UMW IPD50N06S2-14

60V N-Channel MOSFET

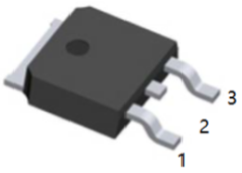
1.Features

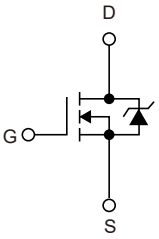
- $V_{DS\ (V)}$=60V
- I_D=50A
- $R_{DS(ON)}$<10.8mΩ(V_{GS}=10V)
- 175°C operating temperature

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	Value	Units
Continuous drain current	I_D	T_C=25°C, V_{GS}=10V	50 [1]	A
		T_C=100°C, V_{GS}=10V [2]	49	A
Pulsed drain current [1]	$I_{D,pulse}$	T_C=25°C	200	A
Avalanche current, single pulse	E_{AS}	I_D=50A	240	mJ
Gate source voltage	V_{GS}		±20	V
Power dissipation	P_D	T_C=25°C	136	W
Storage temperature	T_J,T_{STG}		-55 to 175	°C
IEC cimatic category; DIN IEC 68-1			55/175/56	

4.Thermal resistance rating

Parameter	Symbol	Conditions	Max	Units
Thermal resistance, junction -case	R_{thJC}		1.1	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}		100	K/W
SMD version, device on PCB	R_{thJA}	minimal footprint	75	K/W
		6 cm^2 cooling area [3]	50	K/W

5.Electrical Characteristic (T_J=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	60			V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=80μA	2.1	3	4	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=55V, V_{GS}=0V, T_J=25°C		0.01	1	μA
		V_{DS}=55V, V_{GS}=0V, T_J=125°C [2]		1	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=32A		10.8	14.4	mΩ
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1MHz		1485		pF
Output capacitance	C_{oss}			464		pF
Reverse transfer capacitance	C_{rss}			167		pF
Turn-on delay time	$t_{D(on)}$	V_{DD}=30V, V_{GS}=10V, I_D=50A, R_G=7.5Ω		13		ns
Rise time	t_r			29		ns
Turn-off delay time	$t_{D(off)}$			30		ns
Fall time	t_f			19		ns
Gate to source charge	Q_{gs}	V_{DD}=44V, I_D=50A, V_{GS}=0 to 10V		8	11	nC
Gate to drain charge	Q_{gd}			16	24	nC
Gate charge total	Q_g			39	52	nC
Gate plateau voltage	$V_{plateau}$			5.4		V
Diode continuous forward current [2]	I_S	T_C=25°C			50	A
Diode pulse current [2]	$I_{S,pulse}$				200	A
Diode forward voltage	V_{SD}	V_{GS}=0V, I_F=50A, T_J=25°C		1	1.3	V
Reverse recovery time [2]	t_{rr}	V_R=30V, I_F=I_S, di_F/dt=100A/μs		45		ns
Reverse recovery charge [2]	Q_{rr}	V_R=3V, I_F=I_S, di_F/dt=100A/μs		74		nC

Notes:

[1] Current is limited by bondwire; with an RthJC=1.1 K/W the chip is able to carry 69A.

[2] Defined by design. Not subject to production test.

