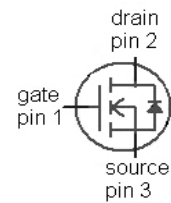
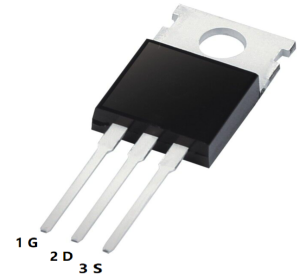


**Features**

- N-channel, normal level
- 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  $V_{GS}=10V$ ) < 7.2mΩ



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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	$I_D$	$T_C=25\text{ °C}^{(2)}$	80	A
		$T_C=100\text{ °C}$	70	
Pulsed drain current <sup>(2)</sup>	$I_{D,pulse}$	$T_C=25\text{ °C}$	320	
Avalanche energy, single pulse	$E_{AS}$	$I_D=80\text{ A}, R_{GS}=25\text{ }\Omega$	160	mJ
Gate source voltage	$V_{GS}$		$\pm 20$	V
Power dissipation	$P_{tot}$	$T_C=25\text{ °C}$	150	W
Operating and storage temperature	$T_j, T_{stg}$		-55 ... 175	°C
IEC climatic category; DIN IEC 68-1			55/175/56	

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

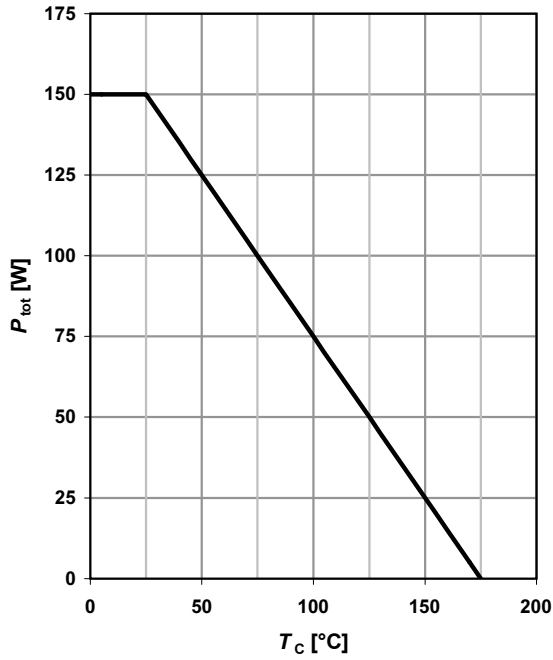
Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal resistance, junction - case	$R_{thJC}$				1	K/W
Thermal resistance, junction - ambient	$R_{thJA}$	minimal footprint			62	
		6 cm <sup>2</sup> cooling area <sup>3)</sup>			40	
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=1\text{ mA}$	100			V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=90\text{ }\mu\text{A}$	2	2.7	3.5	
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=100\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ }^\circ\text{C}$		0.1	1	$\mu\text{A}$
		$V_{DS}=100\text{ V}, V_{GS}=0\text{ V}, T_j=125\text{ }^\circ\text{C}$		10	100	
Gate-source leakage current	$I_{GSS}$	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$		1	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=80\text{ A}$		6.2	7.2	m $\Omega$
		$V_{GS}=6\text{ V}, I_D=40\text{ A}$		7.6	12.7	
Gate resistance	$R_G$			1.6		$\Omega$
Transconductance	$g_{fs}$	$ V_{DS} >2 I_D R_{DS(on)max}, I_D=80\text{ A}$	50	99		S

