UMW IPB015N04NG

40V N-Channel MOSFET

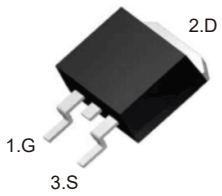
1.Features

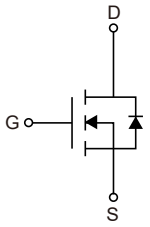
- $V_{DS\ (V)}$=40V
- I_D=120A
- $R_{DS(ON)}$<1.5mΩ(V_{GS}=10V)
- Optimized technology for DC/DC converters
- Excellent gate charge x $R_{(ON)}$ product (FOM)
- Very low on-resistance $R_{DS(ON)}$

2.Pinning information

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

TO-263





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	120	A
		V_{GS}=10V, T_C=100°C	120	
Pulsed drain current [2]	$I_{D,pulse}$	T_C=25°C	400	
Avalanche current, single pulse [3]	I_{AS}	T_C=25°C	100	
Avalanche energy, single pulse	E_{AS}	I_D=100A, R_{GS}=25Ω	865	mJ
Gate source voltage	V_{GS}		±20	V
Power dissipation	P_{tot}	T_C=25°C	250	W
storage temperature	T_J,T_{STG}		-55 to 175	°C
IEC climatic cateory; 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}				0.6	K/W
SMD version, device on PCB	R_{thJA}	minimal footprint			62	K/W
		6 cm^2 cooling area [4])			40	K/W
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=1mA	40			V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=200μA	2		4	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=40V, V_{GS}=0V, T_J=25°C		0.1	2	μA
		V_{DS}=40V, V_{GS}=0V, T_J=125°C		20	200	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}=10V, I_D=100A		1.2	1.5	mΩ
Gate resistance	R_G			1.5		Ω
Transconductance	g_{FS}	$\|V_{DS}\|>2\|I_D\|R_{DS(ON)max}$,$I_D$=100 A	120	230		S
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=20V, f=1MHz		15000	20000	pF
Output capacitance	C_{oss}			4000	5300	pF
Reverse transfer capacitance	C_{rss}			160		pF
Turn-on delay time	$t_{D(on)}$	V_{DD}=20V, V_{GS}=10V I_D=30A, R_G=1.6Ω		40		ns
Rise time	t_r			10		ns
Turn-off delay time	$t_{D(off)}$			64		ns
Fall time	t_f			13		ns
Gate to source charge	Q_{gs}	V_{DD}=20V, I_D=100A V_{GS}=0 to 10V		76		nC
Gate charge at threshold	$Q_{g(th)}$			46		nC
Gate to drain charge	Q_{gd}			23		nC
Switching charge	Q_{SW}			75		nC
Gate charge total	Q_g			188	250	nC
Gate plateau voltage	$V_{plateau}$			5		V

Gate charge total, sync. FET	$Q_{g(synC)}$	V_{DS}=0.1V, V_{GS}=0 to 10V		177		nC
Output charge	Q_{oss}	V_{DD}=20V, V_{GS}=0V		147		nC
Diode continuous forward current	I_S	T_C=25°C			120	A
Diode pulse current	$I_{S,pulse}$				400	A
Diode forward voltage	V_{SD}	V_{GS}=0V, I_F=100A, T_J=25°C		0.88	1.2	V
Reverse recovery charge	Q_{rr}	V_R=15V, I_F=I_S, di_F/dt=400A/μs		141		nC

Notes:

Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm2 (one layer , 70 um thick) copper area for drainconnection .

