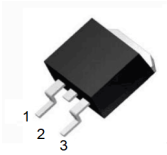
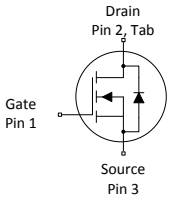
100 V N-Channel MOSFET

Features

- Excellent gate charge x $R_{DS(on)}$ product (FOM)
- 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 (at V_{GS}=10V)=80A
- $R_{DS(ON)}$ (at V_{GS}=10V) < 6.2mΩ



TO-263



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

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Continuous drain current	I_D			80 73	A	T_C=25 °C[1)] T_C=100 °C
Pulsed drain current[1)]	$I_{D,pulse}$			320	A	T_C=25 °C
Avalanche energy, single pulse	E_{AS}			160	mJ	I_D=80 A, R_{GS}=25 Ω
Gate source voltage	V_{GS}	-20		20	V	
Power dissipation	P_{tot}			150	W	T_C=25 °C
Operating and storage temperature	T_j, T_{stg}	-55		175	°C	

Thermal characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Thermal resistance, junction - case	R_{thJC}			1	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}			40	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=90 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	$R_{DS(on)}$		5.9 7.3	6.5 12.4	mΩ	V_{GS}=10 V, I_D=80 A V_{GS}=6 V, I_D=40 A
Gate resistance[1)]	R_G		1.6	2.4	Ω	
Transconductance	g_{fs}	50	99		S	|V_{DS}|>2|I_D|$R_{DS(on)max}$, I_D=80 A

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Input capacitance	C_{iss}		3690	4910	pF	V_{GS}=0 V, V_{DS}=50 V, f=1 MHz
Output capacitance	C_{oss}		646	859	pF	V_{GS}=0 V, V_{DS}=50 V, f=1 MHz
Reverse transfer capacitance	C_{rss}		25	44	pF	V_{GS}=0 V, V_{DS}=50 V, f=1 MHz
Turn-on delay time	$t_{d(on)}$		19		ns	V_{DD}=50 V, V_{GS}=10 V, I_D=80 A, $R_{G,ext}$=1.6 Ω
Rise time	t_r		37		ns	V_{DD}=50 V, V_{GS}=10 V, I_D=80 A, $R_{G,ext}$=1.6 Ω
Turn-off delay time	$t_{d(off)}$		37		ns	V_{DD}=50 V, V_{GS}=10 V, I_D=80 A, $R_{G,ext}$=1.6 Ω
Fall time	t_f		9		ns	V_{DD}=50 V, V_{GS}=10 V, I_D=80 A, $R_{G,ext}$=1.6 Ω

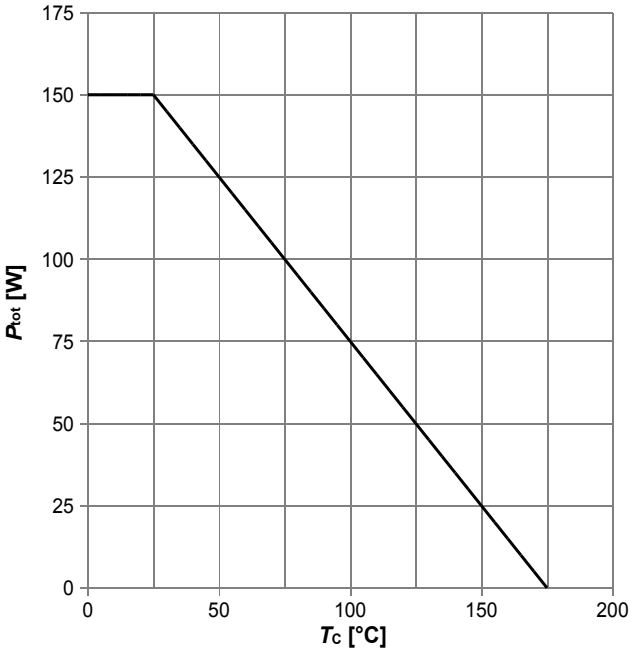
Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Gate to source charge	Q_{gs}		18		nC	V_{DD}=50 V, I_D=80 A, V_{GS}=0 to 10 V
Gate to drain charge[1)]	Q_{gd}		10	15	nC	V_{DD}=50 V, I_D=80 A, V_{GS}=0 to 10 V
Switching charge	Q_{sw}		16		nC	V_{DD}=50 V, I_D=80 A, V_{GS}=0 to 10 V
Gate charge total	Q_g		51	64	nC	V_{DD}=50 V, I_D=80 A, V_{GS}=0 to 10 V
Gate plateau voltage	$V_{plateau}$		4.9		V	V_{DD}=50 V, I_D=80 A, V_{GS}=0 to 10 V
Output charge[1)]	Q_{oss}		68	91	nC	V_{DD}=50 V, V_{GS}=0 V