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Input capacitance	$C_{iss}$	$V_{GS}=0\text{ V}, V_{DS}=50\text{ V},$ $f=1\text{ MHz}$		3690	4910	pF
Output capacitance	$C_{oss}$			646		
Reverse transfer capacitance	$C_{rss}$			25		
Turn-on delay time	$t_{d(on)}$	$V_{DD}=50\text{ V}, V_{GS}=10\text{ V},$ $I_D=80\text{ A}, R_G=3.6\ \Omega$		19		ns
Rise time	$t_r$			37		
Turn-off delay time	$t_{d(off)}$			37		
Fall time	$t_f$			9		
Gate to source charge	$Q_{gs}$	$V_{DD}=50\text{ V}, I_D=80\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$		18		nC
Gate to drain charge	$Q_{gd}$			10		
Switching charge	$Q_{sw}$			16		
Gate charge total	$Q_g$			51	68	
Gate plateau voltage	$V_{plateau}$			4.9		
Output charge	$Q_{oss}$	$V_{DD}=50\text{ V}, V_{GS}=0\text{ V}$		68	91	nC
Diode continuous forward current	$I_S$	$T_C=25\text{ }^\circ\text{C}$			80	A
Diode pulse current	$I_{S,pulse}$				320	
Diode forward voltage	$V_{SD}$	$V_{GS}=0\text{ V}, I_F=80\text{ A},$ $T_j=25\text{ }^\circ\text{C}$		1	1.2	V
Reverse recovery time	$t_{rr}$	$V_R=50\text{ V}, I_F=I_S,$ $di_F/dt=100\text{ A}/\mu\text{s}$		73		ns
Reverse recovery charge	$Q_{rr}$			139		

