

650V 8A 1.18Ω N-ch Power MOSFET

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.

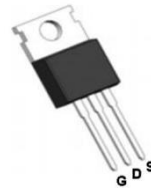
Features

- Typ. $R_{DS(on)}=1.18\Omega@V_{GS}=10V$
- 100% avalanche tested
- RoHS Compliant

Applications

- SMPS
- Charger
- DC-DC

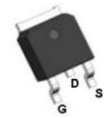
TO-220



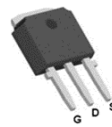
TO-220F



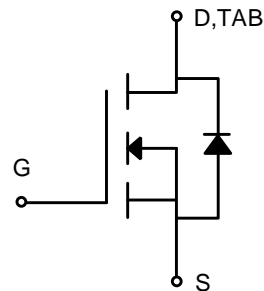
TO-252



TO-251-L4.0



TO-251-L9.4



Absolute Maximum Ratings ($T_c=25^{\circ}C$)

Parameter	Symbol	DTP8N65	DTU8N65/DTL8N65	DTP8N65F	Unit
Drain-source voltage	V_{DSS}	650			V
Gate-source voltage	V_{GS}	± 30			V
Continuous drain current	I_D	8			A
Pulsed drain current ¹	I_{DM}	32			A
Avalanche energy, single pulse ²	E_{AS}	105			mJ
Power dissipation	P_D	125	55	38	W
Derate above 25°C		1	0.4	0.3	W/°C
Operating junction temperature	T_j	-55~150			°C
Storage temperature	T_{stg}	-55~150			°C
Continuous diode forward current	I_S	8			A
Diode pulse current ¹	I_{Spulse}	32			A

Thermal Characteristic

Thermal resistance,junction-to-case	$R_{\theta JC}$	1	2.27	3.29	°C/W
Thermal resistance,junction-to-ambient	$R_{\theta JA}$	62.5	110	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	$R_{DS(ON)}$	$V_{GS}=10V, I_D=4A$	$T_J=25^\circ C$	-	1.18	1.36	Ω
Transconductance ³	G_{fs}	$V_{DS}=20V$	$T_J=25^\circ C$	-	6.2	-	S

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

				Min.	Typ.	Max.	
Input capacitance	C_{iss}	$f=1MHz, V_{DS}=25V, V_{GS}=0V$		-	1103	-	pF
Output capacitance	C_{oss}			-	94	-	pF
Reverse transfer capacitance	C_{rss}			-	10	-	pF
Gate to source charge	Q_{gs}	$V_{DD}=520V$		-	7.4	-	nC
Gate to drain charge	Q_{gd}	$I_D=8A$		-	7	-	nC
Total gate charge	Q_g	$V_{GS}=0$ to 10V		-	24.4	-	nC

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

				Min.	Typ.	Max.	
Turn-on delay time	t_{don}	$V_{DS}=325V, I_D=8A, R_G=25\Omega, V_{GS}=0$ to 10V		-	19	-	ns
Rise time	t_r			-	21	-	ns
Turn-off delay time	t_{doff}			-	80	-	ns
Fall time	t_f			-	30	-	ns

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

				Min.	Typ.	Max.	
Forward voltage	V_{SD}	$I_{SD}=8A, V_{GS}=0V$		-	-	1.4	V
Reverse recovery time	t_{rr}	$V_{DS}=50V, I_S=8A,$		-	280	-	ns
Reverse recovery current	I_{rr}	$V_{GS}=10V$		-	12	-	A
Recovery charge	Q_{rr}	$di/dt=100A/\mu s$		-	1.7	-	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 $V_{DD}=50V, V_{GS}=10V, L=10mH, I_{AS}=4.6A, T_C=25^\circ C$.
3. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

