UMW 7N65

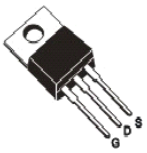
650V N-Channel MOSFET

1.Features

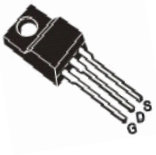
- $V_{DS\ (V)}$=650V
- I_D=7A
- $R_{DS(ON)}$≤1.4Ω(V_{GS}=10V)

2.Pinning information

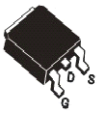
Pin	Symbol	Description
1	G	GATE
2	D	DRAIN
3	S	SOURCE



TO-220



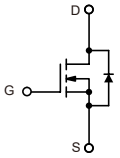
TO-220F



TO-252



TO-263



N-Channel

3.Absolute Maximum Ratings T_C= 25°C

Parameter		Symbol	Rating	Units
Drain-source Voltage		V_{DS}	650	V
gate-source Voltage		V_{GS}	±30	V
Continuous Drain Current	T_C=25°C	I_D	7	A
Continuous Drain Current	T_C=100°C	I_D	3.2	A
Drain Current －Pulsed ①		I_{DM}	28	A
Power Dissipation	TO-220F	P_D	83	W
Junction Temperature		T_J	150	°C
Storage Temperature		T_{STG}	-55 to 150	°C
Single Pulse Avalanche Energy ②		E_{AS}	230	mJ

4.Thermal resistance rating

Parameter	Symbol	MAX			Units
		TO-220	TO-220F	TO-262/263	
Thermal Resistance Junction-case	R_{thJC}	0.88	3.13	0.88	°C/W
Thermal Resistance Junction-ambient	R_{thJA}	62.5	62.5	62.5	°C/W

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	650			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I_D=250μA Referenced to 25°C		0.8		V/°C
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	2		4	V
Drain-source Leakage Current	I_{DSS}	V_{DS}=650V, V_{GS}=0V, T_J=25°C			1	μA
		V_{DS}=520V, V_{GS}=0V, T_J=125°C			10	μA
Forward Transconductance	g_{fs}	V_{DS}=40V, I_D=3.5A ③		3		S
Gate-body Leakage Current (V_{DS}=0)	I_{GSS}	V_{GS}=±30V			±100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=3.5A ③		1.1	1.4	Ω
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1MHz		955		pF
Turn -Off Delay Time	$t_{D(off)}$	V_{DD}=325V, I_D=7A, R_G=25Ω ③		90		ns
Total Gate Charge	Q_g	I_D=7A, V_{DS}=520V, V_{GS}=10V ③		28		nC
Gate-to-Source Charge	Q_{gs}			7		nC
Gate-to-Drain Charge	Q_{gd}			12		nC
Continuous Diode Forward Current	I_S				7	A
Diode Forward Voltage	V_{SD}	T_J=25°C, I_S=7A, V_{GS}=0V ③			1.4	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=7A di/dt=100A/μs ③		400		ns
Reverse Recovery Charge	Q_{rr}			3.3		uC
Output Capacitors	C_{oss}	V_{GS}=0V, V_{DS}=25V, f=1MHz		120		pF
Reverse transmission capacitance	C_{rss}			11.3		pF

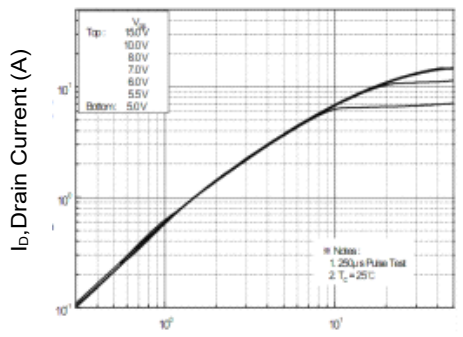
Notes:

① Repetitive rating: Pulse width limited by maximum junction temperature.

② Starting T_J=25°C, V_{DD} =50V, L=10mH, R_G =25Ω, I_{AS}=7A.

③ Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

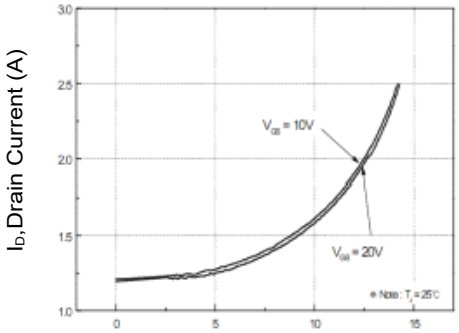
6.1Typical characteristic



I_D,Drain Current (A)

V_{DS},Drain to Source Voltage (V)

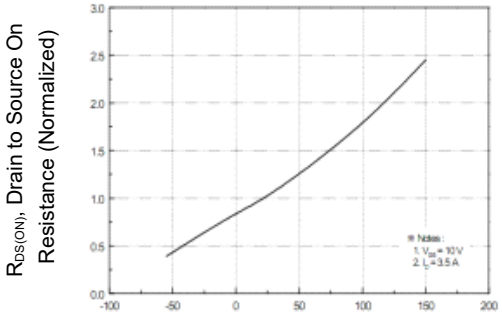
Figure 1: Typical Output Characteristics, Tc=25°C



I_D,Drain Current (A)

V_{DS},Drain to Source Voltage (V)

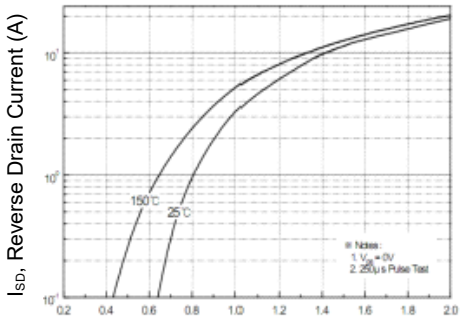
Figure 2: Typical Output Characteristics, Tc=150°C



$R_{DS(ON)}$, Drain to Source On Resistance (Normalized)

T_J,Junction Temperature (°C)

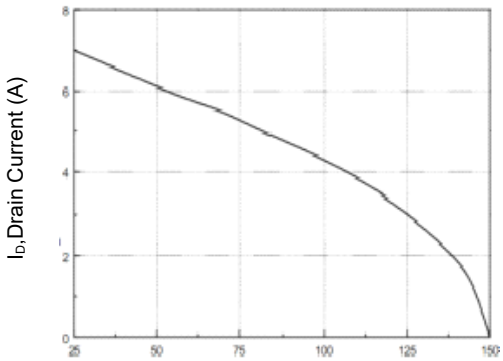
Figure 3: Normalized On-Resistance Vs.Temperature



I_{SD}, Reverse Drain Current (A)

V_{SD},Source to Drain Voltage (V)

Figure 4: Typical Source-Drain Diode Forward Voltage



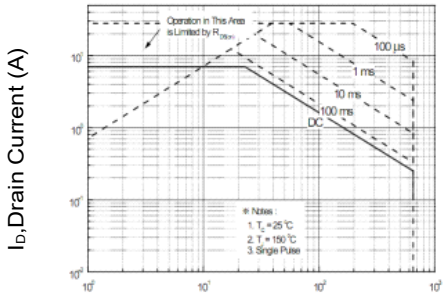
I_D,Drain Current (A)

T_C,Case Temperature (°C)

Figure 5: Maximum Drain Current Vs.Case Temperature

6.2Typical characteristic

7N65(TO-220)

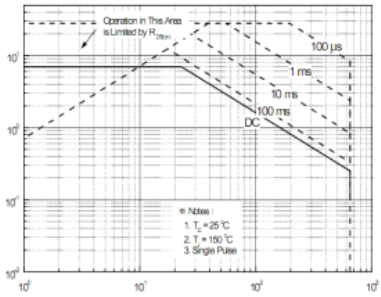


I_D,Drain Current (A)

V_{DS},Drain to Source Voltage (V)

Figure 7: Maximum Safe Operating Area

7N65(TO-220F)

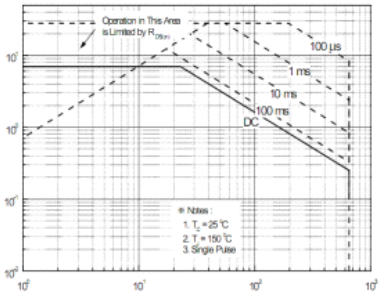


I_D,Drain Current (A)

