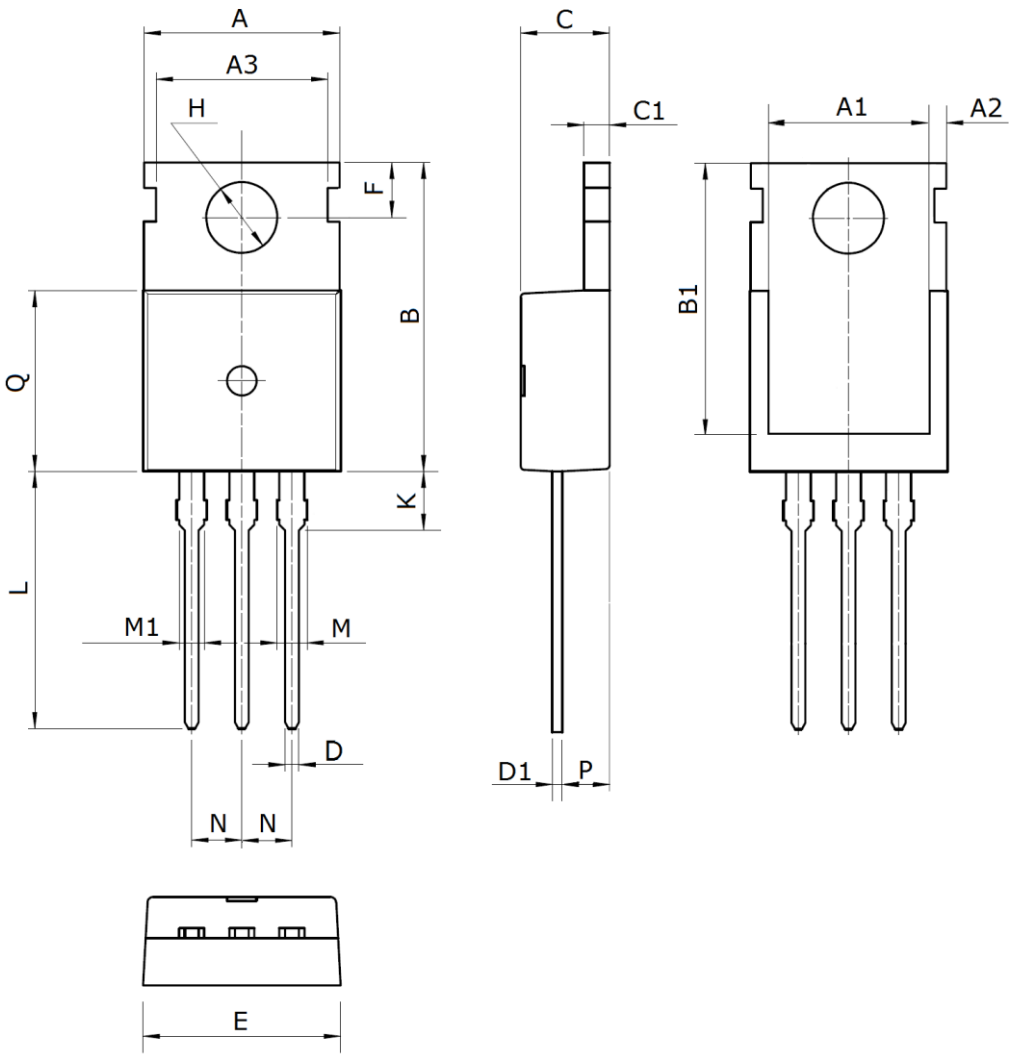
Diagram 15: Drain-source breakdown voltage



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

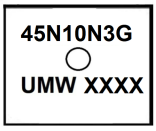


Package Mechanical Data TO-220



Symbol	Dimensions （mm）	Symbol	Dimensions (mm)	Symbol	Dimensions (mm)
A	10.0±0.3	C1	1.3±0.2	L	13.2±0.4
A1	8.0±0.2	D	0.8±0.2	M	1.38±0.1
A2	0.94±0.1	D1	0.5±0.1	M1	1.28±0.1
A3	8.7±0.1	E	10.0±0.3	N	2.54(typ)
B	15.6±0.4	F	2.8 ±0.1	P	2.4±0.3
B1	13.2 ±0.2	H	3.6±0.1	Q	9.15±0. 25
C	4.5±0. 2	K	3.1±0.2		

Marking



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