Reverse diode

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Diode continous forward current	I_S			80	A	T_C=25 °C
Diode pulse current	$I_{S,pulse}$			320	A	T_C=25 °C
Diode forward voltage	V_{SD}		1	1.2	V	V_{GS}=0 V, I_F=80 A, T_j=25 °C
Reverse recovery time[1)]	t_{rr}		73	146	ns	V_R=50 V, I_F=I_S, di_F/dt=100 A/µs
Reverse recovery charge[1)]	Q_{rr}		139	278	nC	V_R=50 V, I_F=I_S, di_F/dt=100 A/µs

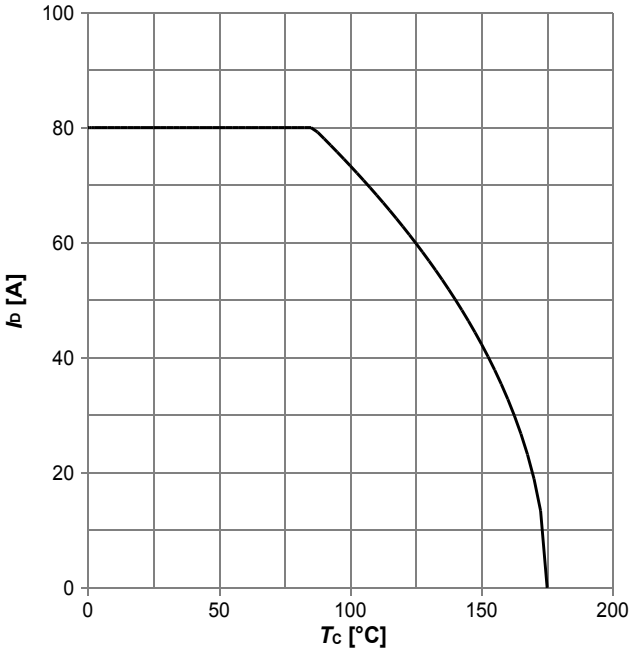
Electrical characteristics diagrams

Diagram 1: Power dissipation



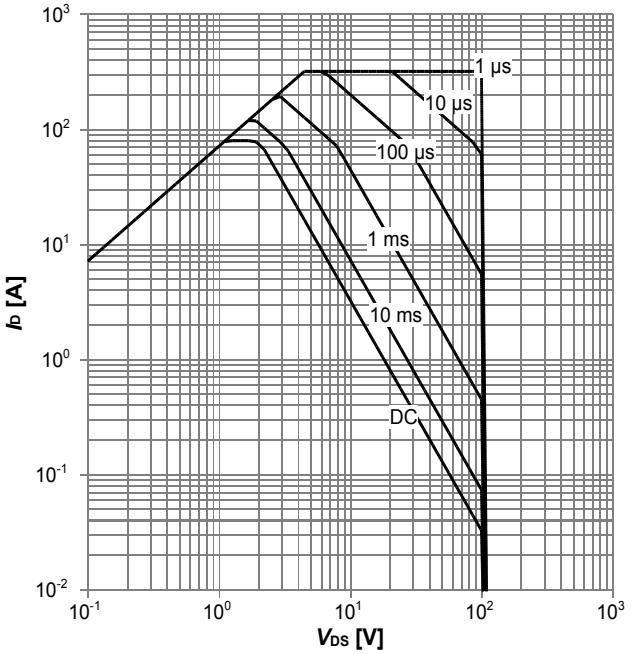
P_{tot}=f(T_C)