TYPICAL CHARACTERISTICS

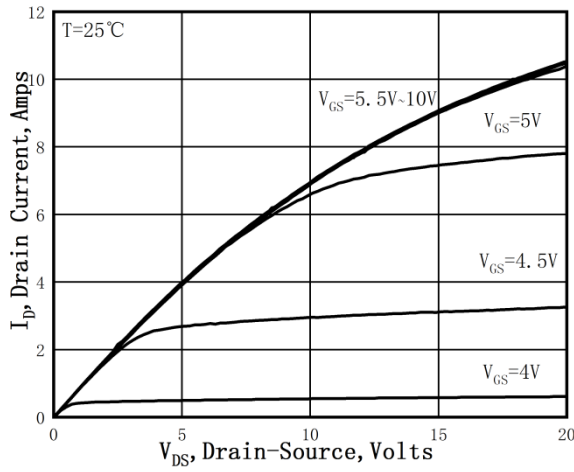


Figure 1. On-Region Characteristics

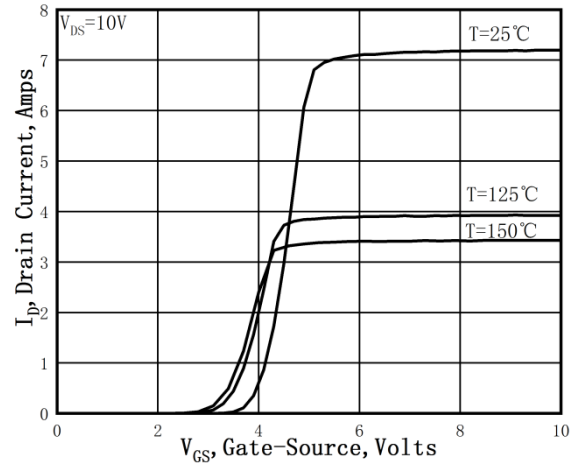


Figure 2. Transfer Characteristics

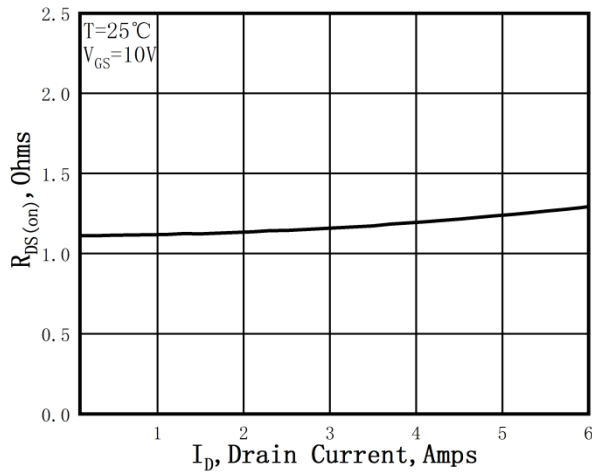


Figure 3. Static Drain-Source On Resistance

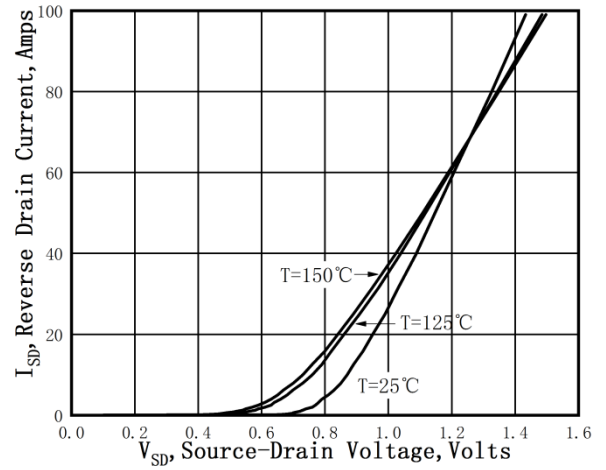