[3] 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

$P_{tot}=f(T_C)$; $V_{GS}\geq 6V$

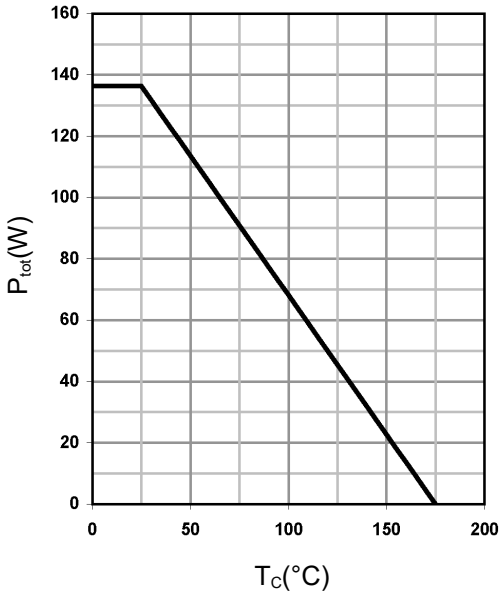


Fig 1. Power dissipation

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

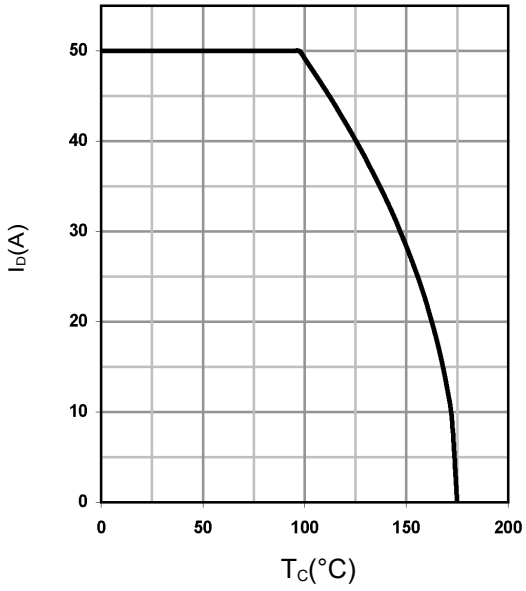


Fig 2. Drain current

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

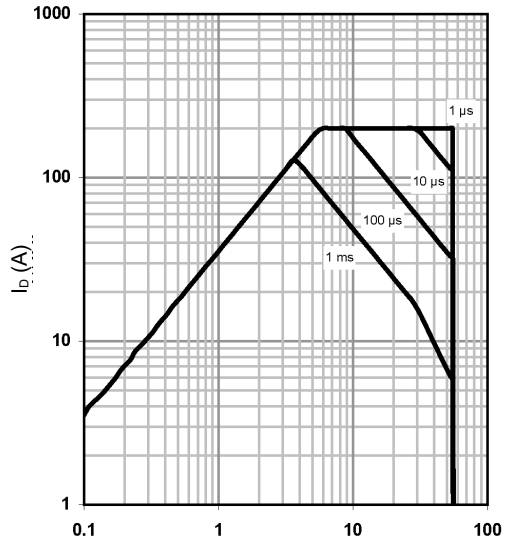


Fig 3. Safe operating area

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

