UMW IPD060N03LG

30V N-Channel MOSFET

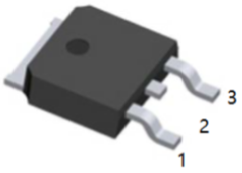
1.Features

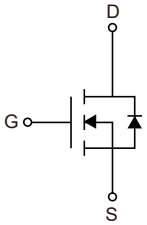
- $V_{DS\ (V)}$=30V
- I_D=50A
- $R_{DS(ON)}$<6mΩ(V_{GS}=10V)
- Fast switching MOSFET for SMPS
- Optimized technology for DC/DC converters
- N-channel, logic level
- Very low on-resistance $R_{DS(ON)}$
- Avalanche rated
- Pb-free plating

2.Pinning information

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

TO-252(DPAK)
top view





3.Absolute Maximum Ratings T_J= 25°C

Parameter	Symbol	Conditions	Rating	Units
Continuous drain current	I_D	V_{GS}=10V, T_C=25°C	50	A
		V_{GS}=10V, T_C=100°C	50	A
		V_{GS}=4.5V, T_C=25°C	50	A
		V_{GS}=4.5V, T_C=25°C	43	A
Pulsed drain current [2]	$I_{D,pulse}$	T_C=25°C	350	A
Avalanche energy, single pulse [3]	I_{AS}	T_C=25°C	50	A
Avalanche energy, single pulse	E_{AS}	I_D=20A, R_{GS}=25Ω	60	mJ
Reverse diode dv/dt	dv/dt	I_D=50A, V_{DS}=24V di/dt=200 A/μs, $T_{j,max}$=175°C	6	kV/μs
Gate source voltage	V_{GS}		±20	V
Power dissipation	P_{tot}	T_C=25°C	56	W
Operating and storage temperature	T_J,T_{STG}		-55 to 175	°C
IEC climatic category; DIN IEC 68-1			55/175/56	

4.Electrical Characteristic (T_J=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Thermal resistance, junction -case	R_{thJC}				2.7	K/W
SMD version, device on PCB	R_{thJA}	minimal footprint			75	K/W
		6 cm^2 cooling area [4])			50	K/W
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=1mA	30			V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1		2.2	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=30V, V_{GS}=0V, T_J=25°C		0.1	1	μA
		V_{DS}=30V, V_{GS}=0V, T_J=125°C		10	100	μA
Gate-source leakage current	I_{GSS}	V_{GS}=20V, V_{DS}=0V		10	100	nA
Drain-source on-state resistance [5])	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=30A		7.2	9	mΩ
		V_{GS}=10V, I_D=30A		5	6	mΩ
Gate resistance	R_G			1.4		Ω
Transconductance	g_{FS}	$\|V_{DS}\|>2\|I_D\|R_{DS(ON)max}$,$I_D$=30A	34	67		S
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=15V, f=1MHz		1700	2300	pF
Output capacitance	C_{oss}			640	850	pF
Reverse transfer capacitance	C_{rss}			35	52	pF
Turn-on delay time	$t_{D(on)}$	V_{DD}=15V, V_{GS}=10V, I_D=30A, R_G=1.6Ω		5		ns
Rise time	t_r			3		ns
Turn-off delay time	$t_{D(off)}$			20		ns
Fall time	t_f			3		ns
Gate to source charge	Q_{gs}	V_{DD}=15V, I_D=30A, V_{GS}=0 to 4.5V		5.6		nC
Gate Charge Characteristics [6])	$Q_{g(th)}$			2.8		nC
Gate to drain charge	Q_{gd}			2.5		nC
Switching charge	Q_{SW}			5.3		nC
Gate charge total	Q_g			10.8	14.4	nC
Gate plateau voltage	$V_{plateau}$			3.2		V

Gate charge total	Q_g	V_{DD}=15V, I_D=30A, V_{GS}=0 to 10V		22	30	nC
Gate charge total, sync.FET	$Q_{g(sync)}$	V_{DS}=0.1V, V_{GS}=0 to 4.5V		9.4		nC
Output charge	Q_{oss}	V_{DD}=15V, V_{GS}=0V		17		nC
Diode continuous forward current	I_S	T_C=25°C			50	A
Diode pulse current	$I_{S,pulse}$				350	A
Diode forward voltage	V_{SD}	V_{GS}=0V, I_F=30A, T_J=25°C		0.88	1.1	V
Reverse recovery charge	Q_{rr}	V_R=15V, I_F=I_S, di_F/dt=400A/µs			10	nC

Notes:

[2] See figure 3 for more detailed information.

