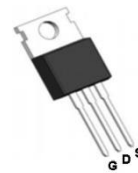


Description

DT2 MOS is DIN-TEK 2nd generation VDMOS family that is dramatic reduction in on-resistance and ultra-low gate charge for applications requiring high power density and high efficiency. And it is very robust and RoHS compliant.

TO-220



TO-220F



TO-263

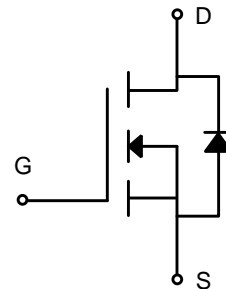


Features

- Typ. $R_{DS(on)}=0.58\Omega@V_{GS}=10V$
- 100% avalanche tested
- RoHS Compliant

Applications

- SMPS
- Charger
- DC-DC



Absolute Maximum Ratings (T_C=25°C)

Parameter	Symbol	DTP12N65/DTK12N65	DTP12N65F	Unit
Drain-source voltage	V _{DSS}	650		V
Gate-source voltage	V _{GS}	±30		V
Continuous drain current	I _D	12		A
Pulsed drain current ¹	I _{DM}	48		A
Avalanche energy, single pulse ²	E _{AS}	605		mJ
Power dissipation	P _D	156	65	W
Derate above 25°C		1.25	0.5	W/°C
Operating junction temperature	T _j	-55~150		°C
Storage temperature	T _{stg}	-55~150		°C
Continuous diode forward current	I _S	12		A
Diode pulse current ¹	I _{Spulse}	48		A

Thermal Characteristic

Thermal resistance, junction-to-case	R _{θJC}	0.8	2	°C/W
Thermal resistance, junction-to-ambient	R _{θJA}	62.5	62.5	°C/W

Electrical Characteristics of MOSFET

				Min.	Typ.	Max.	
Drain-source break down voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	$T_C=25^\circ C$	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D=250\mu A, V_{DS}=V_{GS}$	$T_J=25^\circ C$	2.0	-	4.0	V
Drain-source leakage current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V$	$T_J=25^\circ C$	-	-	1	μA
		$V_{DS}=520V, V_{GS}=0V$	$T_J=125^\circ C$	-	-	100	μA
Gate-source leakage current,forward	I_{GSSF}	$V_{DS}=0V, V_{GS}=30V$	$T_J=25^\circ C$	-	-	100	nA
Gate-source leakage current,reverse	I_{GSSR}	$V_{DS}=0V, V_{GS}=-30V$	$T_J=25^\circ C$	-	-	-100	nA
Drain-source on-state resistance ³	$R_{DS(ON)}$	$V_{GS}=10V, I_D=6A$	$T_J=25^\circ C$	-	0.58	0.74	Ω

Dynamic Characteristics of MOSFET ($T_C=25^\circ C$)

				Min.	Typ.	Max.	
Input capacitance	C_{iss}	$f=1MHz, V_{DS}=25V, V_{GS}=0V$		-	2010	-	pF
Output capacitance	C_{oss}			-	161	-	pF
Reverse transfer capacitance	C_{rss}			-	18.5	-	pF
Gate to source charge	Q_{gs}	$V_{DD}=320V$		-	10.8	-	nC
Gate to drain charge	Q_{gd}	$I_D=12A$		-	14.4	-	nC
Total gate charge	Q_g	$V_{GS}=0$ to 10V		-	44.7	-	nC

Switching Characteristics of MOSFET ($T_C=25^\circ C$)

				Min.	Typ.	Max.	
Turn-on delay time	t_{don}	$V_{DS}=320V, I_D=12A,$ $R_G=25\Omega, V_{GS}=0$ to 10V		-	29	-	ns
Rise time	t_r			-	33	-	ns
Turn-off delay time	t_{doff}			-	143	-	ns
Fall time	t_f			-	47	-	ns

Characteristics of Body Diode ($T_C=25^\circ C$)