Diagram 2: Drain current



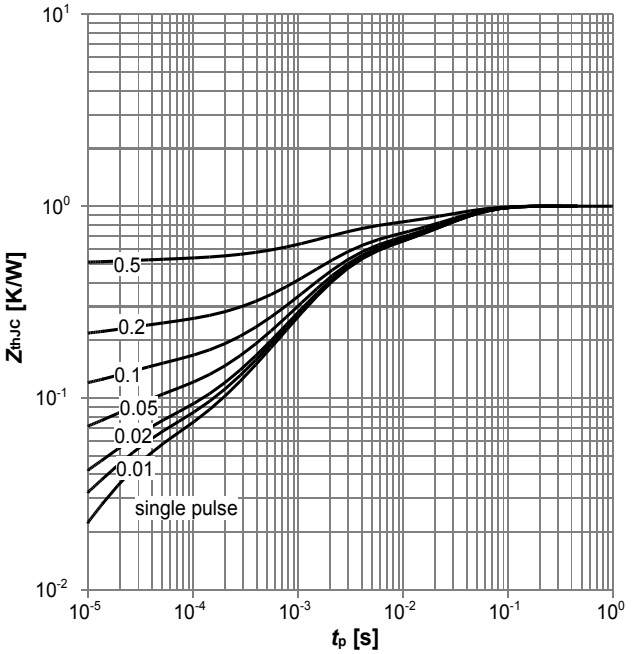
I_D=f(T_C); V_{GS}≥10 V

Diagram 3: Safe operating area



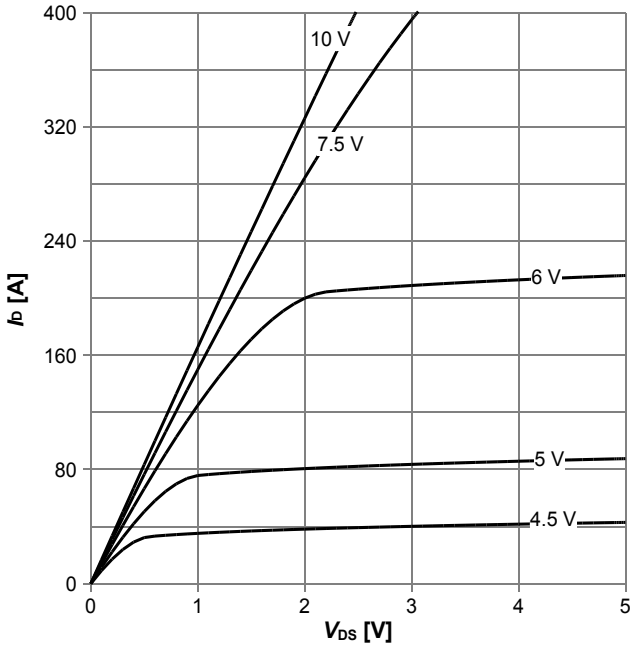
I_D=f(V_{DS}); T_C=25 °C; D=0; parameter: t_p