[3] See figure 13 for more detailed information.

[4] 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.

[5] Measured from drain tab to source pin.

5.1Typical characteristic

$P_{tot}=f(T_C)$

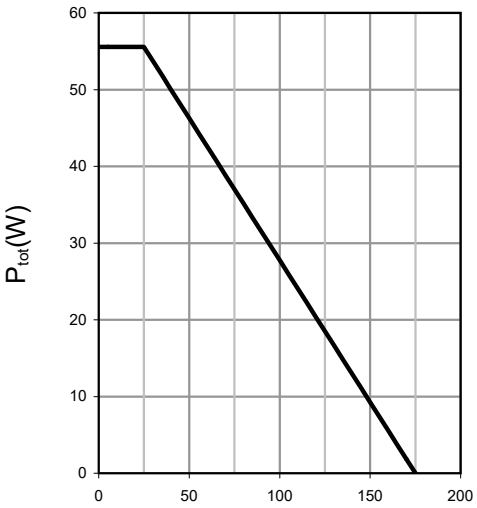


Fig 1. Power dissipation

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

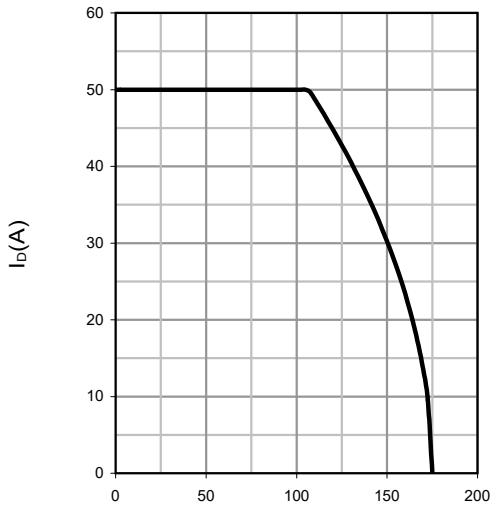


Fig 2. Drain current

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

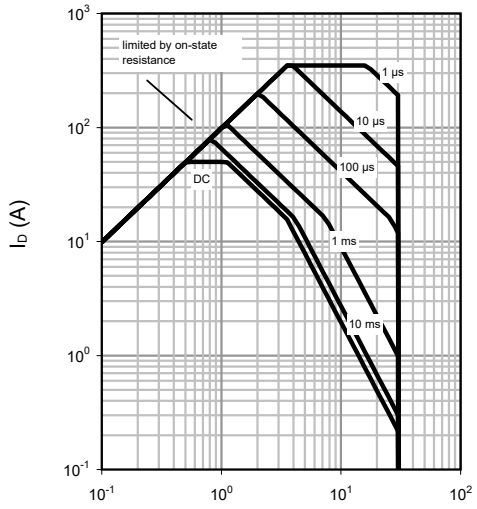


Fig 3. Safe operating area

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