				Min.	Typ.	Max.	
Forward voltage	V_{SD}	$I_{SD}=12A, V_{GS}=0V$		-	-	1.4	V
Reverse recovery time	t_{rr}	$V_{DS}=320V, I_S=12A, V_{GS}=0V$ $di/dt=100A/us$		-	364	-	ns
Reverse recovery current	I_{rr}			-	37	-	A
Recovery charge	Q_{rr}			-	6.8	-	μC

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ C$.
2. The E_{AS} data shows Max. rating . The test condition is $V_{DD}=50V, V_{GS}=10V, L=10mH, I_{AS}=11A, T_C=25^\circ C$.
3. The data tested by pulsed , pulse width $\leq 300us$, duty cycle $\leq 2\%$.

TYPICAL CHARACTERISTICS

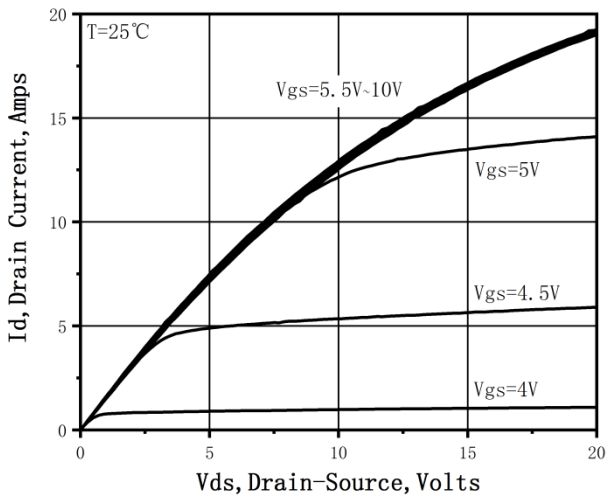


Figure 1. On-Region Characteristics

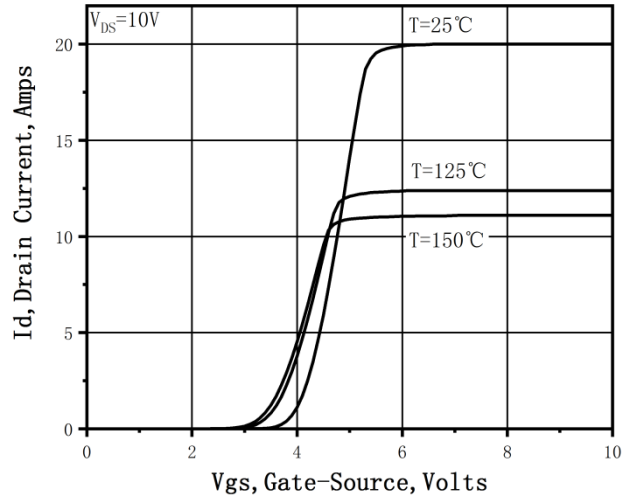


Figure 2. Transfer Characteristics

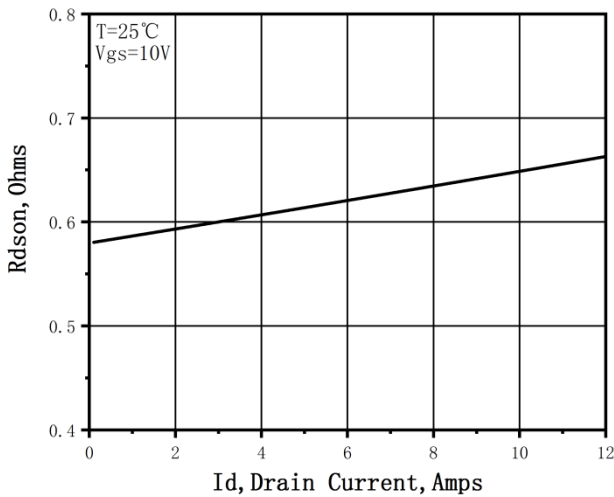


Figure 3. Static Drain-Source On Resistance

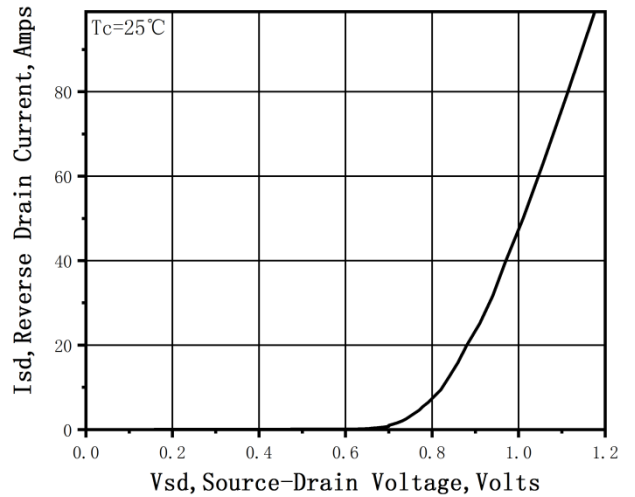


Figure 4. Typical Body Diode Transfer Characteristics

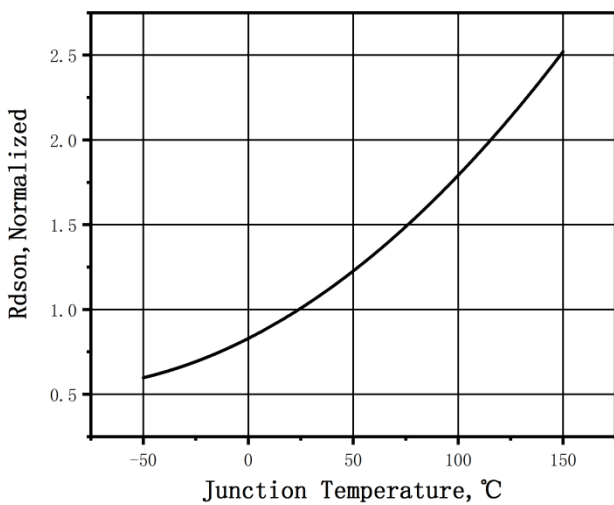


Figure 5. Normalized $R_{DS(on)}$ vs. Temperature

