UMW IPP045N10N3G

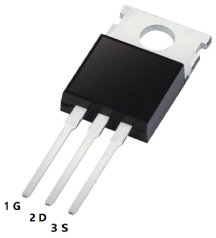
100V N-Channel MOSFET

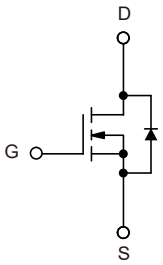
1.Features

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

2.Pinning information

Pin	Symbol	Description
1	G	GATE
2	D	DRAIN
3	S	SOURCE





3.Absolute Maximum Ratings T_A= 25°C

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

4.Thermal resistance rating

Parameter	Symbol	Max	Units
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' cooling area [2)]	R_{thJA}	50	K/W

5.Electrical Characteristic (T_C=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
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=150μA	2	2.7	3.5	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=100V, V_{GS}=0V, T_J=25°C		0.1	1	μA
		V_{DS}=100V, V_{GS}=0V, T_J=125°C		10	100	μA
Gate-source leakage current	I_{GSS}	V_{GS}=20V, V_{DS}=0V		1	100	nA
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=100A		3.9	4.5	mΩ
		V_{GS}=6V, I_D=50A		4.7	7.7	mΩ
Gate resistance	R_G			1.4		Ω
Transconductance	g_{FS}	$\|V_{DS}\|>2\|I_D\|R_{DS(ON)max}$,$I_D$=100 A	73	145		S
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=50V, f=1MHz		6320	8410	pF
Output capacitance	C_{oss}			1210	1610	pF
Reverse transfer capacitance	C_{rss}			41		pF
Turn-on delay time	$t_{D(on)}$	V_{DD}=50V, V_{GS}=10V I_D=50A, R_G=1.6Ω		27		ns
Rise time	t_r			59		ns
Turn-off delay time	$t_{D(off)}$			48		ns
Fall time	t_f			14		ns
Gate to source charge	Q_{gs}	V_{DD}=50V, I_D=100A V_{GS}=0 to 10V		30	39	nC
Gate to drain charge	Q_{gd}			16		nC
Switching charge	Q_{SW}			27		nC
Gate charge total	Q_g			88	117	nC
Gate plateau voltage	$V_{plateau}$			4.7		V
Output charge	Q_{oss}	V_{DD}=50V, V_{GS}=0V		122	162	nC

Diode continuous forward current	I_S	T_C=25°C			137	A
Diode pulse current	$I_{S,pulse}$	T_C=25°C			548	A
Diode forward voltage	V_{SD}	V_{GS}=0V, I_F=100A, T_J=25°C		1	1.2	V
Reverse recovery time	t_{rr}	V_R=50V, I_F=I_S, di_F/dt=100A/μs		68		ns
Reverse recovery charge	Q_{rr}	V_R=50V, I_F=I_S, di_F/dt=100A/μs		135		nC

Notes:

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.