Diagram 4: Max. transient thermal impedance



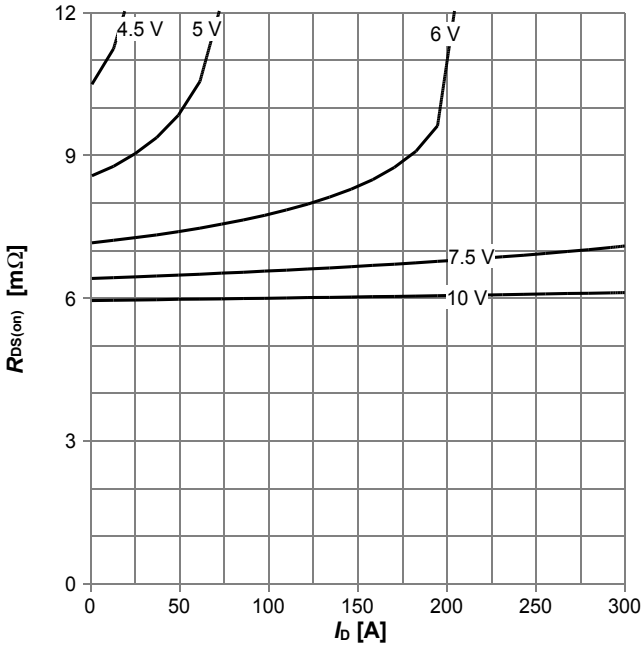
Z_{thJC}=f(t_p); parameter: D=t_p/T

Diagram 5: Typ. output characteristics



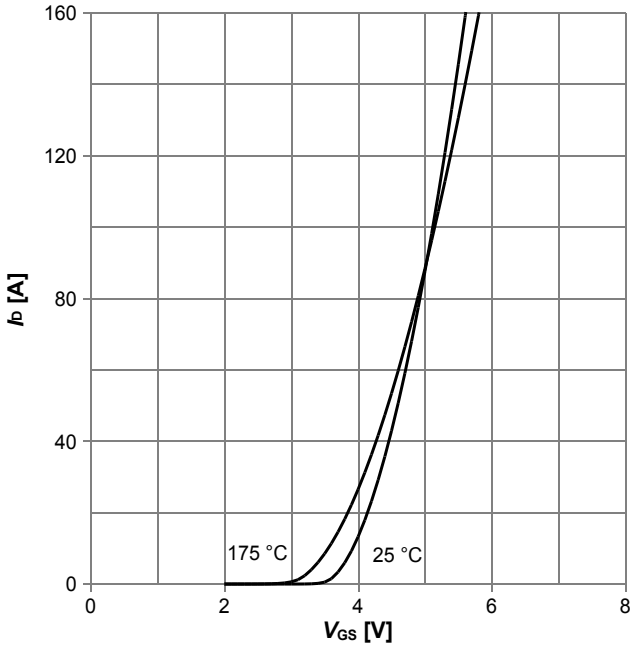
I_D=f(V_{DS}); T_j=25 °C; parameter: V_{GS}

Diagram 6: Typ. drain-source on resistance



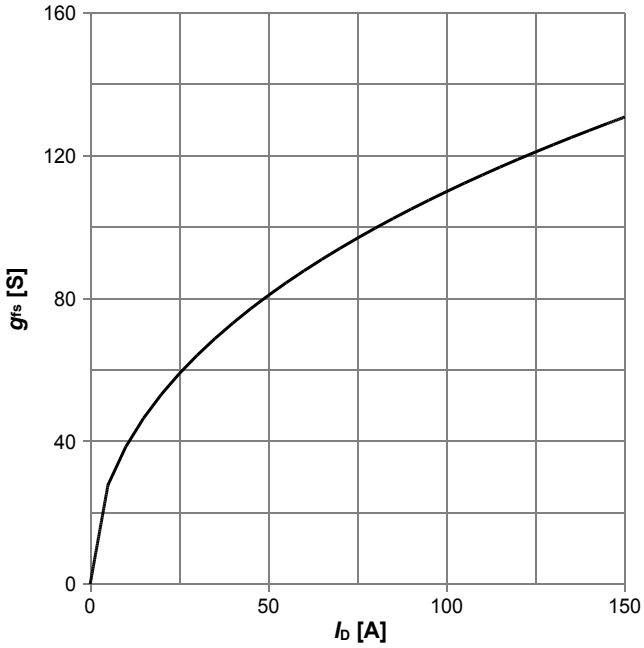
$R_{DS(on)}$=f(I_D); T_j=25 °C; parameter: V_{GS}

Diagram 7: Typ. transfer characteristics



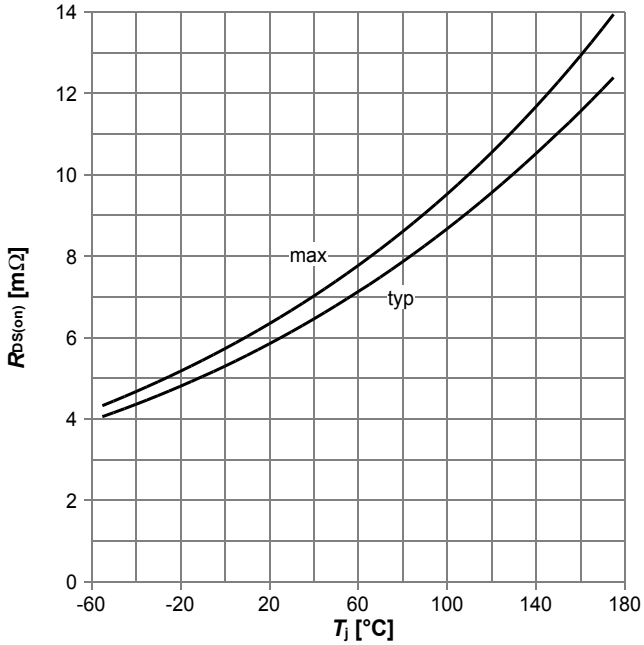
I_D=f(V_{GS}); |V_{DS}|>2|I_D|$R_{DS(on)max}$; parameter: T_j