Figure 4. Typical Body Diode Transfer Characteristics

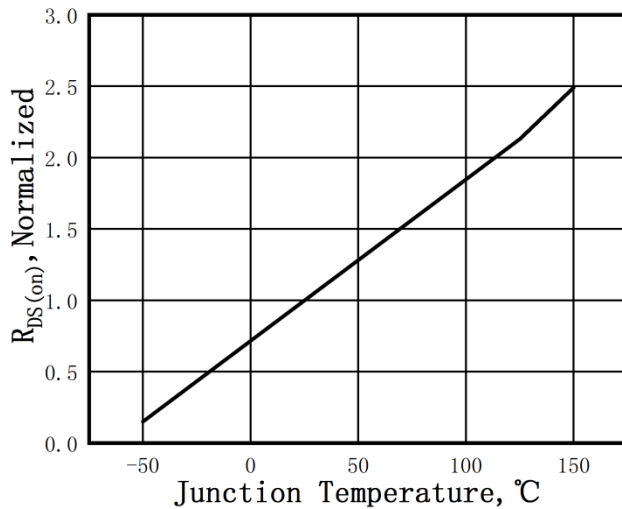


Figure 5. Normalized $R_{DS(on)}$ vs. Temperature

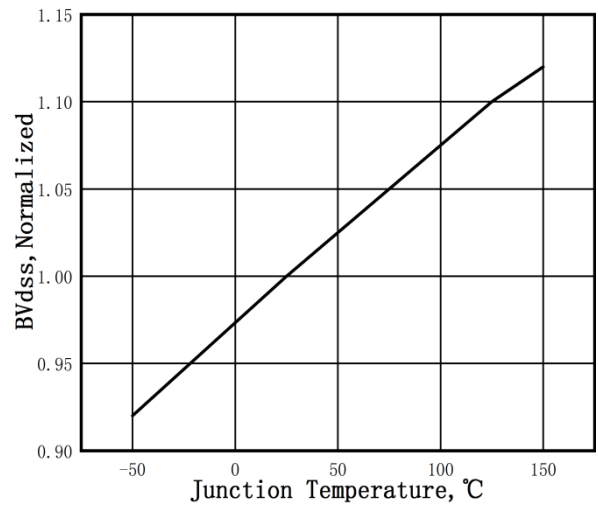


Figure 6. Normalized BV_{DSS} vs. Temperature

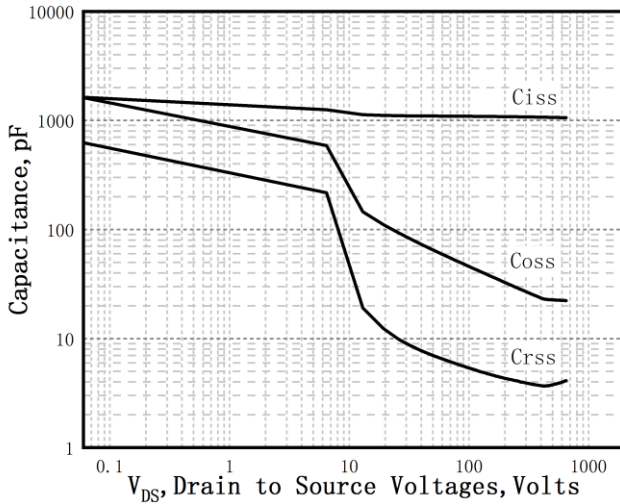


Figure 7. Capacitance Characteristics

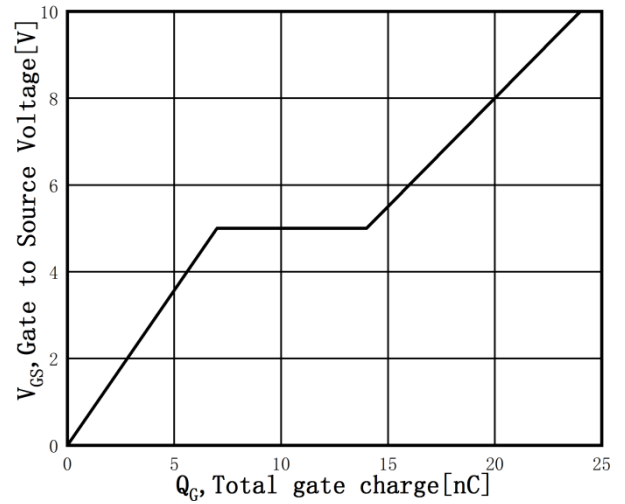