6.1Typical characteristic

$P_{tot}=f(T_C)$

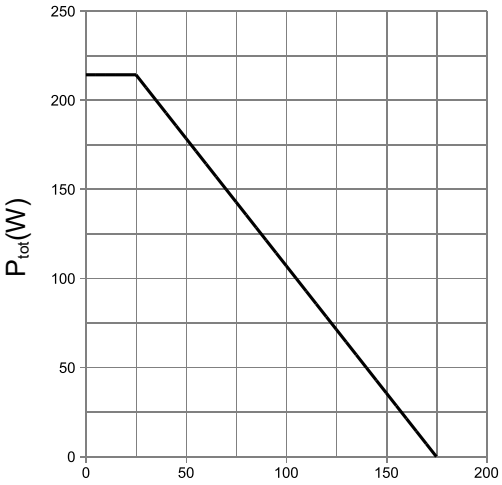


Fig 1. Power dissipation

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

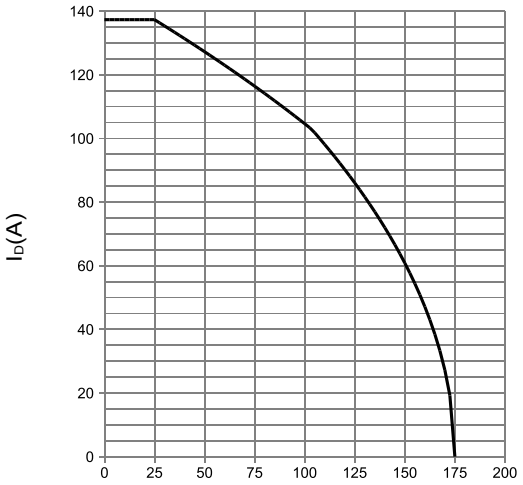


Fig 2. Drain current

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

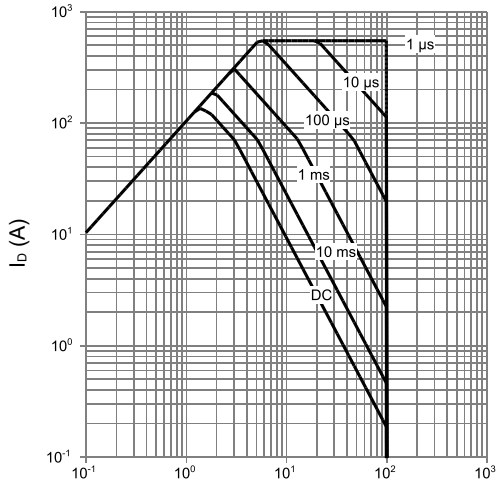


Fig 3. Safe operating area

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

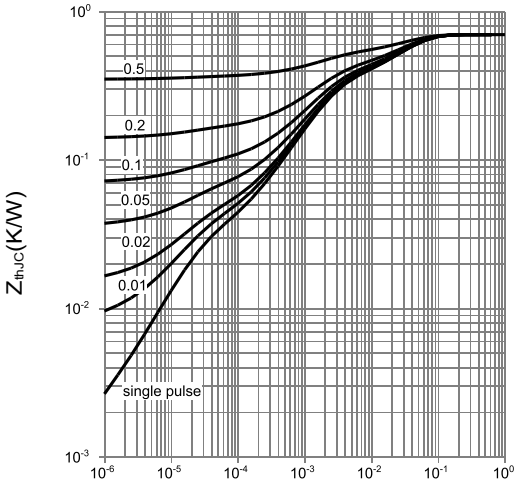


Fig 4. Max transient thermal impedance

6.2Typical characteristic