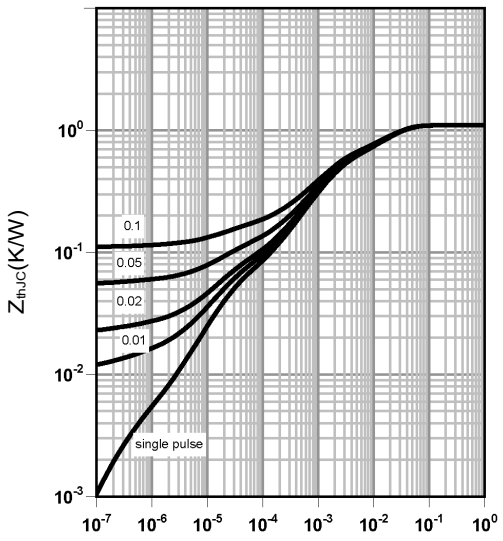


Fig 4. Max transient thermal impedance

6.2Typical characteristic

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

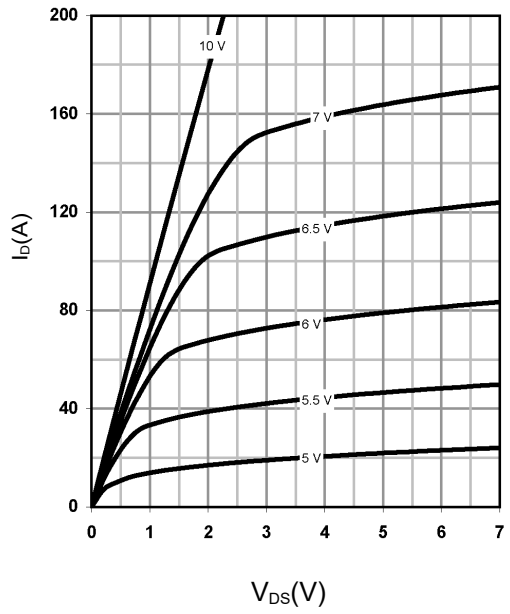


Fig 5. output characteristics

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

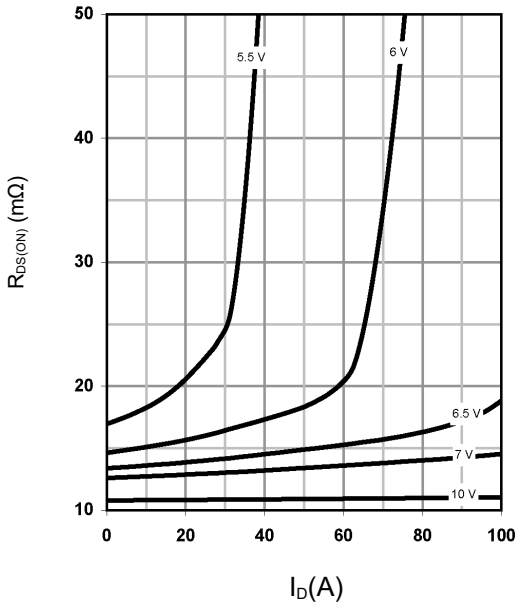


Fig 6. drain-source on resistance

$I_D=f(V_{GS})$; V_{DS}=6V; parameter: T_J

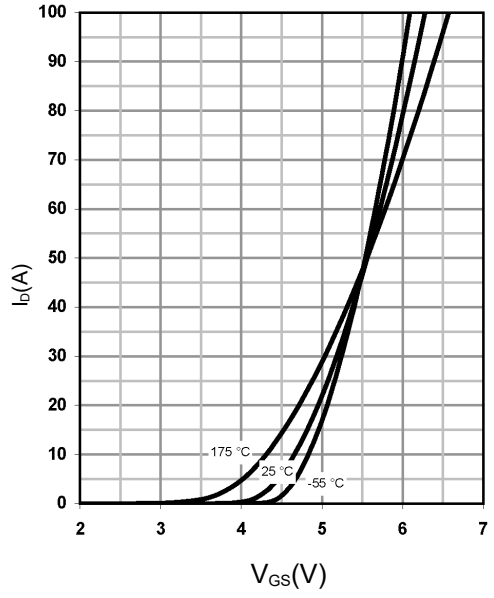


Fig 7. transfer characteristics