Diagram 8: Typ. forward transconductance



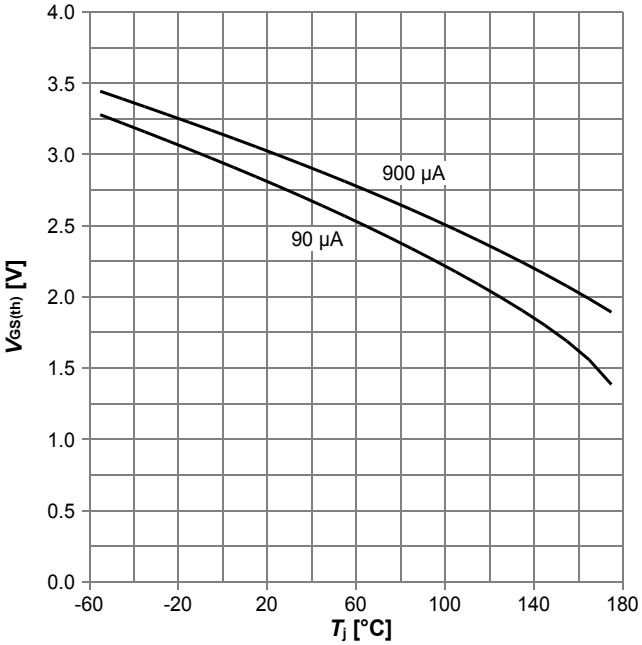
g_{fs}=f(I_D); T_j=25 °C

Diagram 9: Drain-source on-state resistance



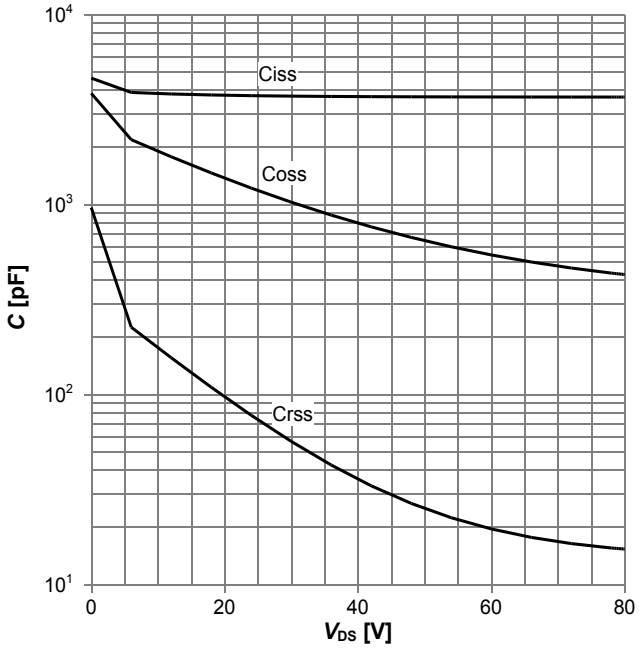
$R_{DS(on)}$=f(T_j); I_D=80 A; V_{GS}=10 V

Diagram 10: Typ. gate threshold voltage



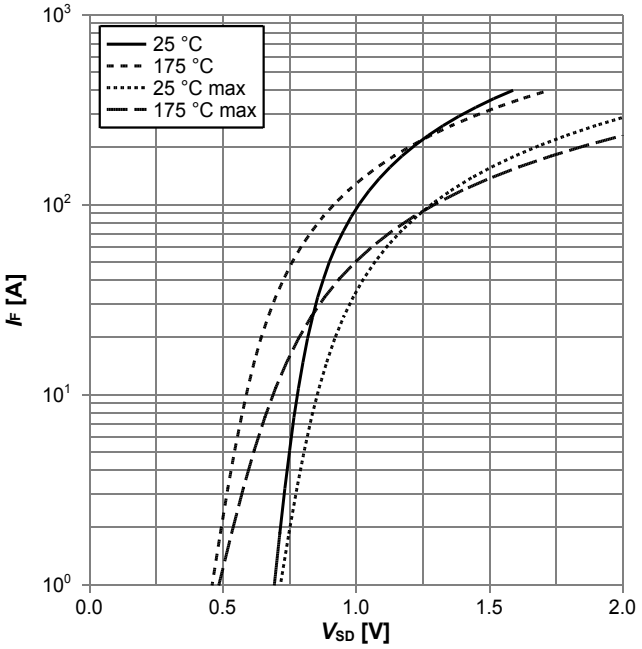
$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}; parameter: I_D