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

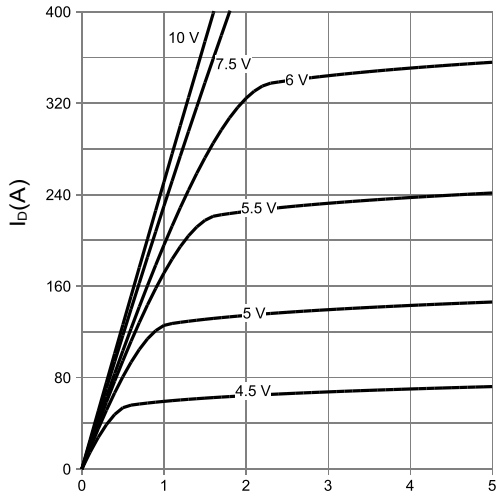


Fig 5. output characteristics

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

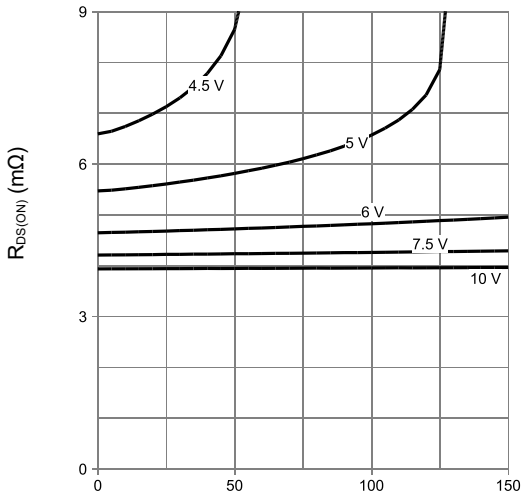


Fig 6. drain-source on resistance

$ID=f(V_{GS})$; $|V_{DS}|>2|$ I_D $|R_{DS(ON)max}$; parameter: T_J

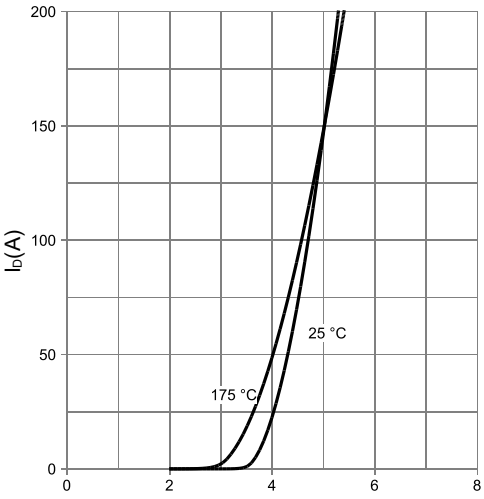


Fig 7. transfer characteristics

$g_{fs}=f(I_D)$; T_J=25°C

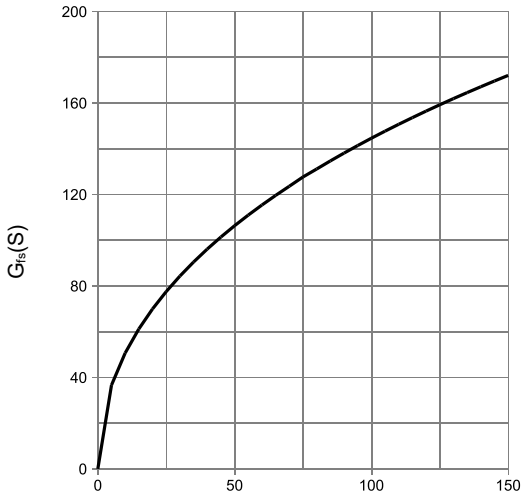


Fig 8. forward transconductance