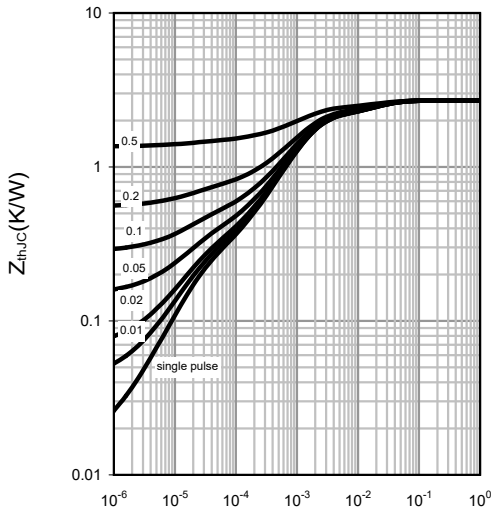


Fig 4. Max transient thermal impedance

5.2Typical characteristic

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

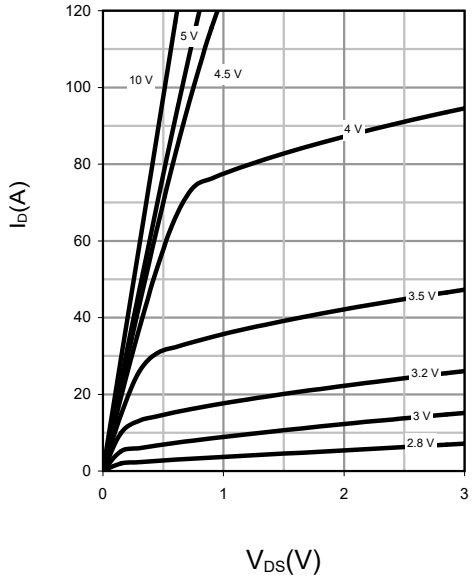


Fig 5. output characteristics

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

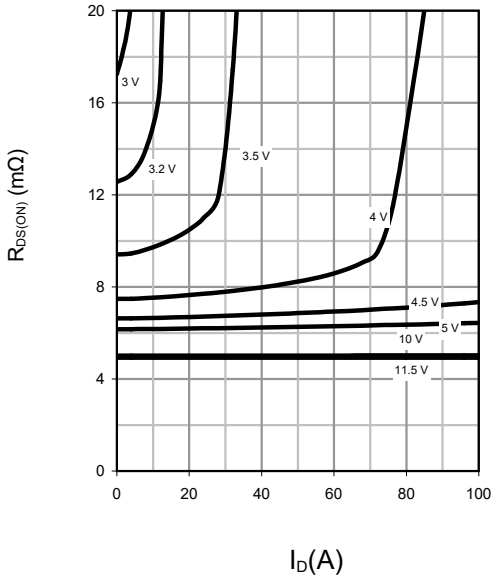


Fig 6. drain-source on resistance

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

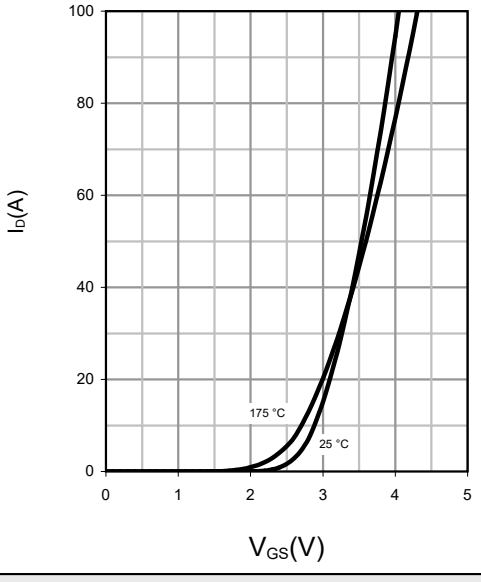


Fig 7. transfer characteristics

$g_{fs}=f(I_D)$; T_J=25°C