Figure 8. Gate Charge Characteristics

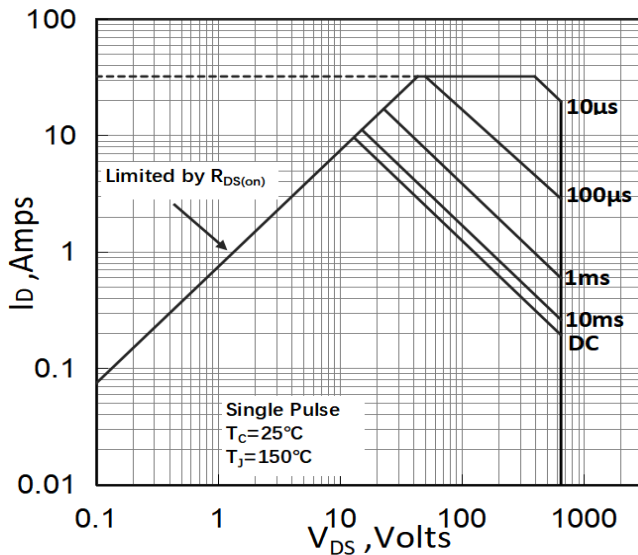


Figure 9. Maximum Safe Operating Area (TO-220)

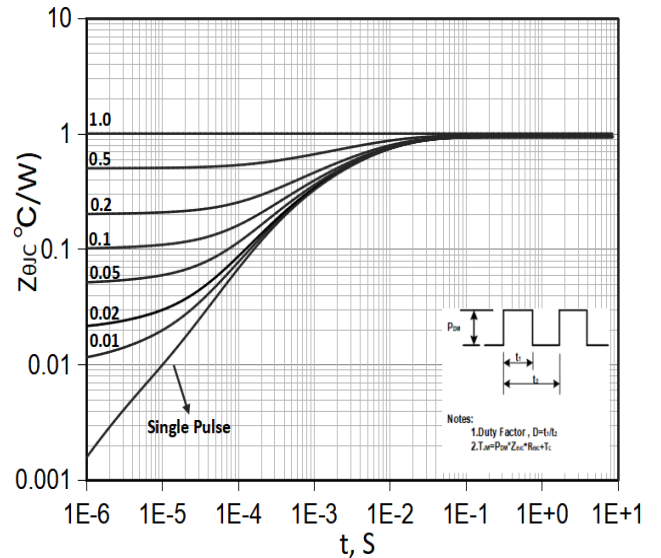


Figure 10. Transient Thermal Response Curve (TO-220)

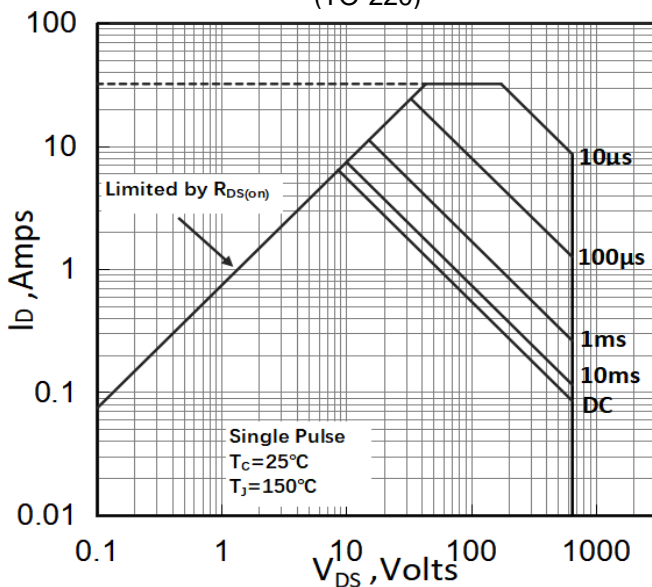


Figure 11. Maximum Safe Operating Area (TO-252/TO-251)