<sup>6)</sup> See figure 16 for gate charge parameter definition

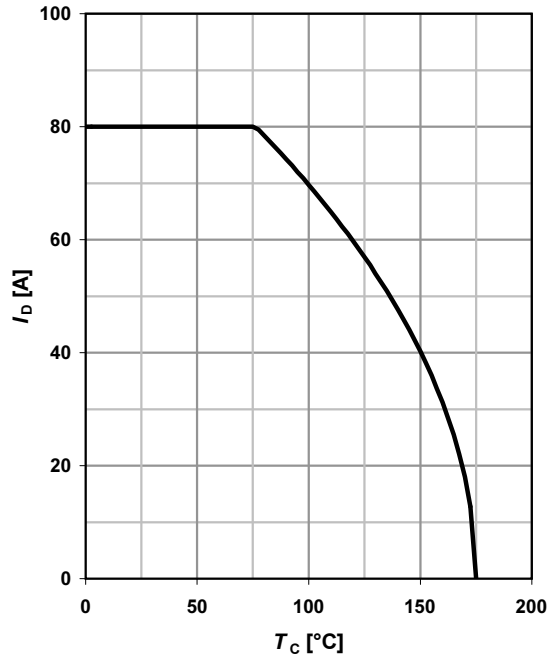
**1 Power dissipation**

$P_{tot}=f(T_C)$



**2 Drain current**

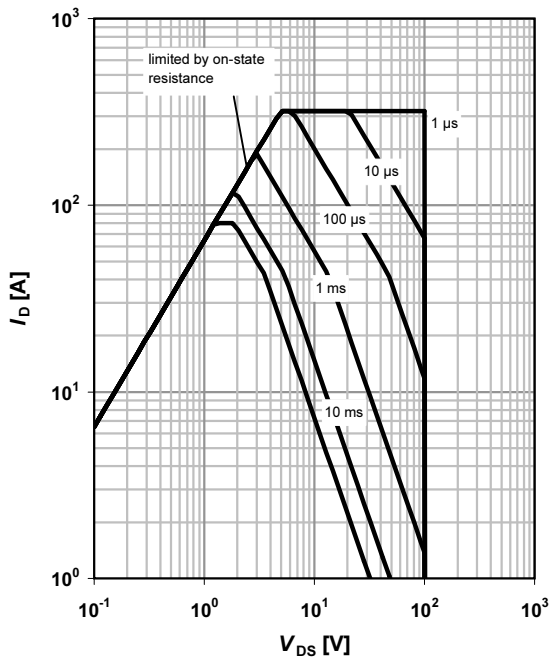
$I_D=f(T_C); V_{GS} \geq 10\text{ V}$



**3 Safe operating area**

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

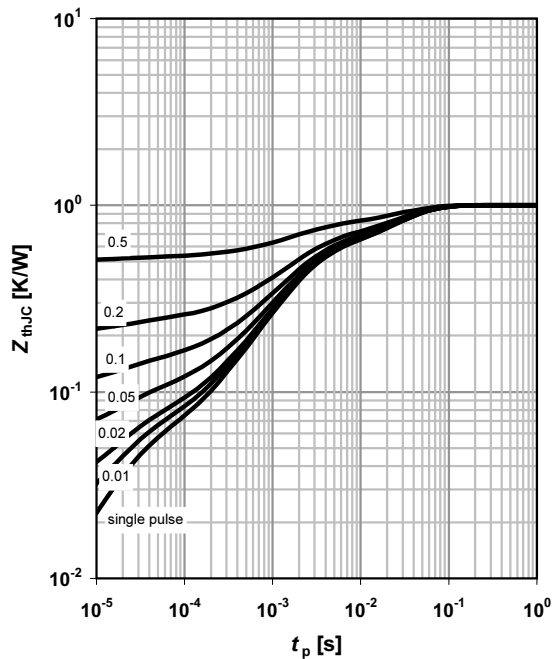
parameter:  $t_p$



**4 Max. transient thermal impedance**

$Z_{thJC}=f(t_p)$

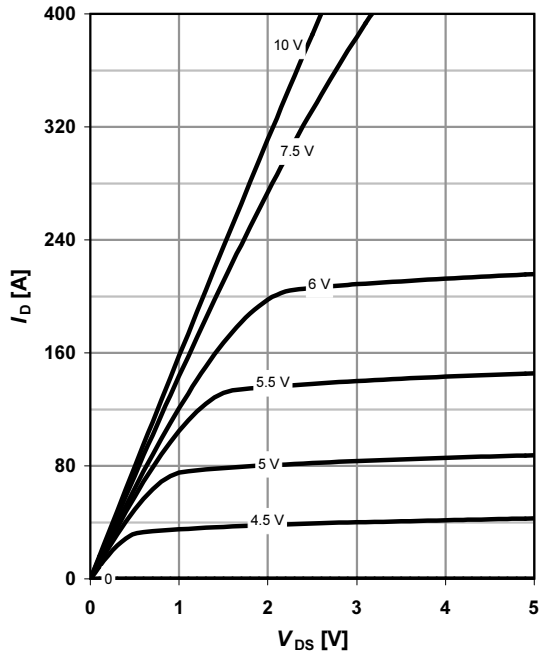