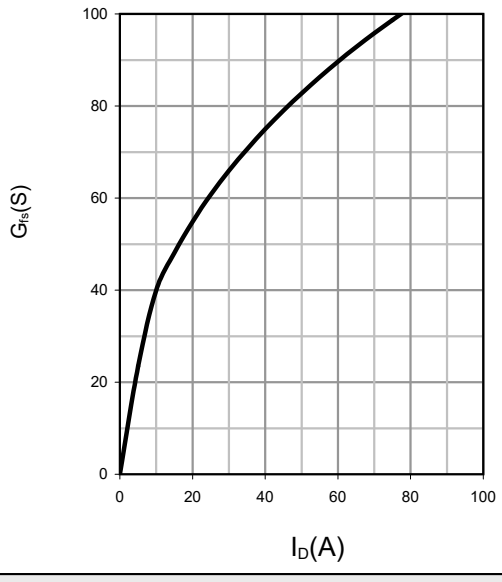


Fig 8. forward transconductance

5.3Typical characteristic

$R_{DS(ON)}=f(T_J)$; I_D=30A; V_{GS}=10V

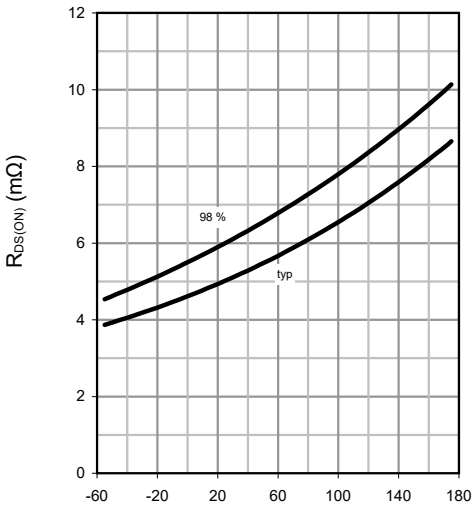


Fig 9. Drain-source on-state resistance

$V_{GS(th)}=f(T_J)$;$V_{GS}=V_{DS}$; I_D=250μA

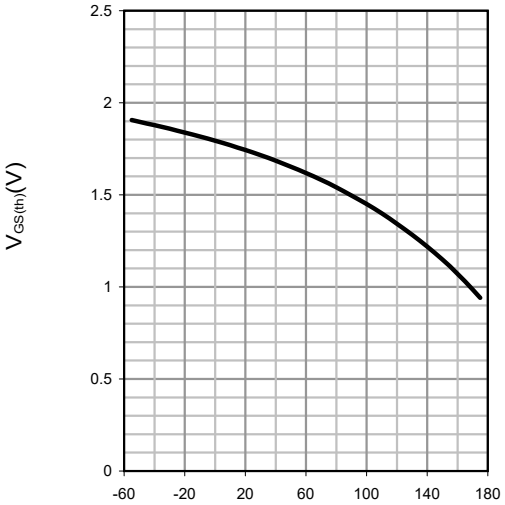


Fig 10. Gate threshold voltage

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

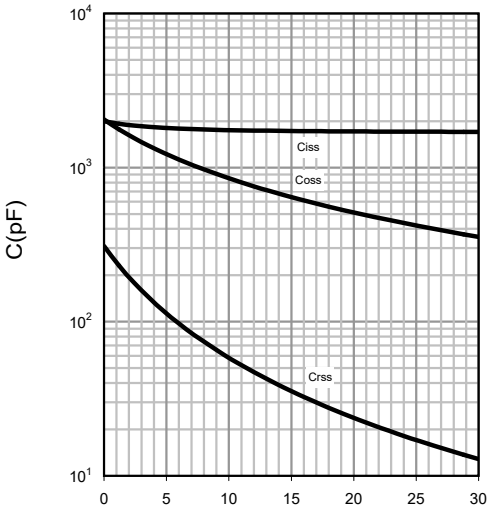


Fig 11. capacitances

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