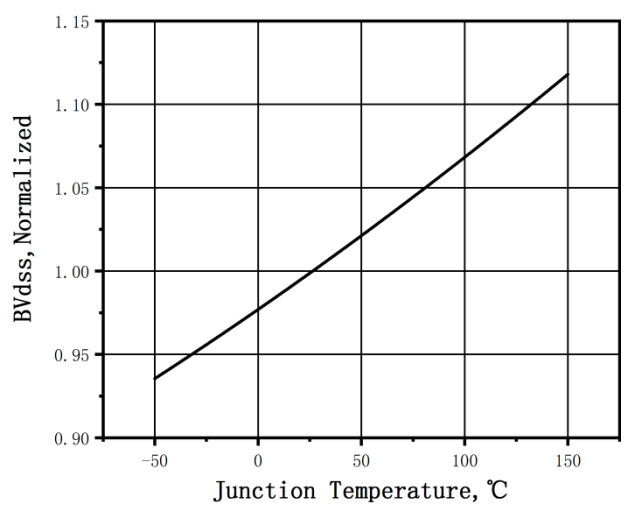


Figure 6. Normalized BV_{DSS} vs. Temperature

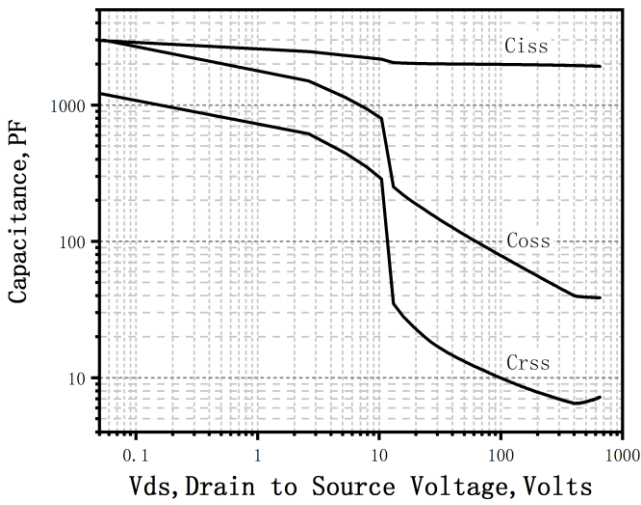


Figure 7. Capacitance Characteristics

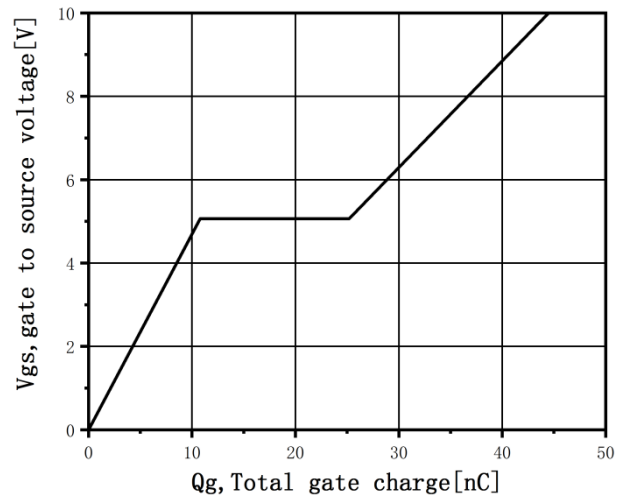


Figure 8. Gate Charge Characteristics

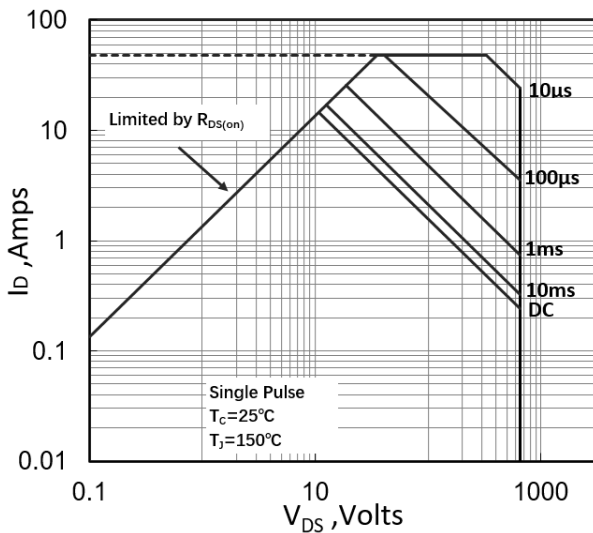


Figure 9. Maximum Safe Operating Area (TO-220/TO-263)

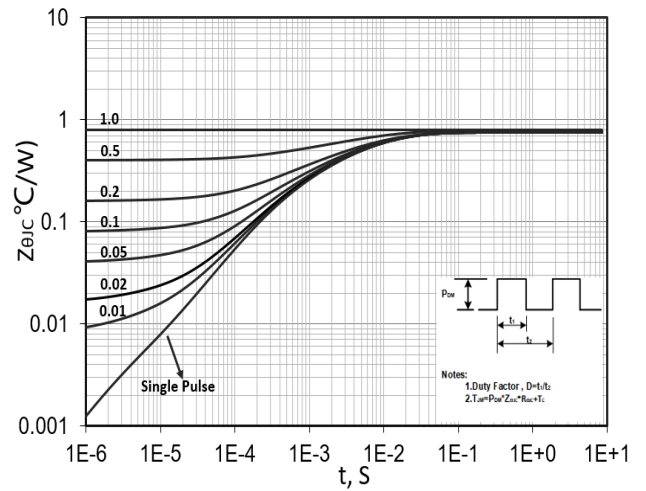


Figure 10. Transient Thermal Response Curve (TO-220/TO-263)