$g_{fs}=f(I_D)$; T_J=25°C; parameter: g_{fs}

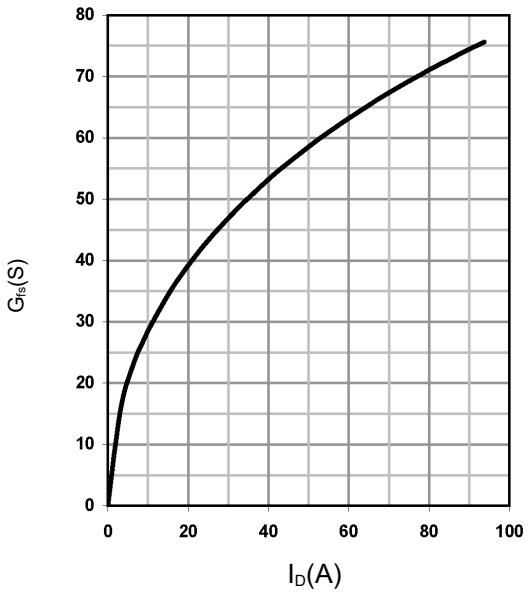


Fig 8. forward transconductance

6.3Typical characteristic

$R_{DS(ON)}=f(T_J)$; I_D=32A; V_{GS}=10V

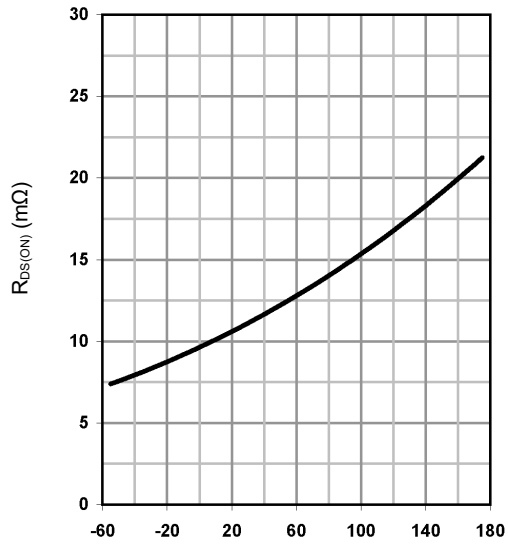


Fig 9. Drain-source on-state resistance

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

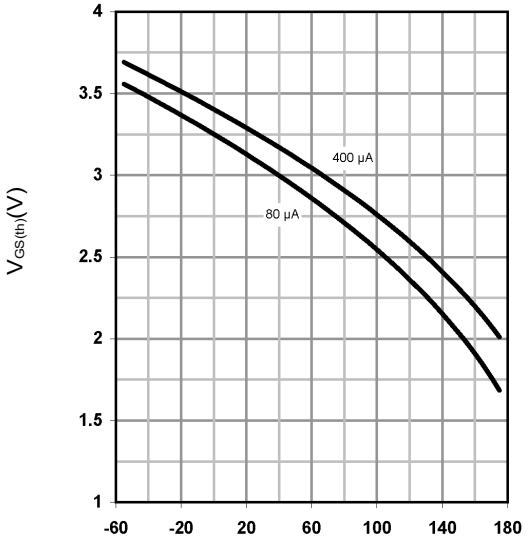


Fig 10. Tgate threshold voltage

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

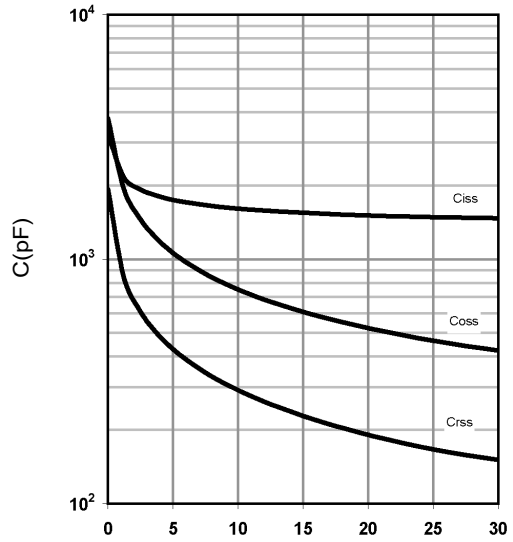