PCB is vertical in still air. Measured from drain tab to source pin

5.1Typical characteristic

$P_{tot}=f(T_C)$

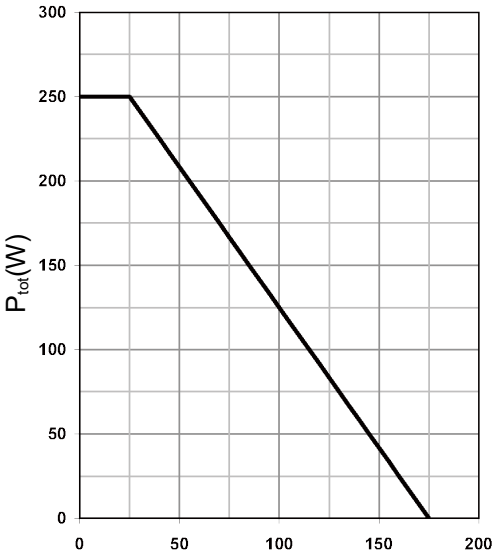


Fig 1. Power dissipation

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

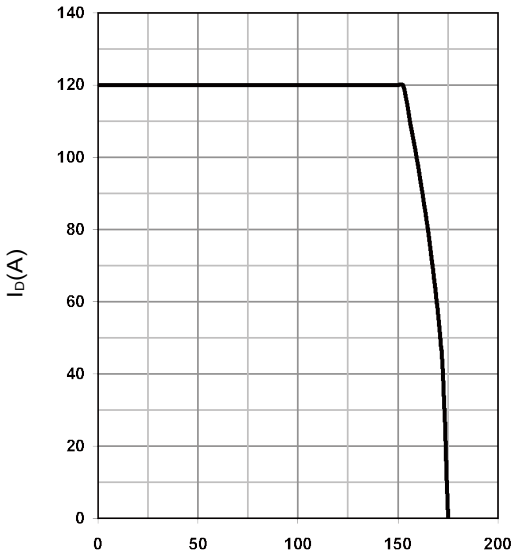


Fig 2. Drain current

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

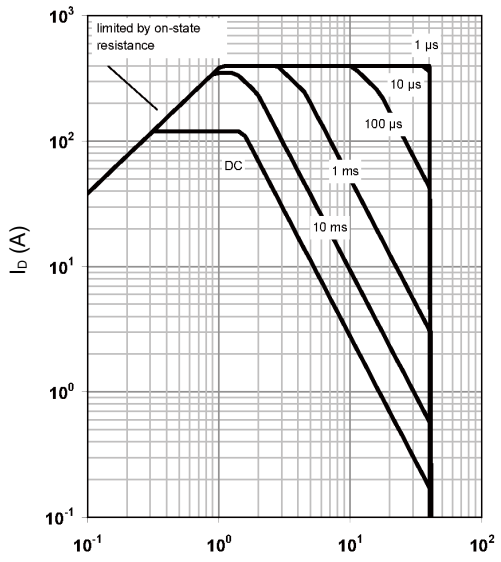


Fig 3. Safe operating area

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

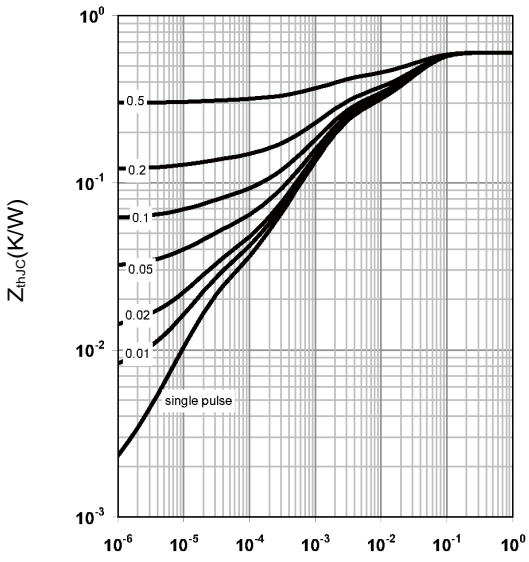


Fig 4. Max transient thermal impedance

5.2Typical characteristic