Diagram 11: Typ. capacitances



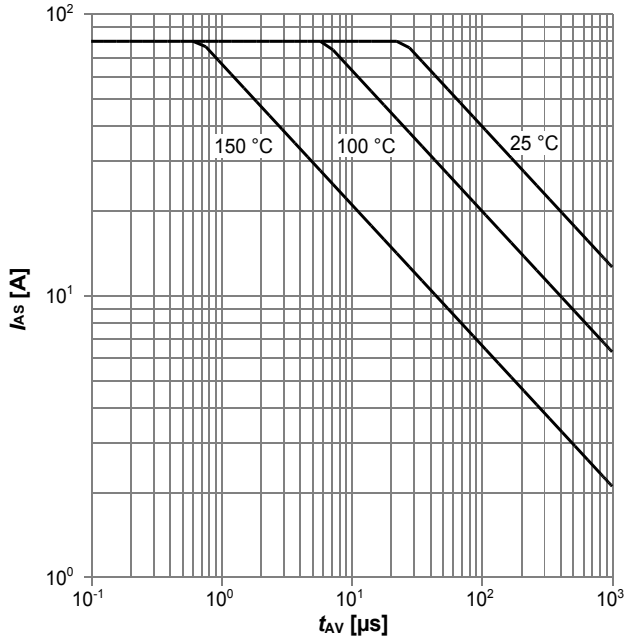
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz

Diagram 12: Forward characteristics of reverse diode



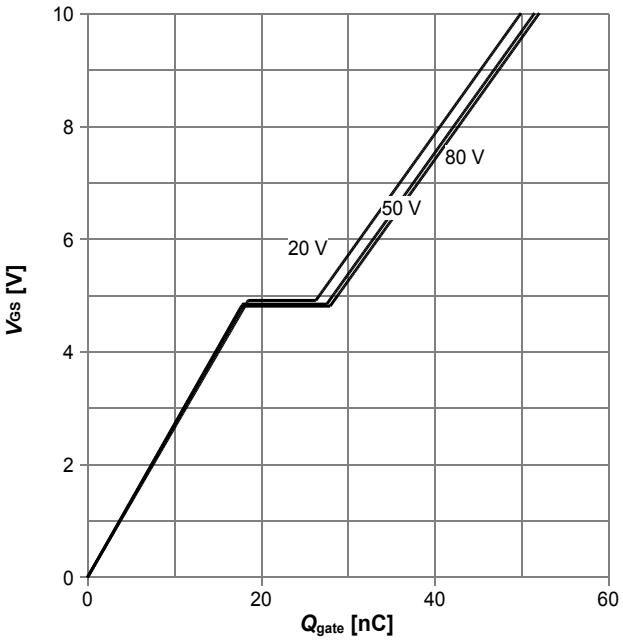
$_F$=f(V_{SD}); parameter: T_j

Diagram 13: Avalanche characteristics



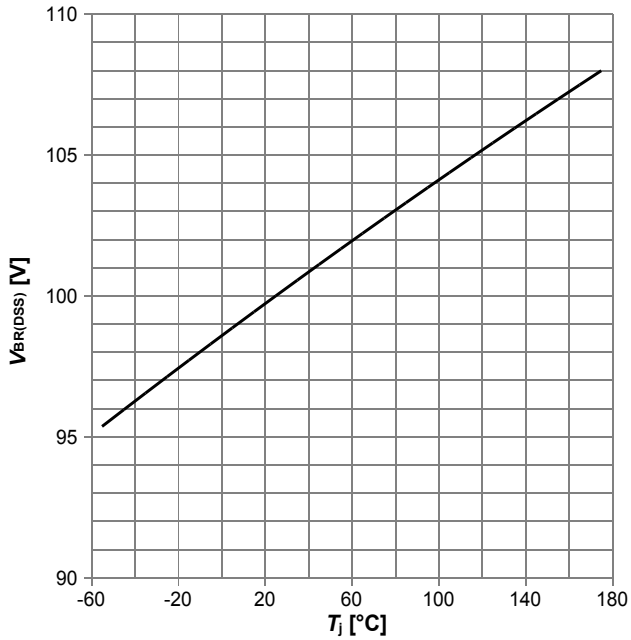
I_{AS}=f(t_{AV}); R_{GS}=25 Ω; parameter: $T_{j(start)}$

