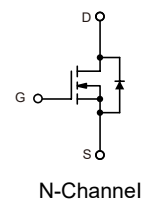
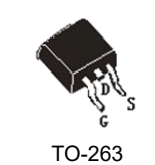
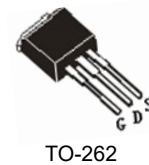
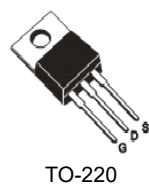


1.Features

- $V_{DS(V)}=650V$
- $I_D=10A$
- $R_{DS(ON)}=0.9\Omega$

2.Pinning information

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



3.Absolute Maximum Ratings $T_c=25^{\circ}C$

Parameter		Symbol	Rating	Units
Drain-source Voltage		V_{DS}	650	V
gate-source Voltage		V_{GS}	± 30	V
Continuous Drain Current	$T_c=25^{\circ}C$	I_D	10	A
Continuous Drain Current	$T_c=100^{\circ}C$	I_D	6	A
Drain Current – Pulsed ①		I_{DM}	40	A
Power Dissipation		P_D	50	W
Junction Temperature		T_J	150	$^{\circ}C$
Storage Temperature		T_{STG}	-55 to 150	$^{\circ}C$
Single Pulse Avalanche Energy ②		E_{AS}	500	mJ



4.Thermal resistance rating

Parameter	Symbol	MAX			Units
		TO-220	TO-220F	TO-262/263	
Thermal Resistance Junction-case	R _{thJC}	0.8	2.5	1	°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)

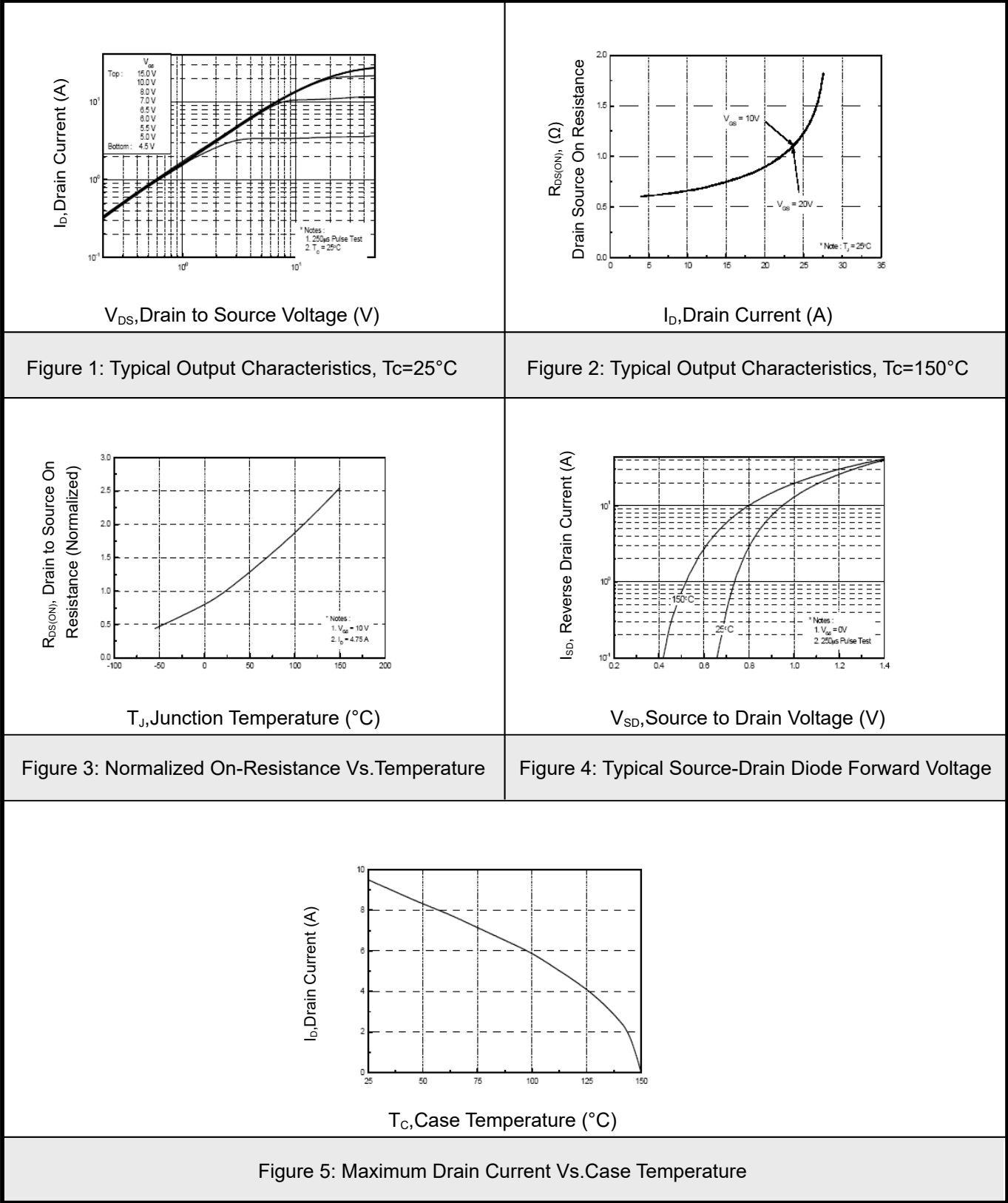