6.3Typical characteristic

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

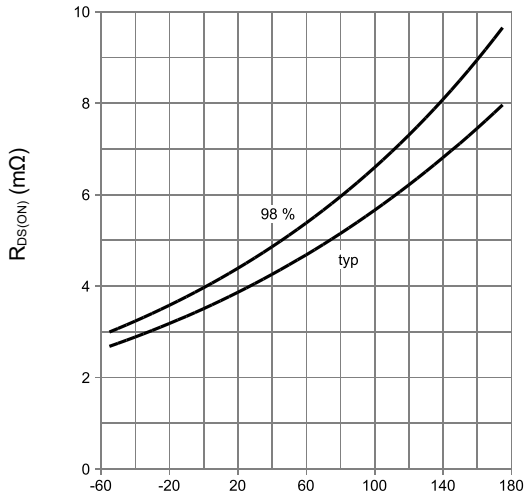


Fig 9. Drain-source on-state resistance

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

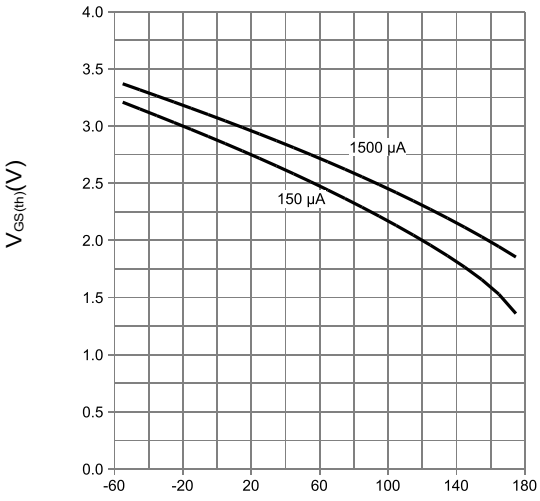


Fig 10. Tgate threshold voltage

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

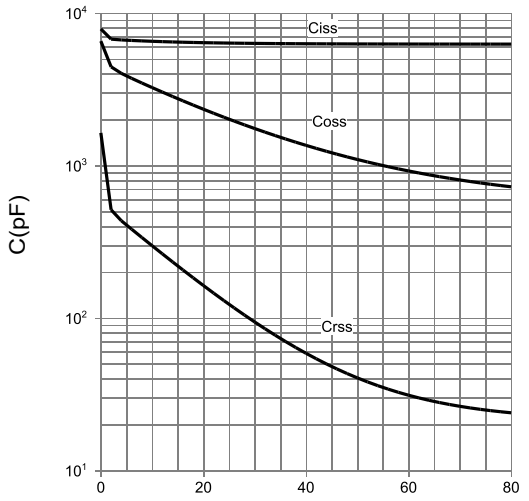


Fig 11. capacitances

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

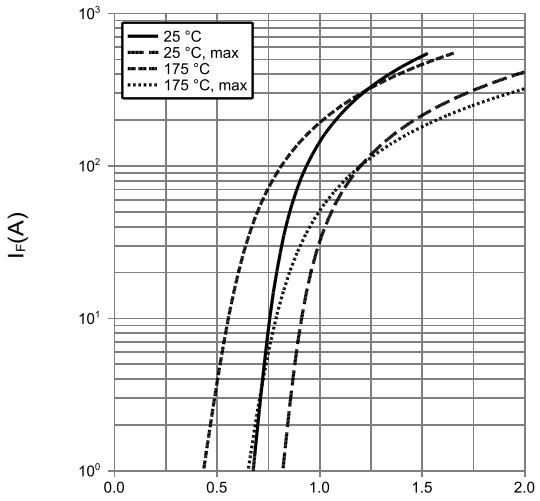