Fig 11. capacitances

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

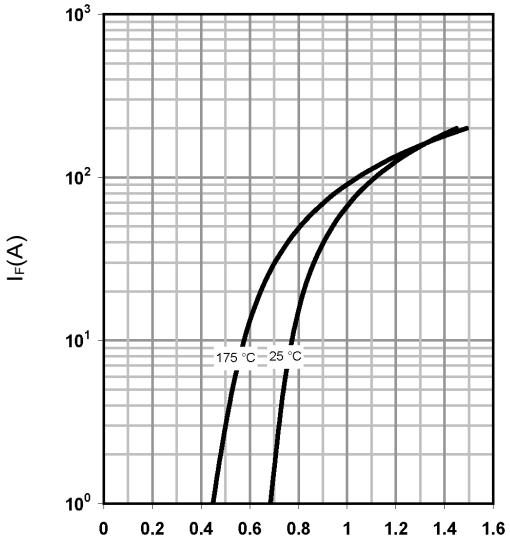


Fig 12. Typical forward diode characteristicis

6.4Typical characteristic

$E_{AS}=f_{(TJ)}$; parameter: I_D

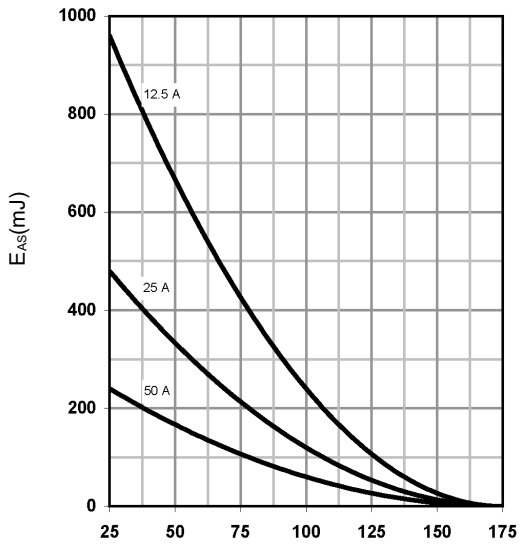


Fig 13. Typical avalanche energy

$V_{GS}=f(Q_{gate})$; I_D=50Apulsed

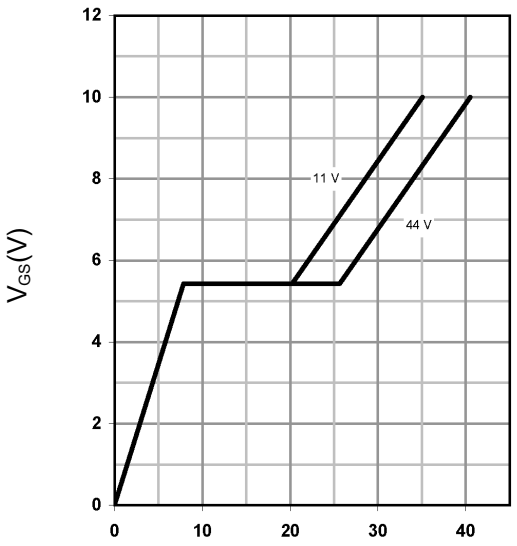


Fig 14. gate charge

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