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	650			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I _D =250μA Referenced to 25°C		0.65		V/°C
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2		4	V
Drain-source Leakage Current	I _{DSS}	V _{DS} =650V, V _{GS} =0V, T _J =25°C			1	μA
		V _{DS} =480V, V _{GS} =0V, T _J =125°C			10	μA
Forward Transconductance	g _{fs}	V _{DS} =40V, I _D =5A ③		8		S
Gate-body Leakage Current (V _{DS} =0)	I _{GSS}	V _{GS} =±20V			±100	nA
Static Drain-source On Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =5A ③		0.75	0.9	Ω
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V, f=1MHz		1570		pF
Turn -Off Delay Time	t _{D(off)}	V _{DD} =300V, I _D =10A, R _G =25Ω ③		130		ns
Total Gate Charge	Q _g	I _D =10A, V _{DS} =480V, V _{GS} =10V ③		45		nC
Gate-to-Source Charge	Q _{gs}			7.5		nC
Gate-to-Drain Charge	Q _{gd}			18.5		nC
Continuous Diode Forward Current	I _S				10	A
Diode Forward Voltage	V _{SD}	T _J =25°C, I _S =10A, V _{GS} =0V ③			1.4	V
Reverse Recovery Time	t _{rr}	T _J =25°C, I _F =10A		420		ns
Reverse Recovery Charge	Q _{rr}	di/dt=100A/μs ③		4.2		uC