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

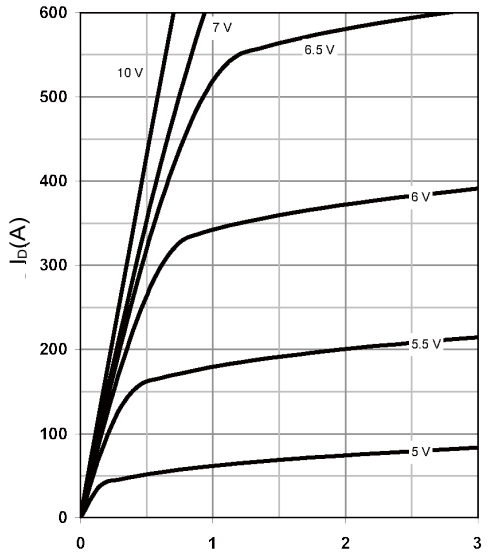


Fig 5. output characteristics

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

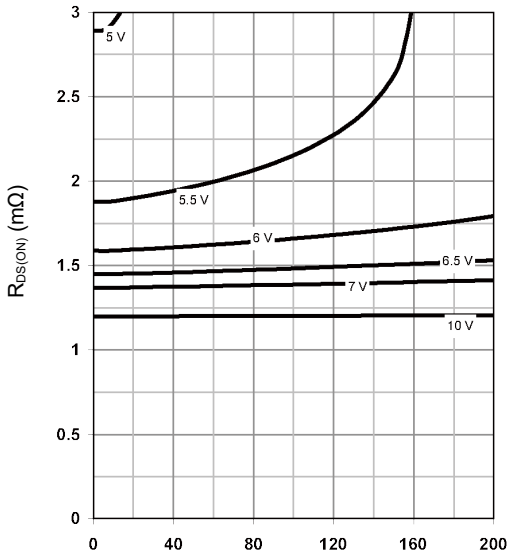


Fig 6. drain-source on resistance

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

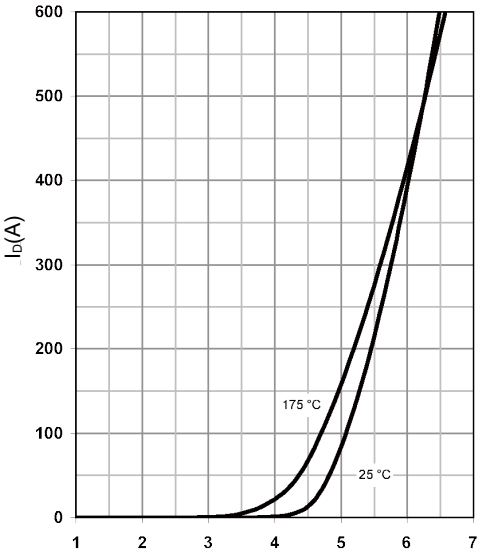


Fig 7. transfer characteristics

$g_{fs}=f(I_D)$; T_J=25°C

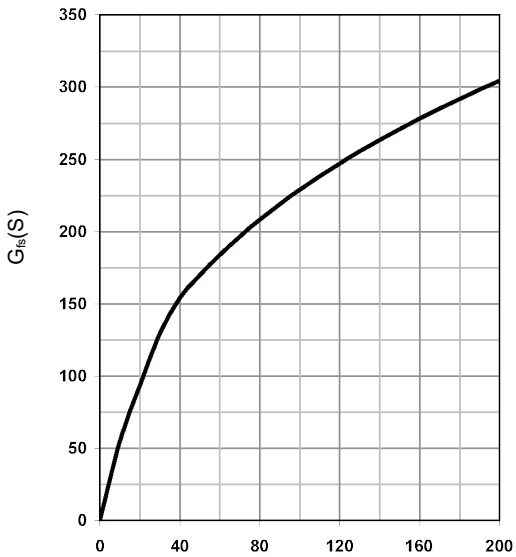


Fig 8. forward transconductance

5.3Typical characteristic

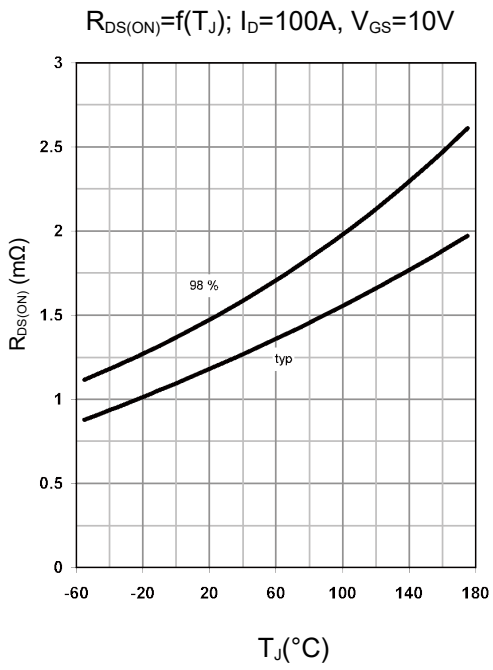


Fig 9. Drain-source on-state resistance

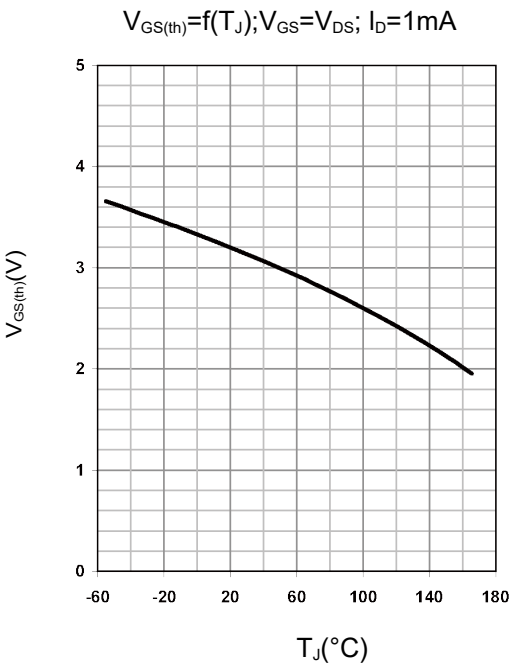