parameter:  $D=t_p/T$



**5 Typ. output characteristics**

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

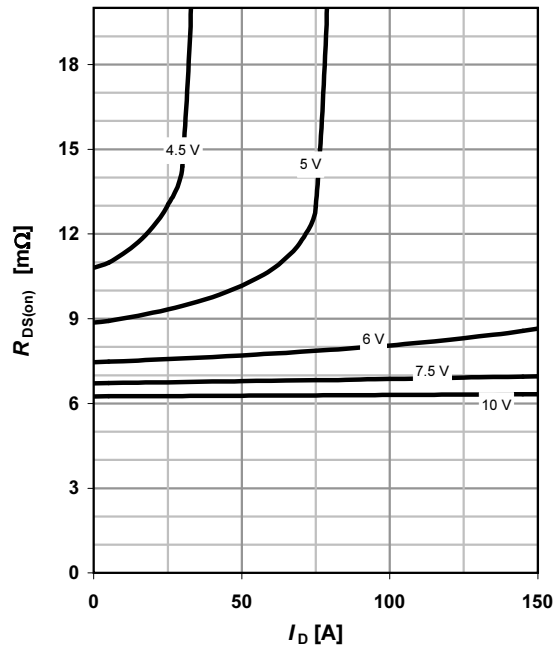
parameter:  $V_{GS}$



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

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

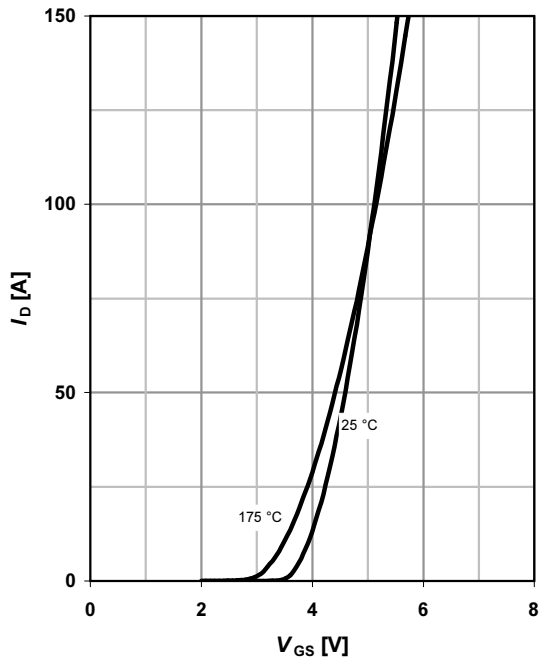
parameter:  $V_{GS}$



**7 Typ. transfer characteristics**

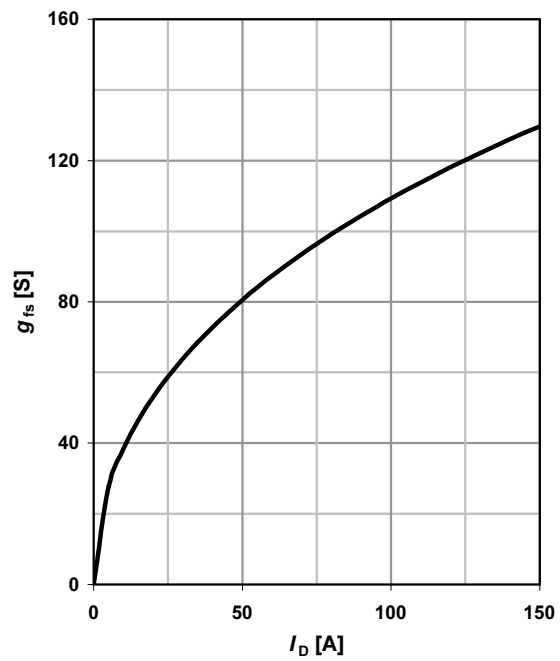
$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$