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}=10A.
- ③ Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.



6.1Typical characteristic



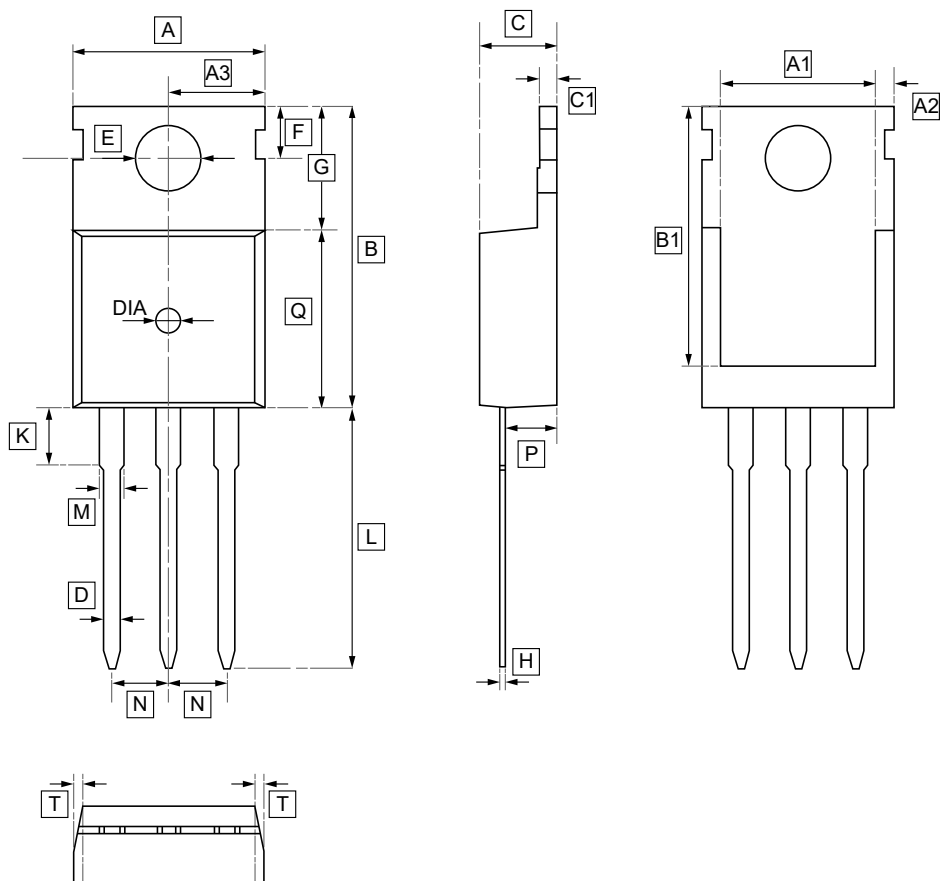


6.2Typical characteristic

10N65(TO-220) I_D, Drain Current (A) V_{DS}, Drain Source Voltage (V) Figure 7: Maximum Safe Operating Area	10N65(TO-220F) I_D, Drain Current (A) V_{DS}, Drain Source Voltage (V) Figure 8: Maximum Safe Operating Area
10N65(TO-262&263) I_D, Drain Current (A) V_{DS}, Drain Source Voltage (V) Figure 9: Maximum Safe Operating Area	



7.1 TO-220 Package Outline Dimensions



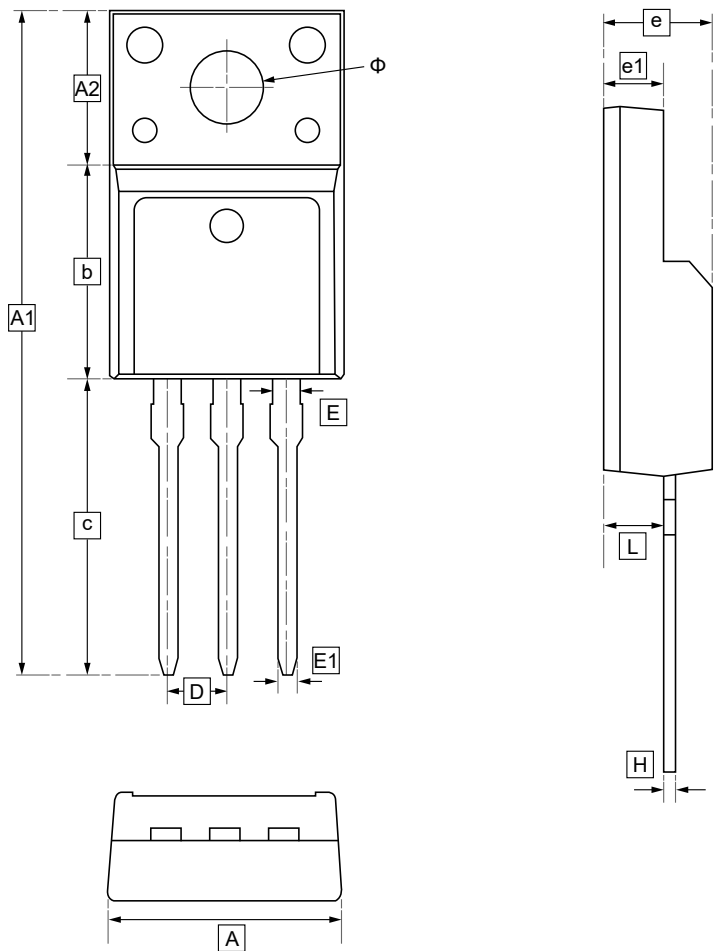
DIMENSIONS (mm are the original dimensions)