Fig 12. Forward characteristics of reverse diode

6.4Typical characteristic

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

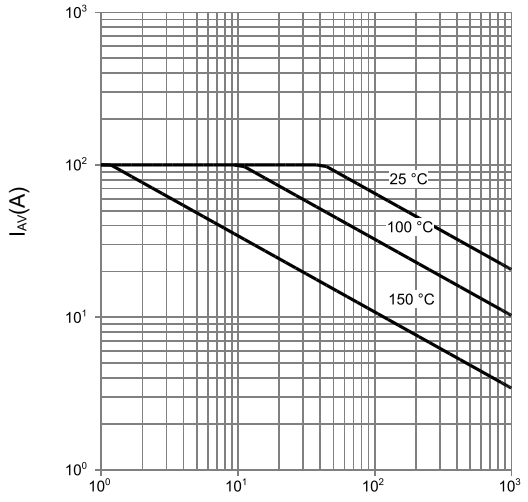


Fig 13. Avalanche characteristics

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

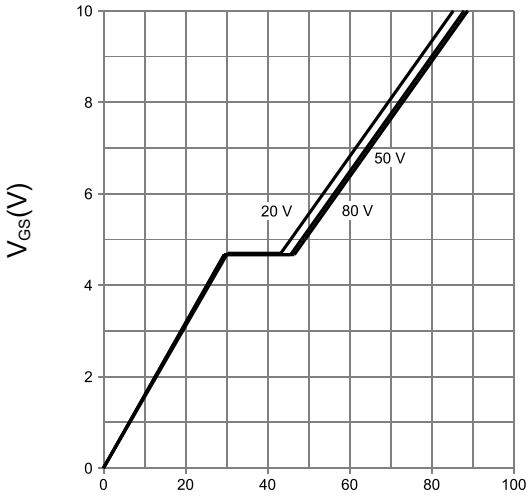


Fig 14. gate charge

$V_{BR(DSS)}=f(T_J)$; $I_D=1m$ A

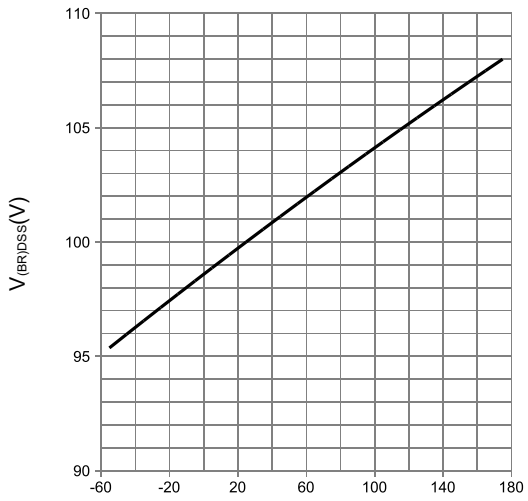


Fig 15. drai source breakdown voltage

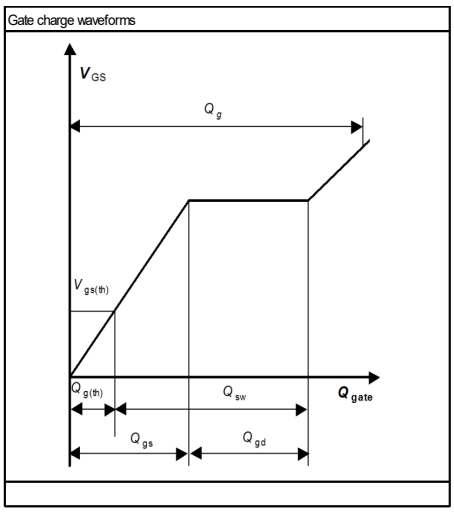
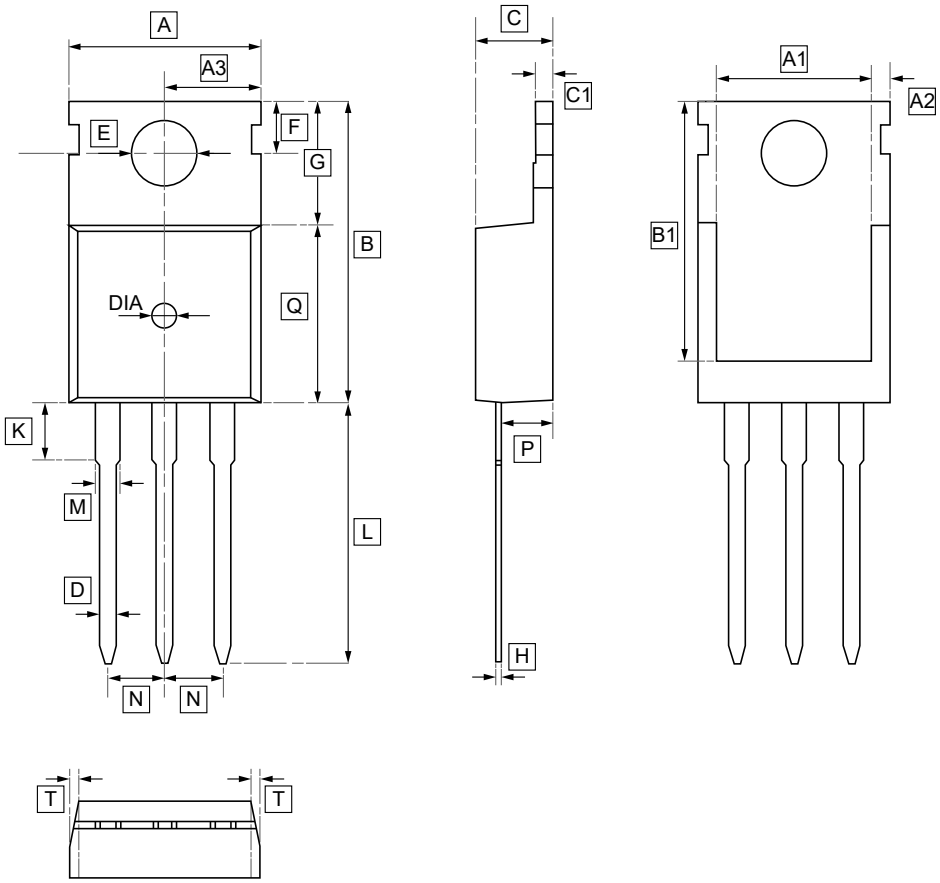