parameter:  $T_j$



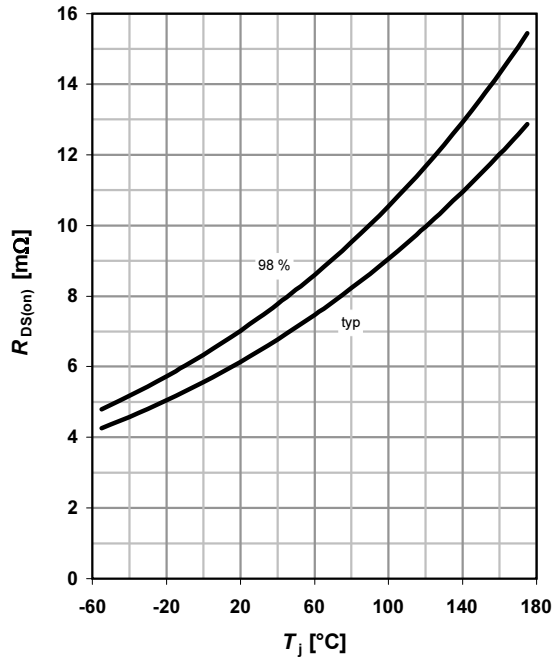
**8 Typ. forward transconductance**

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



**9 Drain-source on-state resistance**

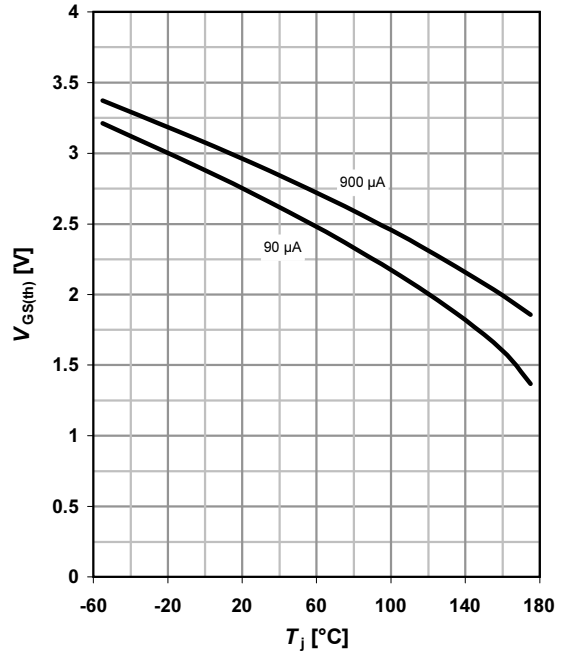
$R_{DS(on)} = f(T_j); I_D = 80 \text{ A}; V_{GS} = 10 \text{ V}$



**10 Typ. gate threshold voltage**

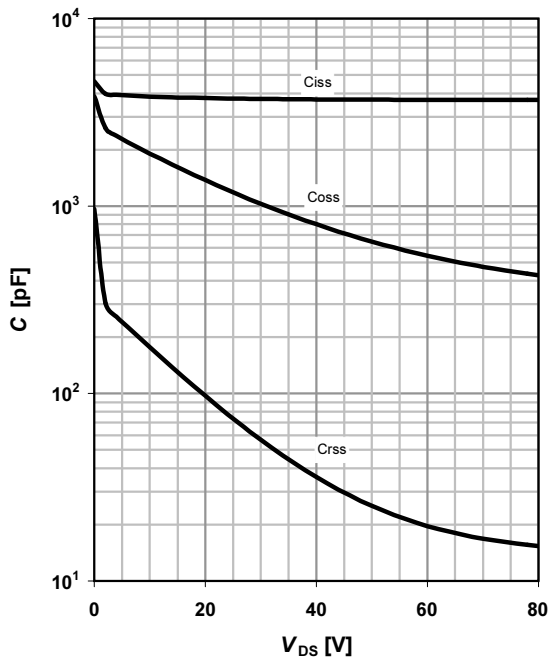
$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$

parameter:  $I_D$



**11 Typ. capacitances**

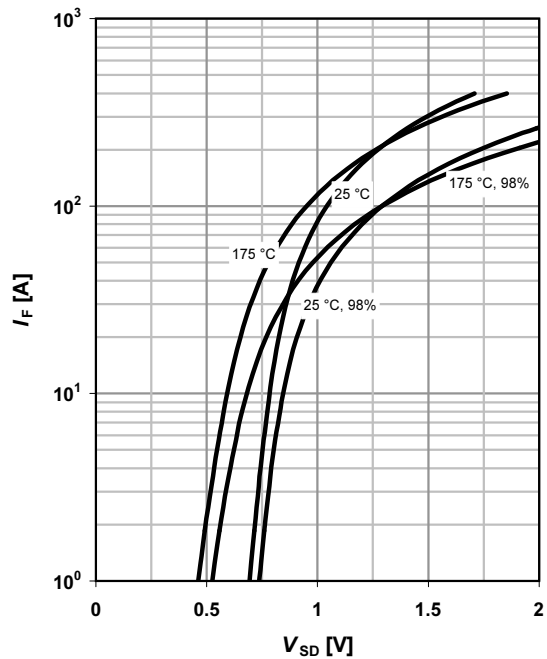
$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$