V_{DS},Drain to Source Voltage (V)

Figure 8: Maximum Safe Operating Area

7N65(TO-262&263)

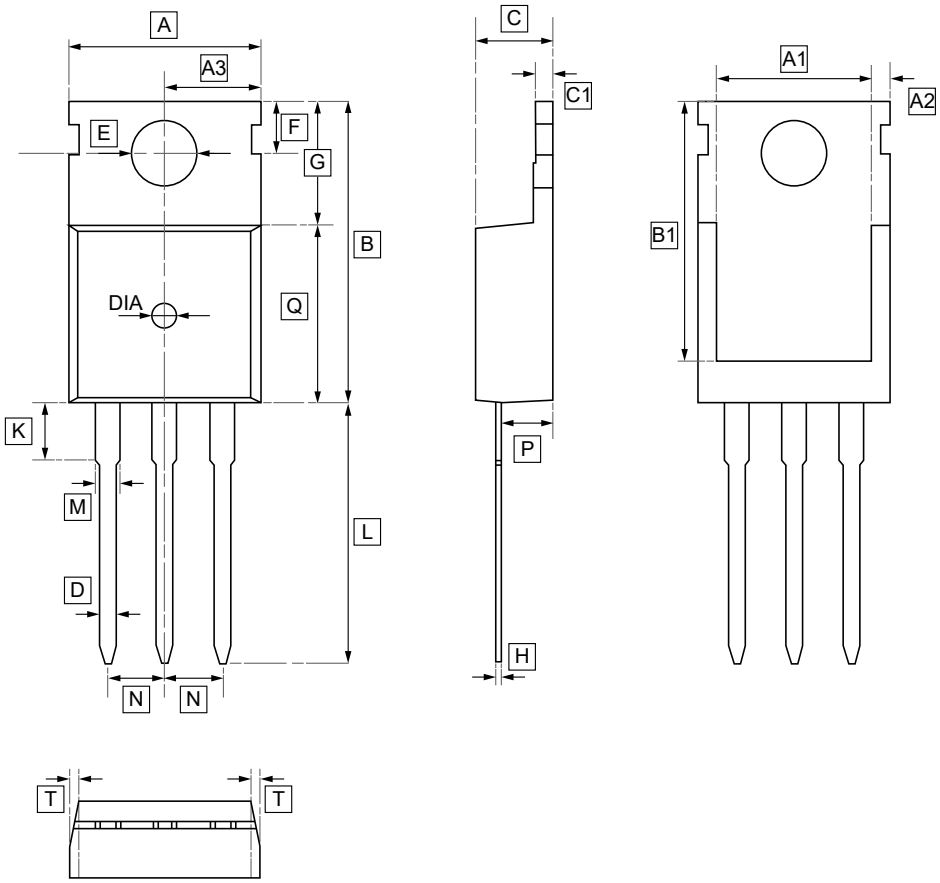


I_D,Drain Current (A)

V_{DS},Drain to Source Voltage (V)