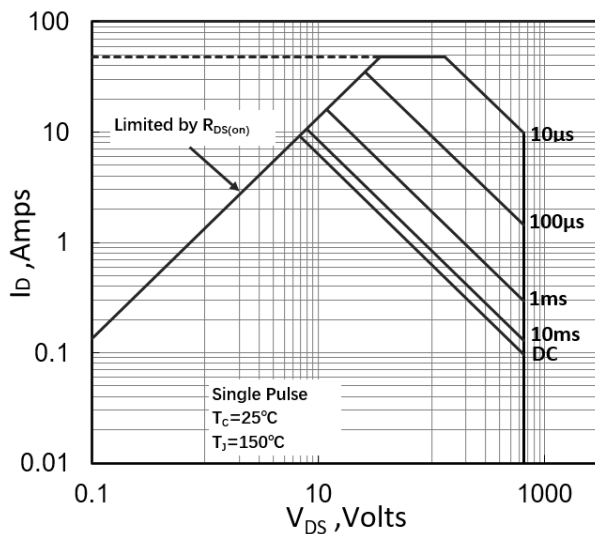


Figure 11. Maximum Safe Operating Area (TO-220F)

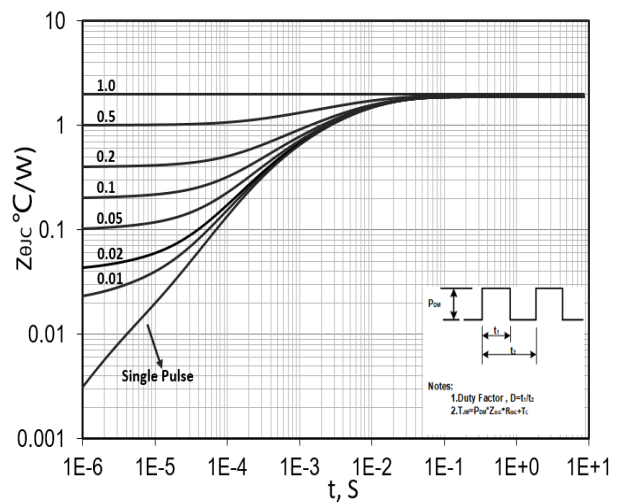
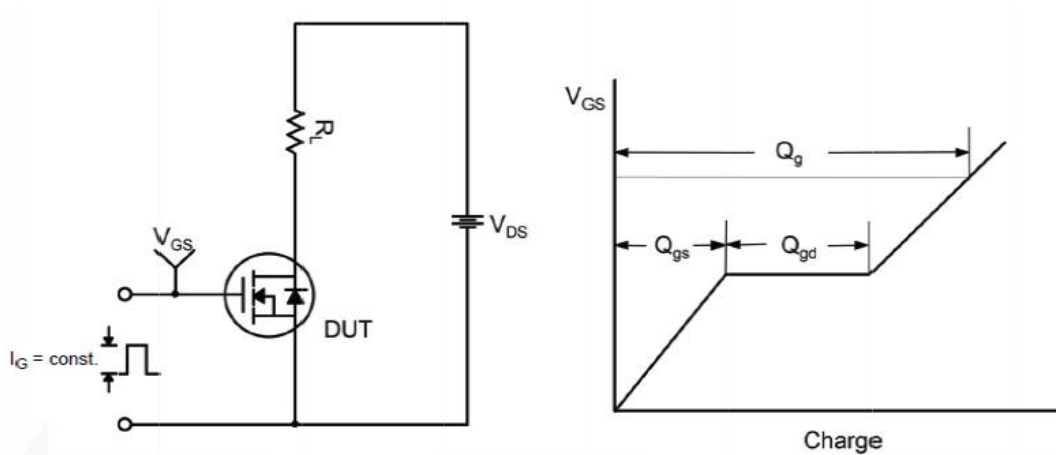