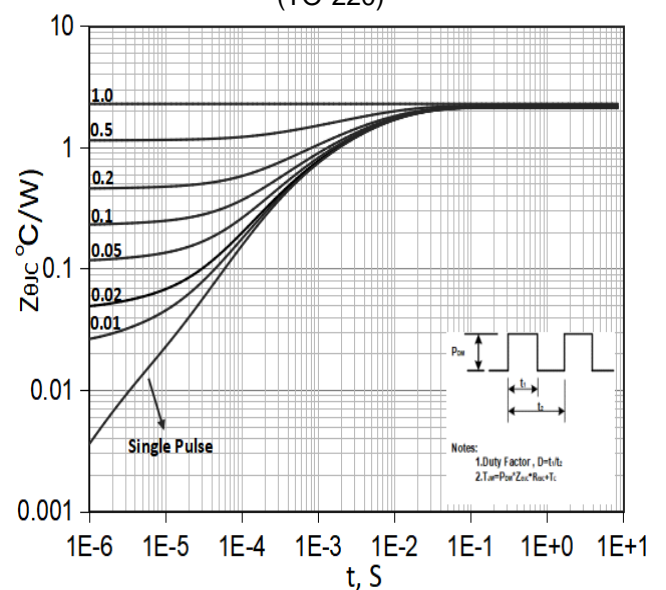


Figure 12. Transient Thermal Response Curve (TO-252/TO-251)

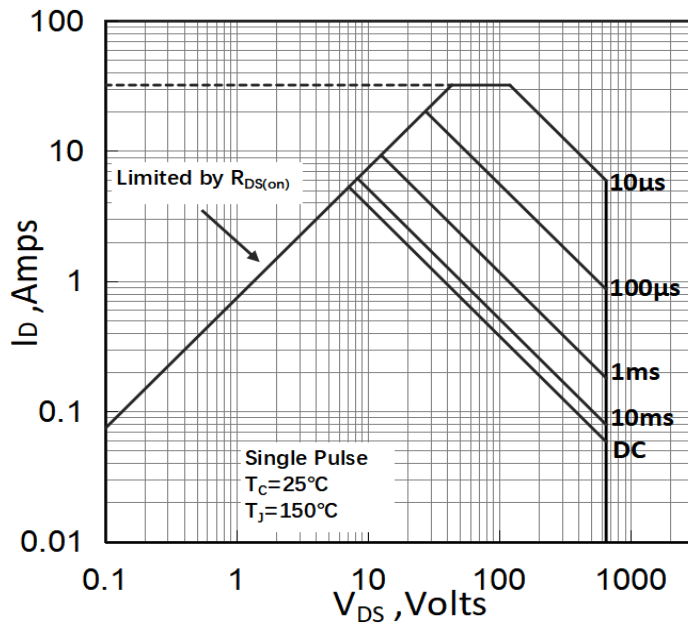


Figure 13. Maximum Safe Operating Area (TO-220F)