Fig 10. Tgate threshold voltage

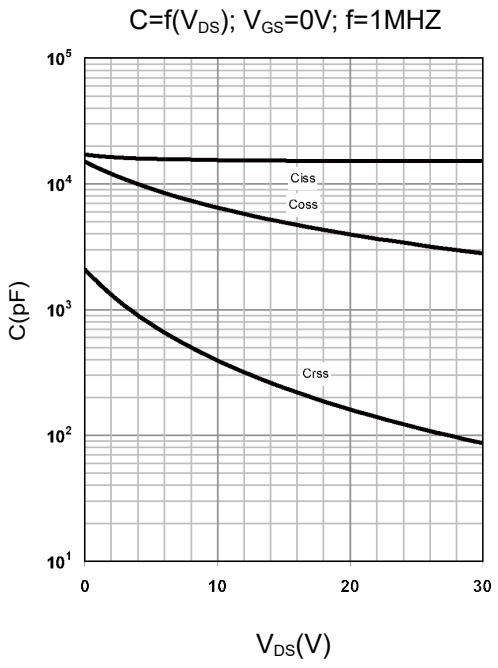


Fig 11. capacitances

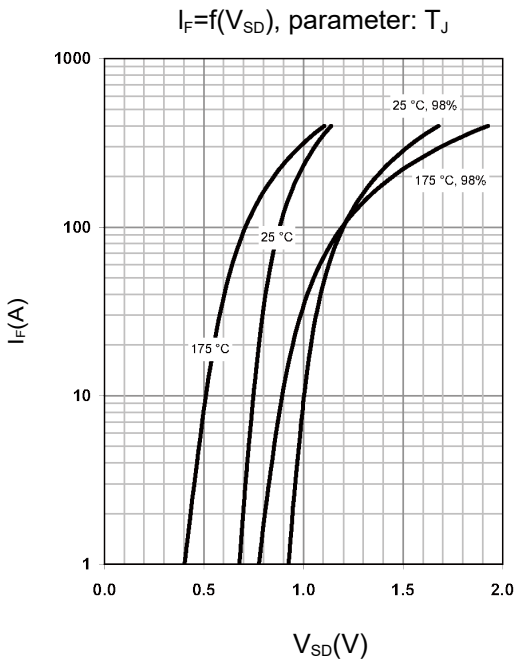


Fig 12. Forward characteristics of reverse diode

5.4Typical characteristic

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

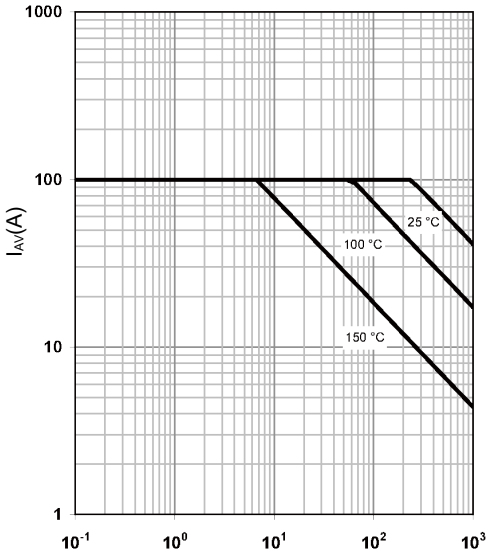


Fig 13. Avalanche characteristics

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

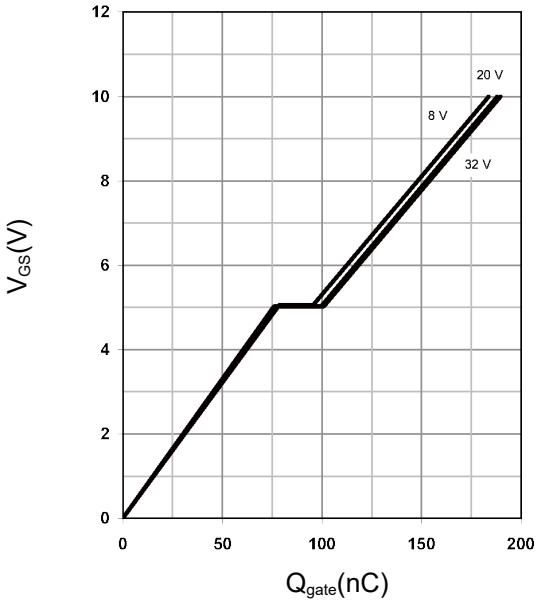


Fig 14. gate charge

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

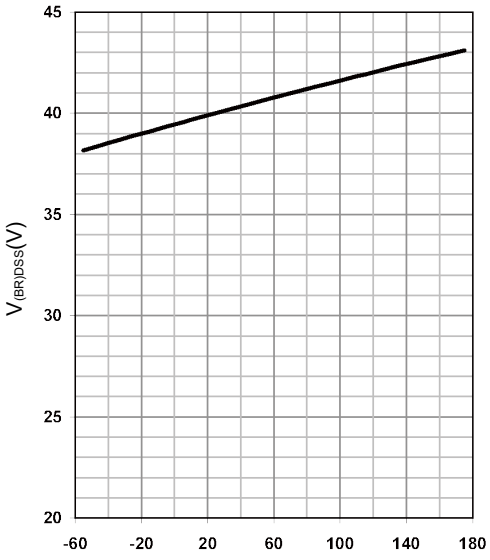


Fig 15. drai source breakdown voltage