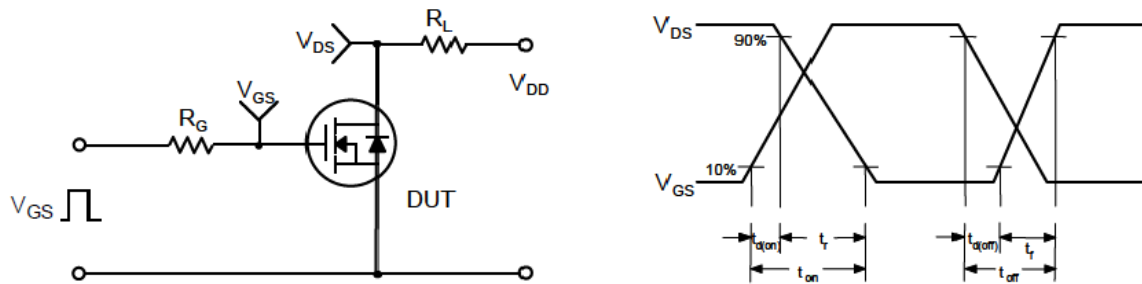
Figure 12. Transient Thermal Response Curve (TO-220F)

Test Circuit

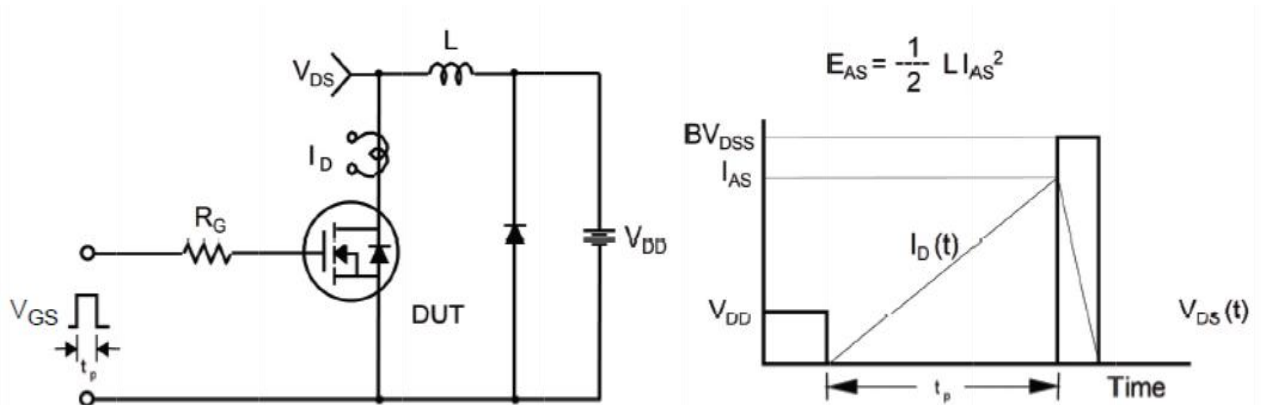
Gate Charge Test Circuit & Waveform



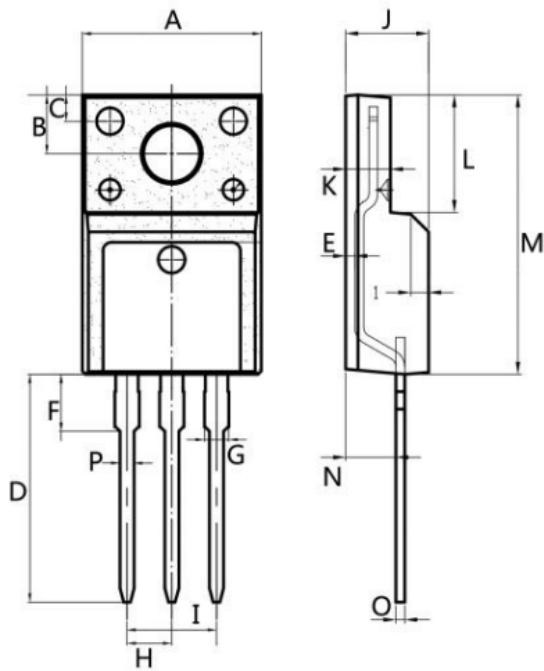
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