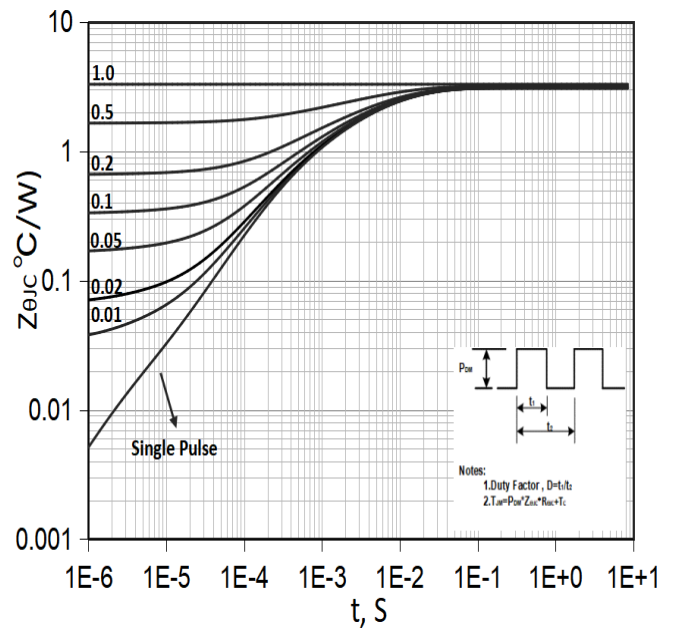
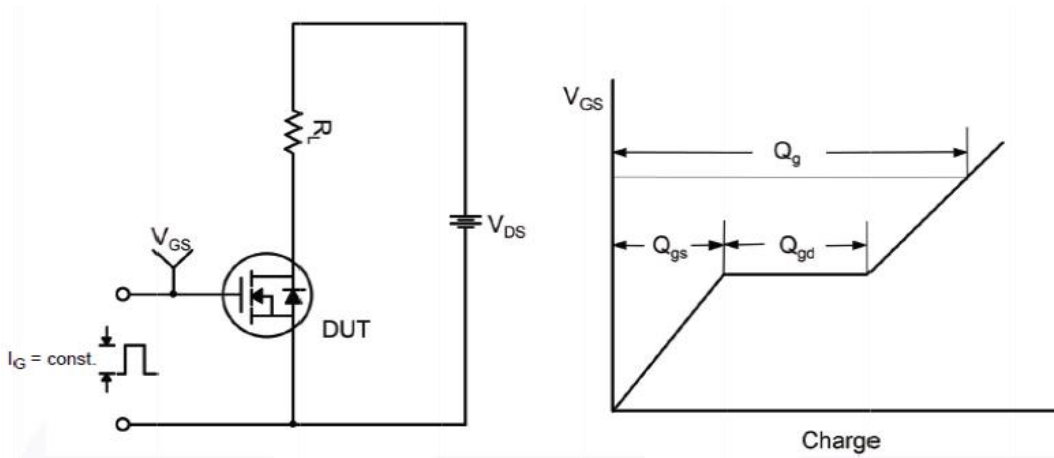


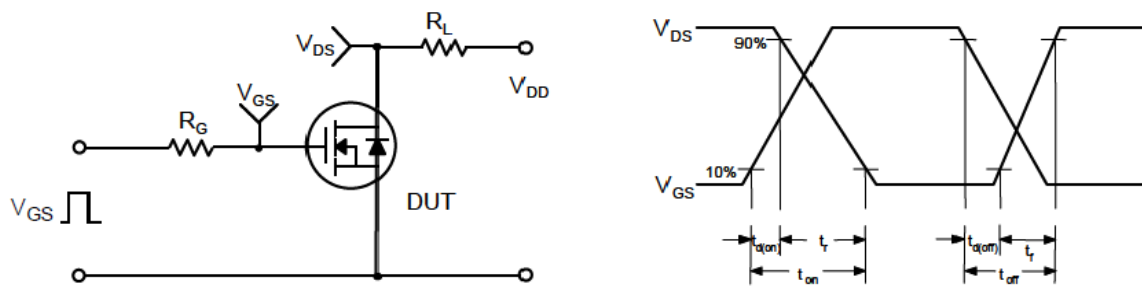
Figure 14. Transient Thermal Response Curve (TO-220F)