**12 Forward characteristics of reverse diode**

$I_F = f(V_{SD})$

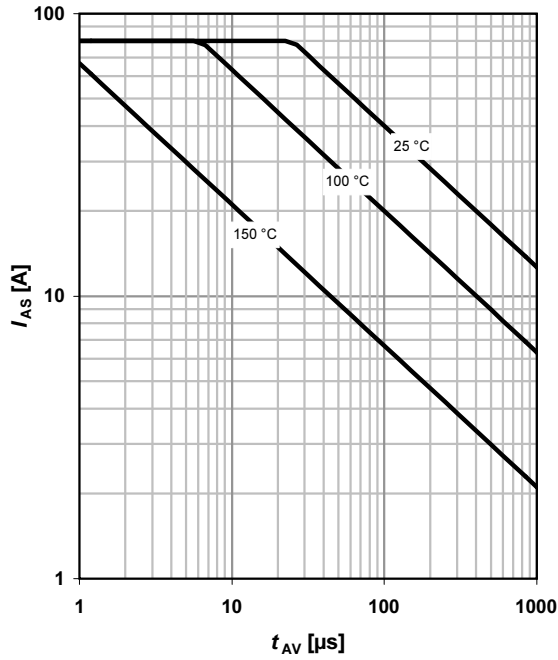
parameter:  $T_j$



**13 Avalanche characteristics**

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

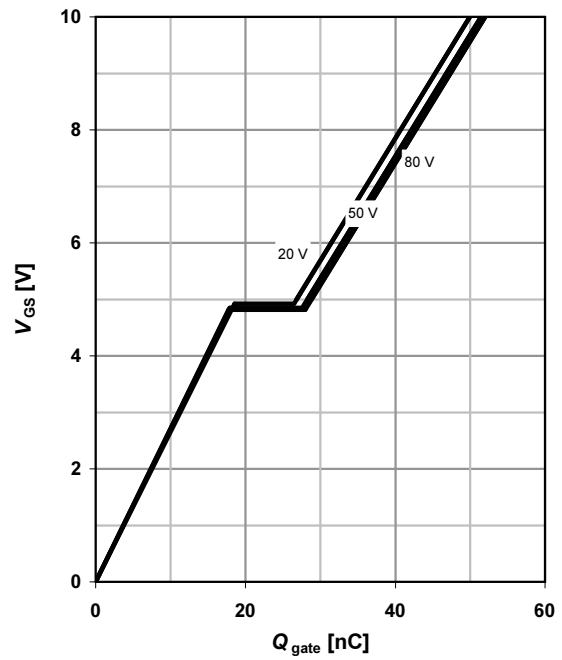
parameter:  $T_{j(start)}$



**14 Typ. gate charge**

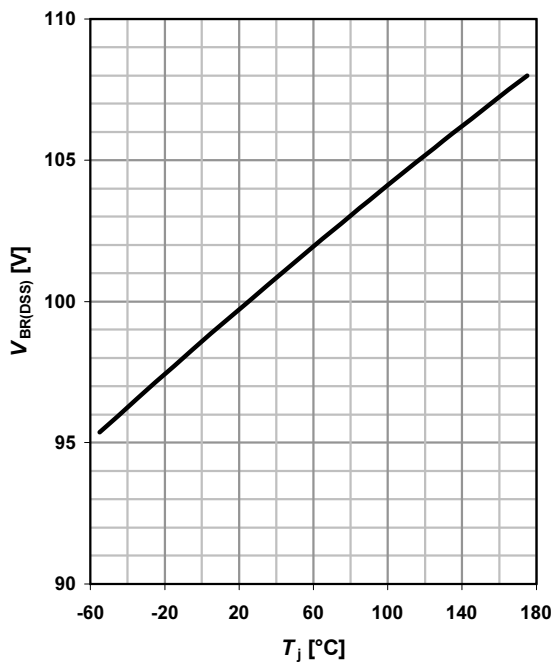
$V_{GS}=f(Q_{gate}); I_D=80\ \text{A pulsed}$