Diagram 14: Typ. gate charge



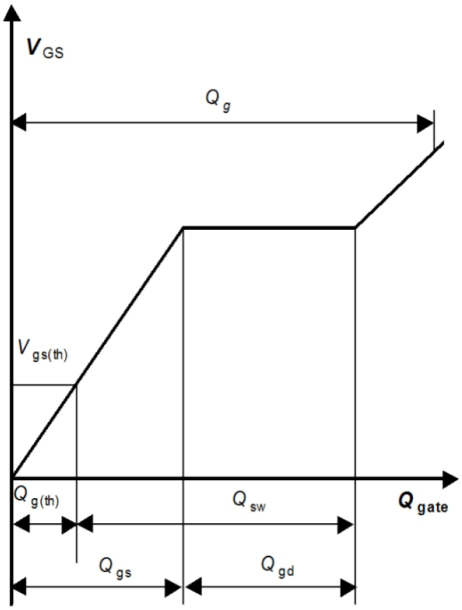
V_{GS}=f(Q_{gate}); I_D=80 A pulsed; parameter: V_{DD}

Diagram 15: Drain-source breakdown voltage



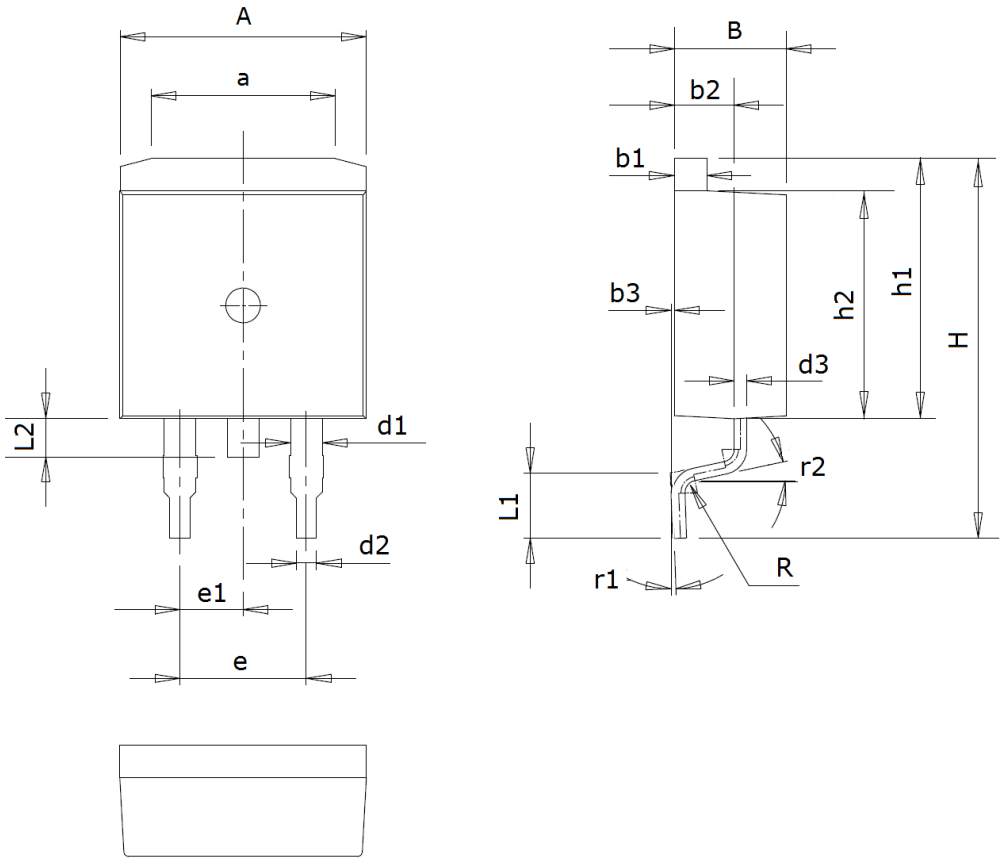
$V_{BR(DSS)}$=f(T_j); I_D=1 mA

Gate charge waveforms

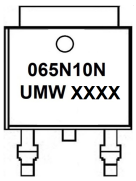


Package Mechanical Data

TO-263



Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW IPB065N10N3G	TO-263	800	Tape and reel

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