Figure 9: Maximum Safe Operating Area

7.1 TO-220 Package Outline Dimensions

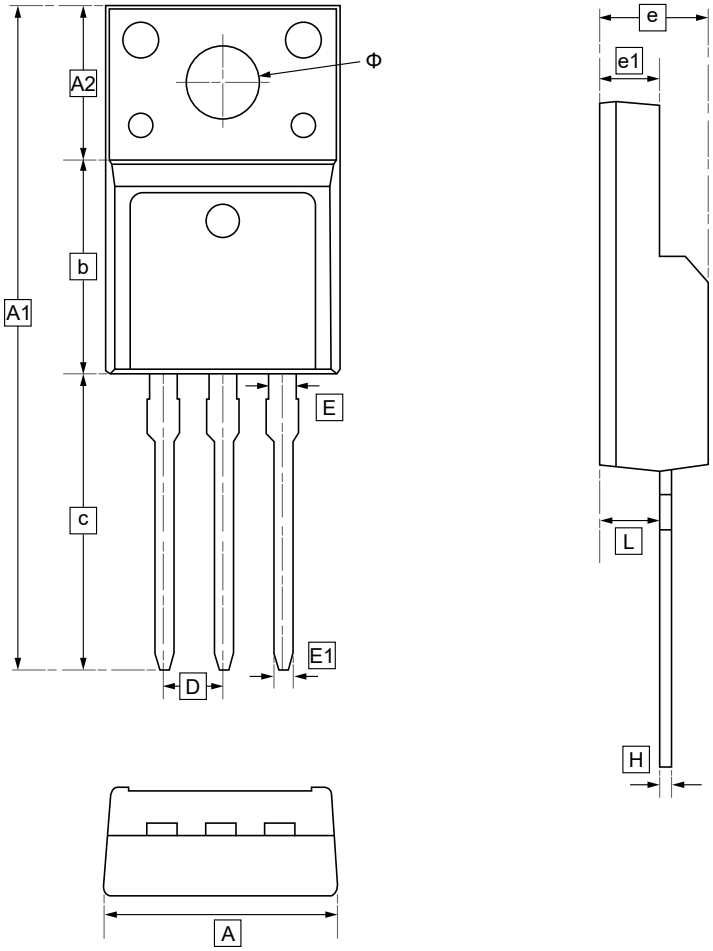


DIMENSIONS (mm are the original dimensions)

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 (deep 0.2)
Max	0.6	3.3	13.6	3.3	1.35	2.59	2.7	9.3		

7.2 TO-220F Package Outline Dimensions

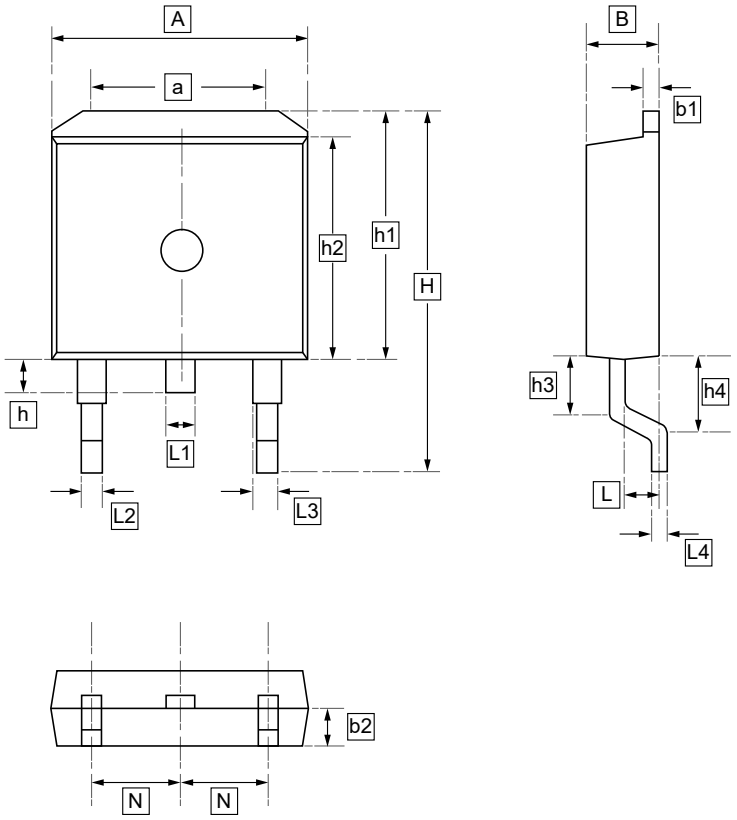


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	Φ	e	e1	L
Min	10.00	28.80	6.58	9.12	12.95	2.54	1.15	0.75	3.13	4.50	2.40	2.50
Max	10.20	29.20	6.78	9.32	13.25		1.25	0.85	3.23	4.70	2.60	2.70