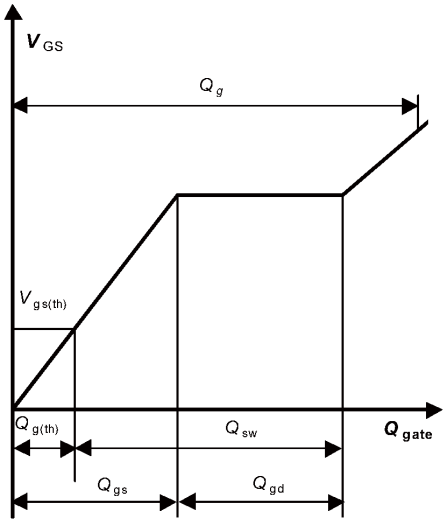
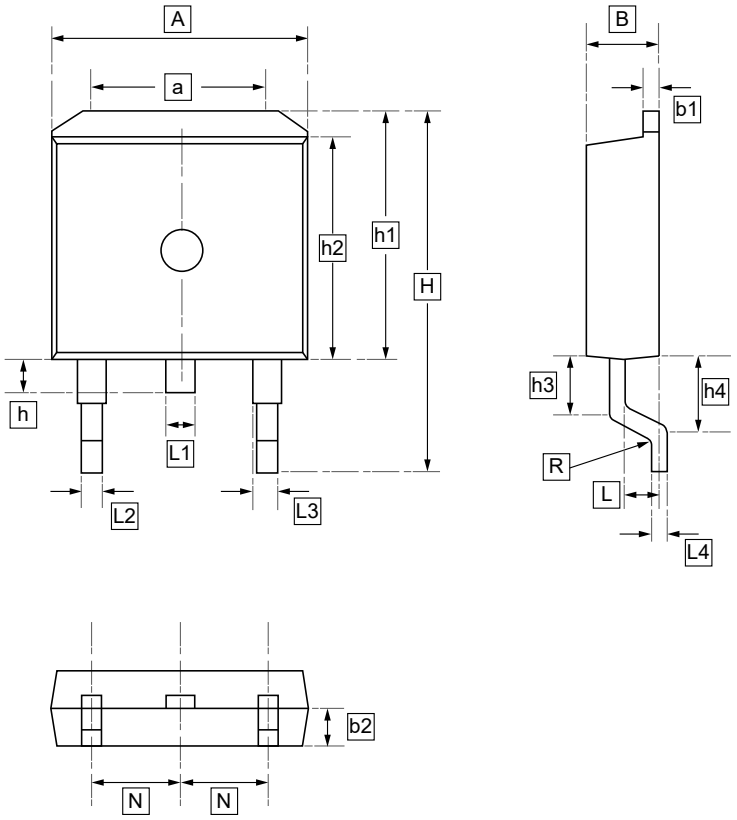


Fig 16. Gate charge waveforms

8.TO-263 Package Outline Dimensions

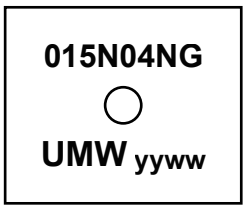


DIMENSIONS (mm are the original dimensions)

Symbol	A	a	B	b1	b2	H	h	h1	h2	h3	h4	L	L1	L2	L3
Min	9.6	7.2	4.3	1.25	2.2	15.2	1.34	10.3	9.1	1.34	2.5	2.2	1.2	0.7	1.2
Max	10.0	7.6	4.7	1.35	2.6	15.8	1.74	10.7	9.3	1.74	2.9	2.6	1.4	0.9	1.4

Symbol	L4	N	R
Min	0.4	2.4	0.45
Max	0.6	2.5	0.55

7.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IPB015N04NG	TO-263	800	Tape and reel

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