Fig 16. Gate charge waveforms

7.1 TO-220 Package Outline Dimensions

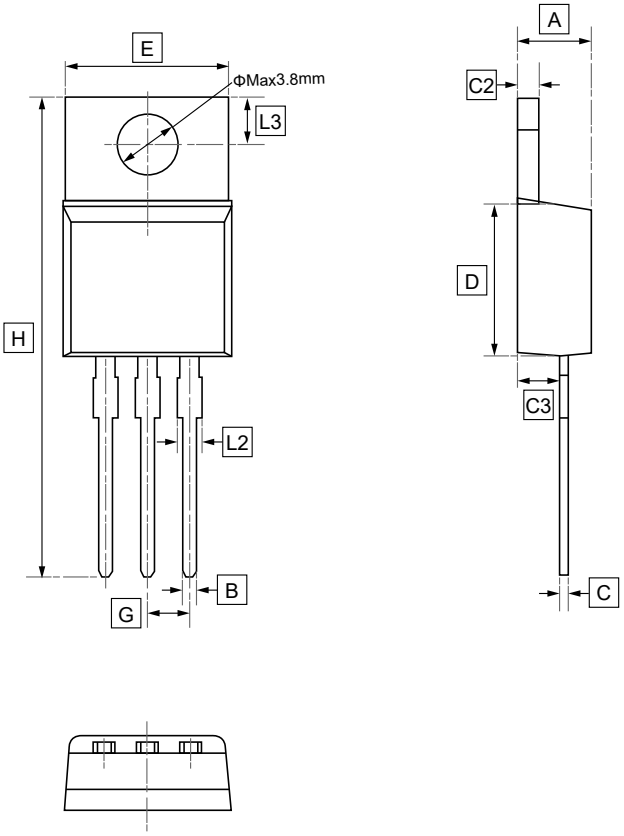


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	B	B1	C	C1	D	E	F	G
Min	9.7	8.44	1.05	4.8	15.4	12.9	4.28	1.1	0.6	3.4	2.65	5.2
Max	10.3	8.84	1.25	5.2	16.2	13.5	4.68	1.5	1.0	3.8	3.25	5.8

Symbol	H	K	L	L1	M	N	P	Q	T	DIA
Min	0.4	2.9	12.8	2.7	1.15	2.49	2.1	8.7	W:0.35	⊙1.5
Max	0.6	3.3	13.6	3.3	1.35	2.59	2.7	9.3		(deep 0.2)

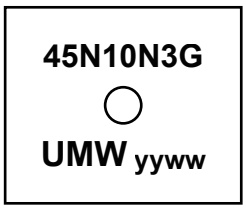
7.2 TO-220 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	B	C	C2	C3	D	E	G	H	L2	L3
Min	4.30	0.60	0.28	1.17	2.30	8.80	9.80	2.44	28.55	1.10	2.59
Max	4.70	1.00	0.48	1.37	2.70	9.20	10.20	2.64	29.15	1.50	2.89

8.Ordering Information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IPP045N10N3G	TO-220	1000	Tube and box

9.Disclaimer

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