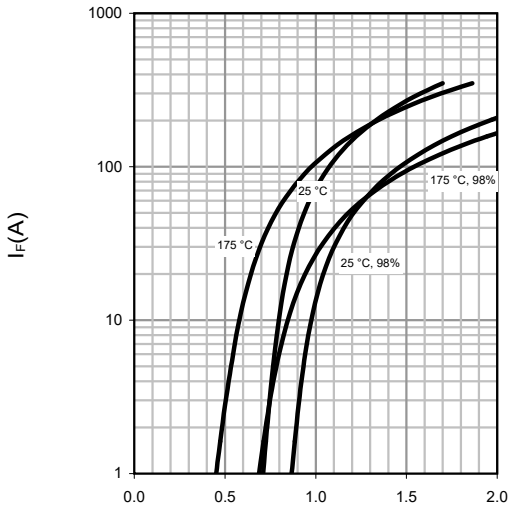


Fig 12. Forward characteristics of reverse diode

5.4Typical characteristic

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

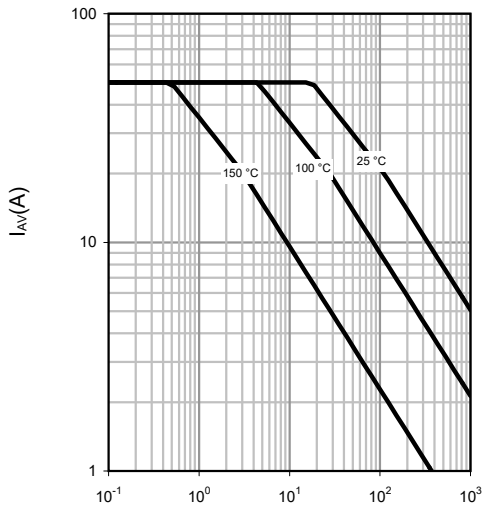


Fig 13. Avalanche characteristics

$V_{GS}=f(Q_{gate})$; $I_D=30A$pulsed; parameter: V_{DD}

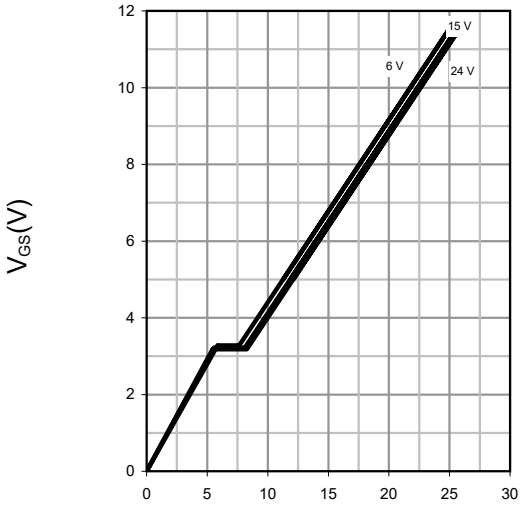


Fig 14. gate charge

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

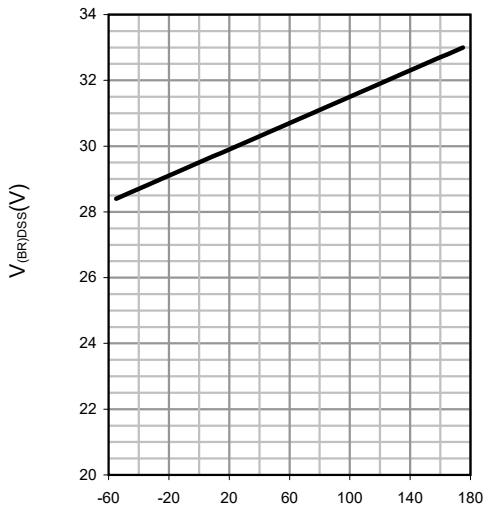


Fig 15. drain source breakdown voltage

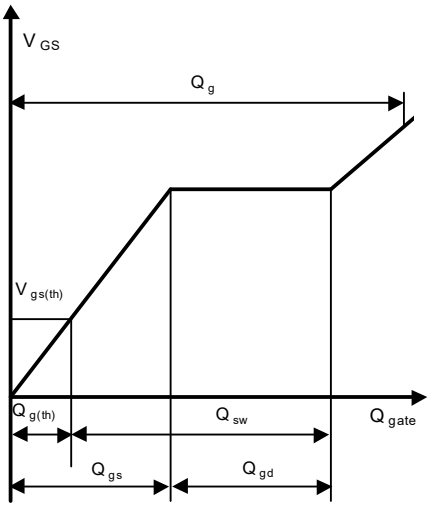