parameter:  $V_{DD}$



**15 Drain-source breakdown voltage**

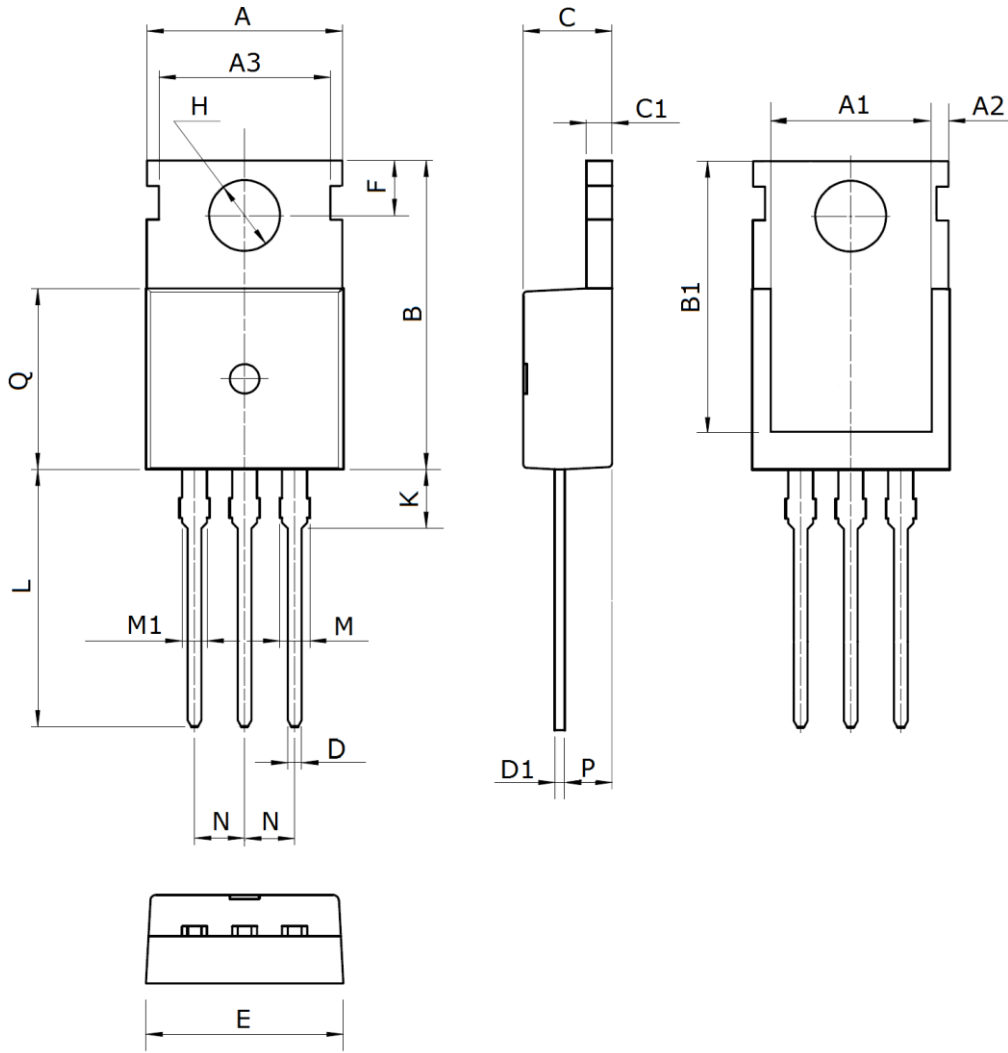
$V_{BR(DSS)}=f(T_j); I_D=1\ \text{mA}$



**16 Gate charge waveforms**



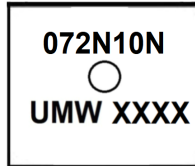
Package Mechanical Data TO-220



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**



**Ordering information**

Order code	Package	Baseqty	Deliverymode
UMW IPP072N10N3G	TO-220	1000	Tube and box