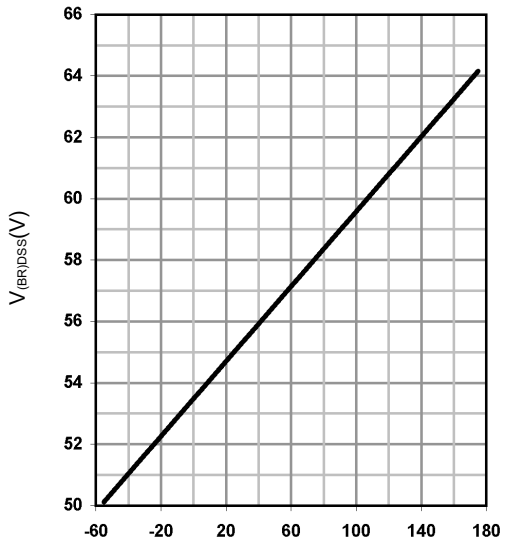


Fig 15. drain source breakdown voltage

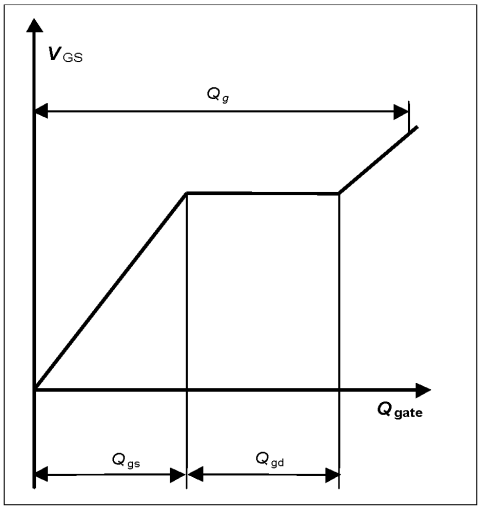
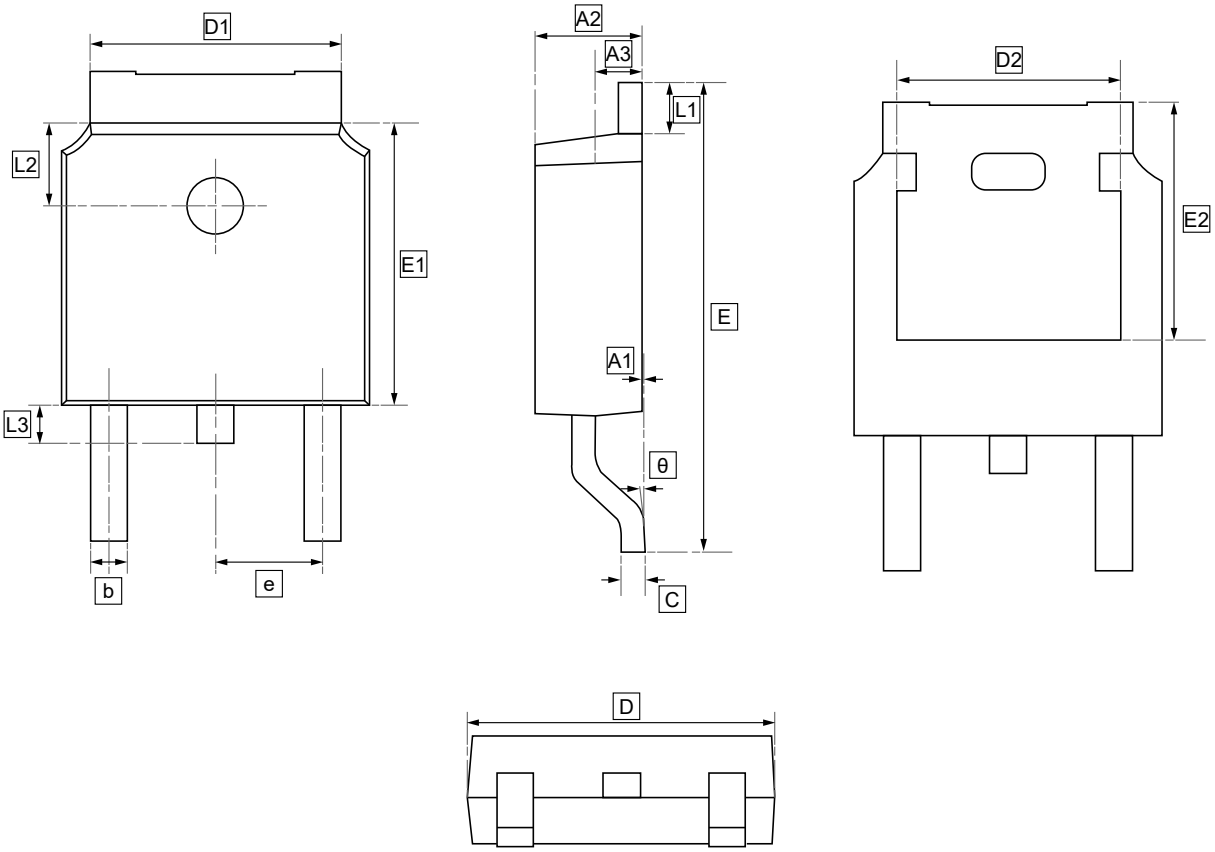


Fig 16. Gate charge waveforms

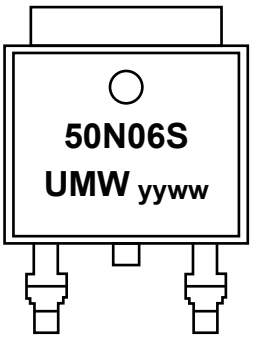
7.TO-252 Package Outline Dimensions



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

8.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IPD50N06S2-14	TO-252	2500	Tape and reel

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