Symbol	H
Min	0.45
Max	0.55

7.3 TO-263 Package Outline Dimensions

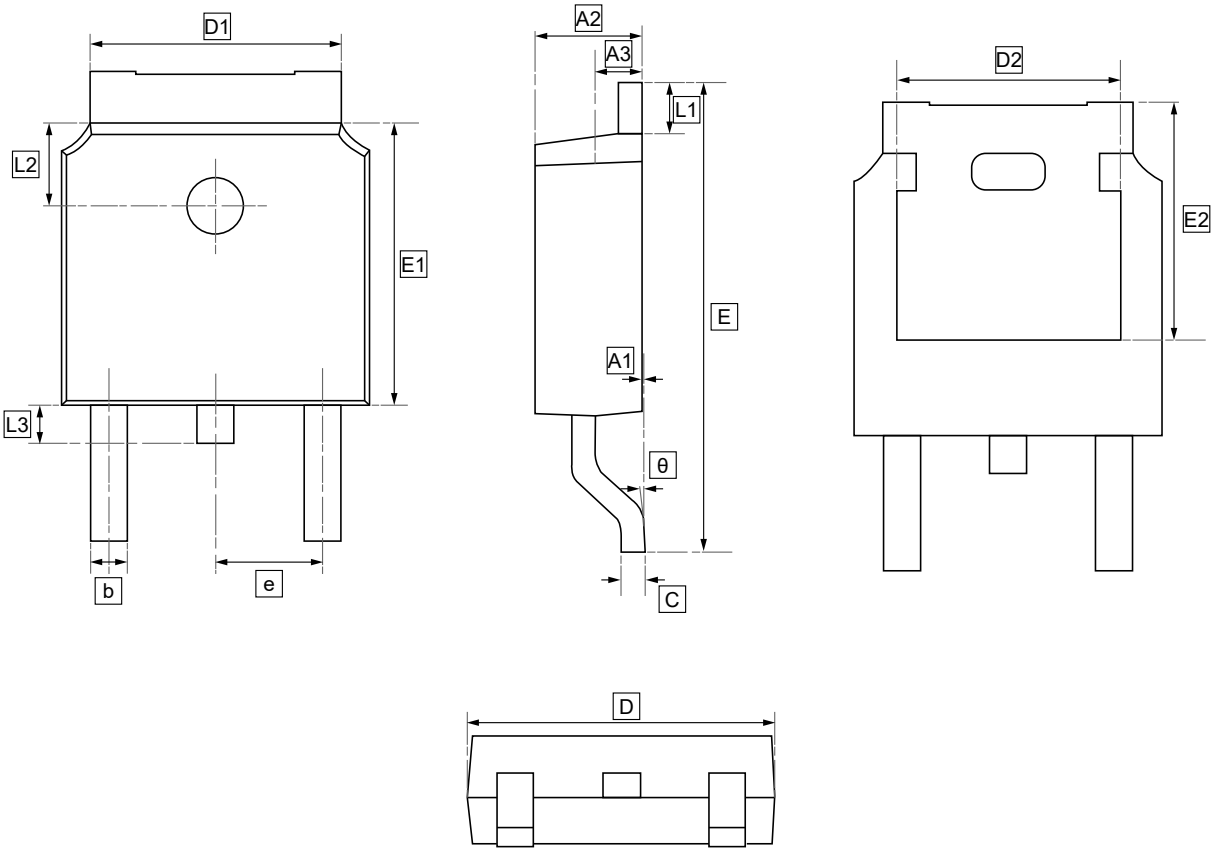


DIMENSIONS (mm are the original dimensions)

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
Min	0.4	2.4
Max	0.6	2.5

7.4 TO-252 Package Outline Dimensions

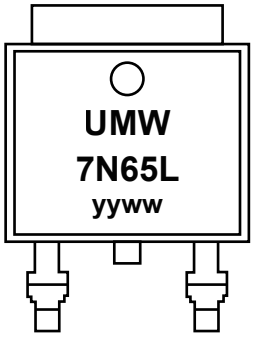


DIMENSIONS (mm are the original dimensions)

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

TO-252



TO-220F



yy: Year Code
ww: Week Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW 7N65L	7N65L	TO-252	2500	Tape and reel
UMW 7N65F	7N65F	TO-220F	1000	Tape and box
UMW 7N65	7N65	TO-263	800	Tape and reel
UMW 7N65	7N65	TO-220	1000	Tape and box

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