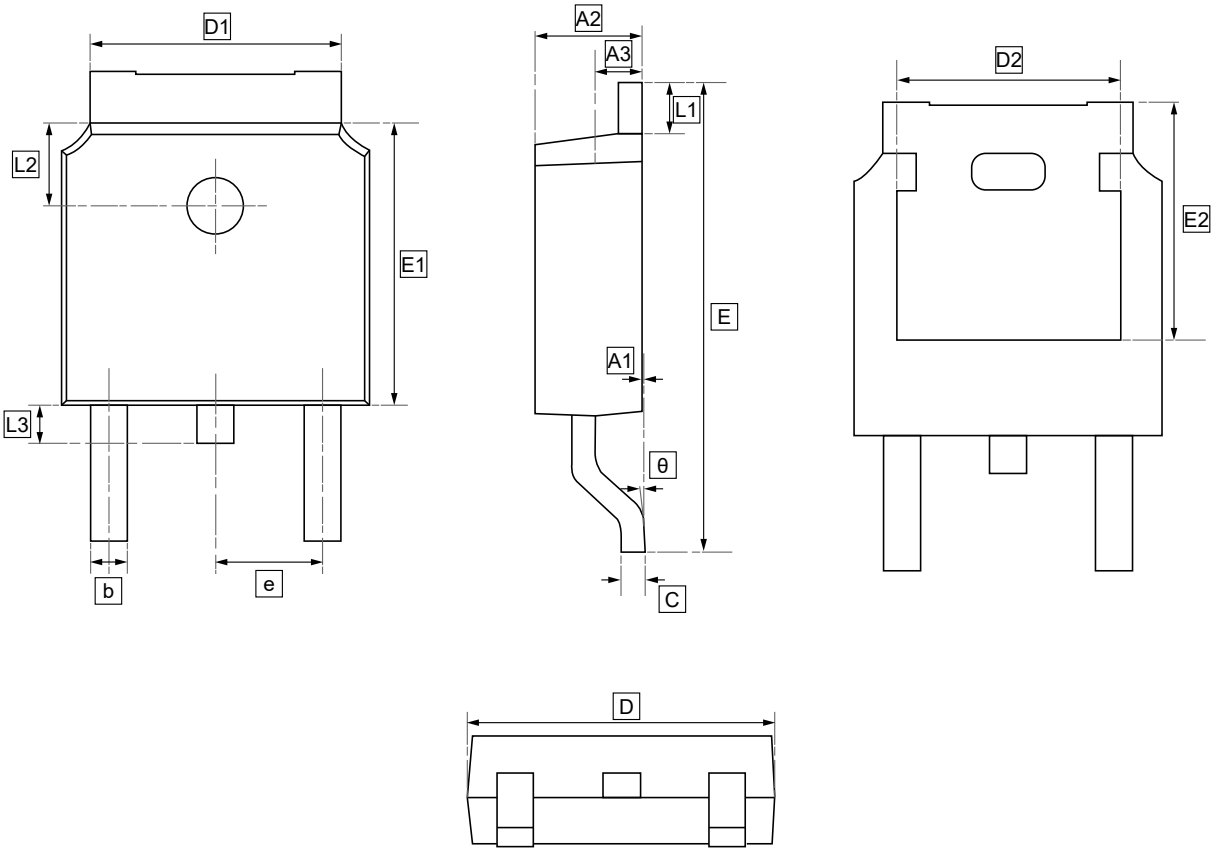


Fig 16. Gate charge waveforms

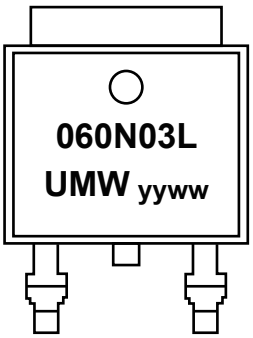
6.TO-252 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A1	A2	A3	b	c	D	D1	D2	E	E1	E2	e	L1	L2	L3	θ
Min	0.00	2.18	0.90	0.65	0.46	6.35	4.95	4.32	9.40	5.97	5.21	2.286	0.89	1.70	0.60	0.00
Max	0.13	2.39	1.10	0.85	0.61	6.73	5.46	4.90	10.41	6.22	5.38	BSC	1.27	1.90	1.00	8.00

7.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IPD060N03LG	TO-252	2500	Tape and reel

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