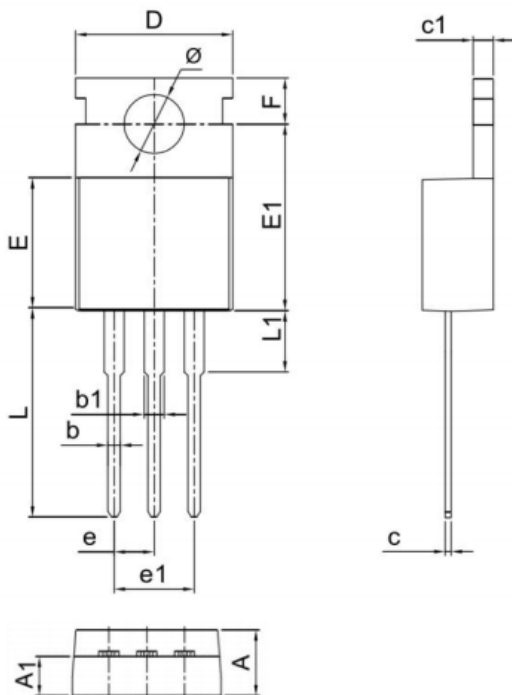
Mechanical Dimensions for TO-220F



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	9.95	10.36
B	2.95	3.55
C	1.25	1.6
D	12.64	13.5
E	0.40	0.60
F	2.80	3.80
G	1.14	1.58
H	2.44	2.64
I	4.88	5.26
J	4.50	4.90
K	2.34	2.80
L	6.48	6.90
M	15.40	16.07
N	2.66	3.50
O	0.40	0.64
P	0.70	0.94

Mechanical Dimensions for TO-220

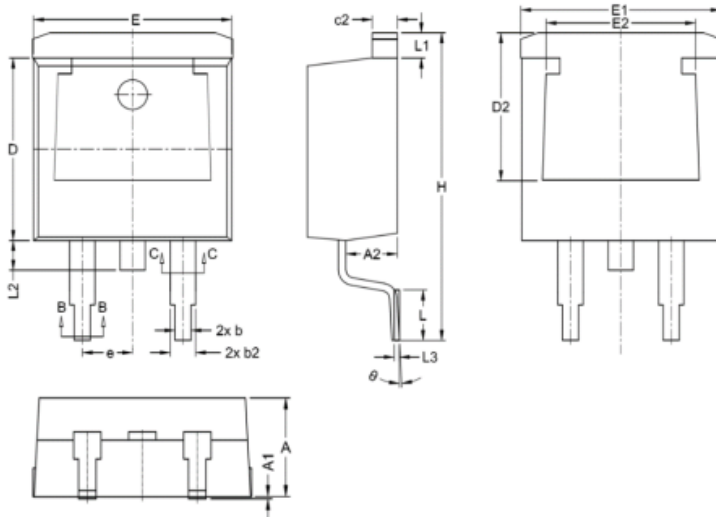


COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	4.30	4.70
A1	2.30	2.82
b	0.70	0.94
b1	1.17	1.41
c	0.30	0.64
c1	1.17	1.44
D	9.70	10.20
E	8.50	9.30
E1	12.00	12.50
e	2.44	2.64
e1	4.88	5.26
F	2.60	2.94
L	13.00	14.00
L1	3.385	4.20
Ø	3.74	3.95

Mechanical Dimensions for TO-263

COMMON DIMENSIONS



SYMBOL	MM	
	MIN	MAX
A	4.45	4.65
A1	0	0.15
A2	2.50	2.70
b	0.75	0.96
b1	0.71	0.92
b2	1.21	1.41
b3	1.17	1.37
c	0.33	0.52
c1	0.28	0.48
c2	1.21	1.41
D	9.10	9.30
D2	7.21	7.62
E	9.90	10.10
E1	9.90	10.30
E2	7.34	7.74
e	2.50	2.60
H	15.30	15.70
L	2.34	2.74
L1	1.06	1.47
L2	1.40	1.60
L3	0.25	0.26

Ordering Information

Part	Package	Packing method
DTP12N65F	TO-220F	Tube
DTP12N65	TO-220	Tube
DTK12N65	TO-263	Tape and Reel

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