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



7.2 TO-220F Package Outline Dimensions



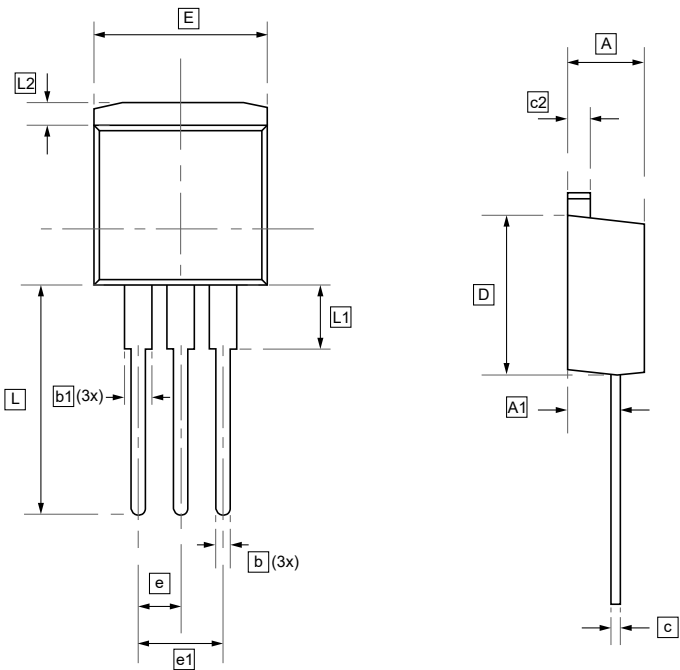
DIMENSIONS (mm are the original dimensions)

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



7.2 TO-262 Package Outline Dimensions

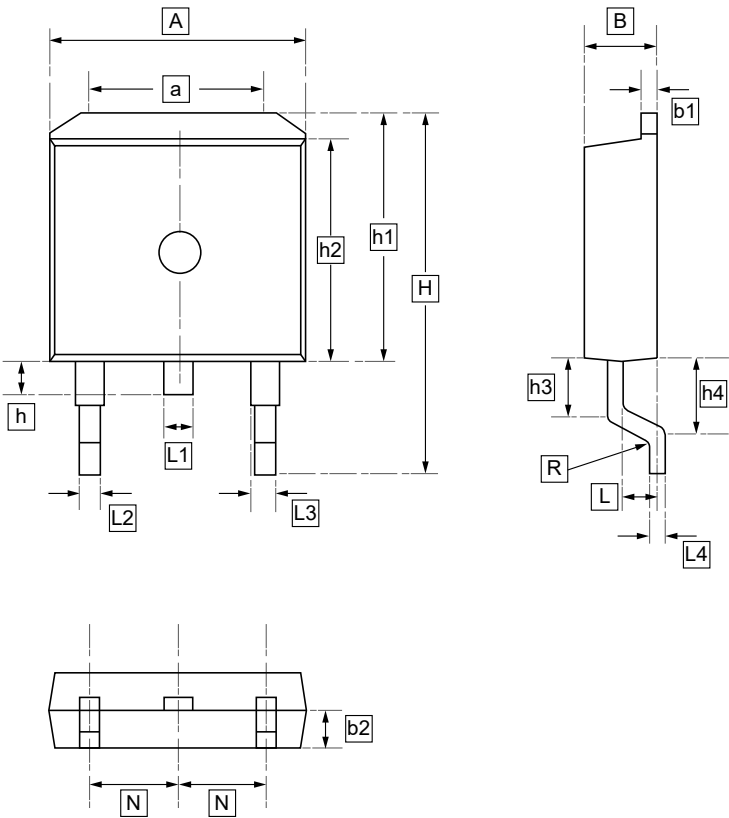


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	b	b1	c	c2	D	e	e1	E	L	L1	L2
Min	3.80	2.00	0.60	1.20	0.40	1.10	-	-	-	9.90	12.50	0.80	-
Max	4.80	2.80	1.00	1.40	0.70	1.40	9.60	-	5.30	10.70	14.50	1.20	1.50



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	R
Min	0.4	2.4	0.45
Max	0.6	2.5	0.55



8.Ordering information

UMW
10N65
yyww

yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW 10N65F	TO-220F	1000	Tube and box



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