Test Circuit

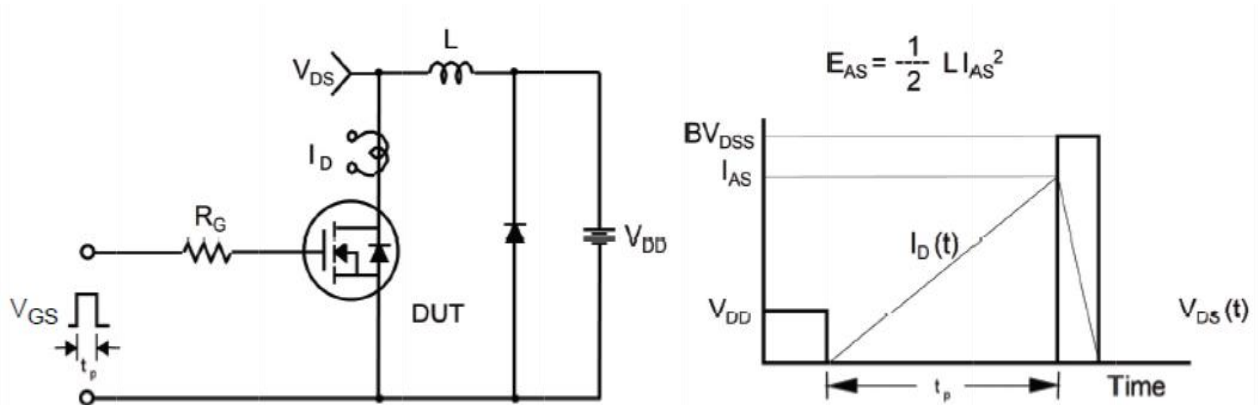
Gate Charge Test Circuit & Waveform



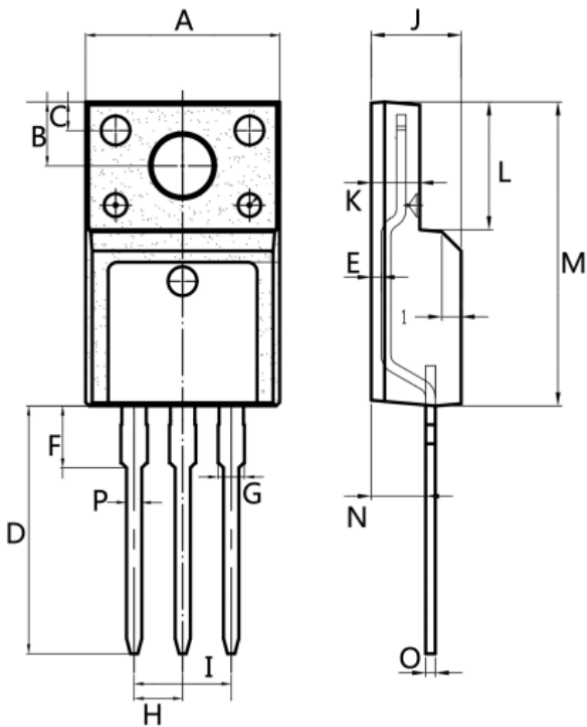
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



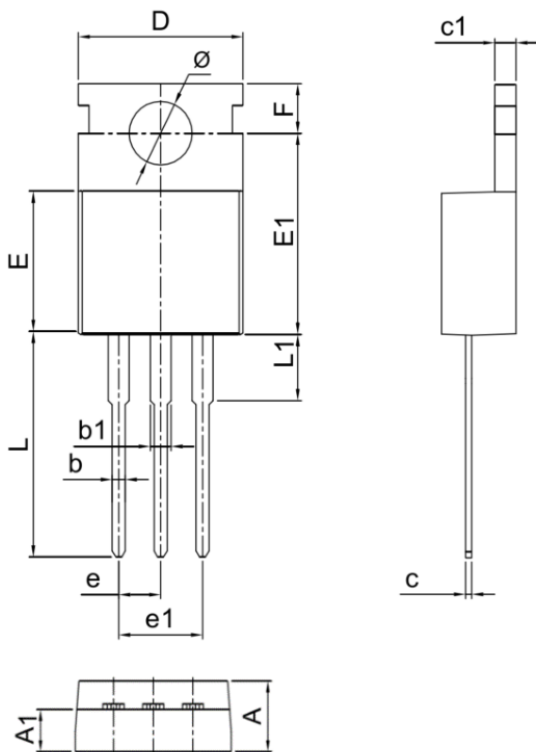
Mechanical Dimensions for TO-220F



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

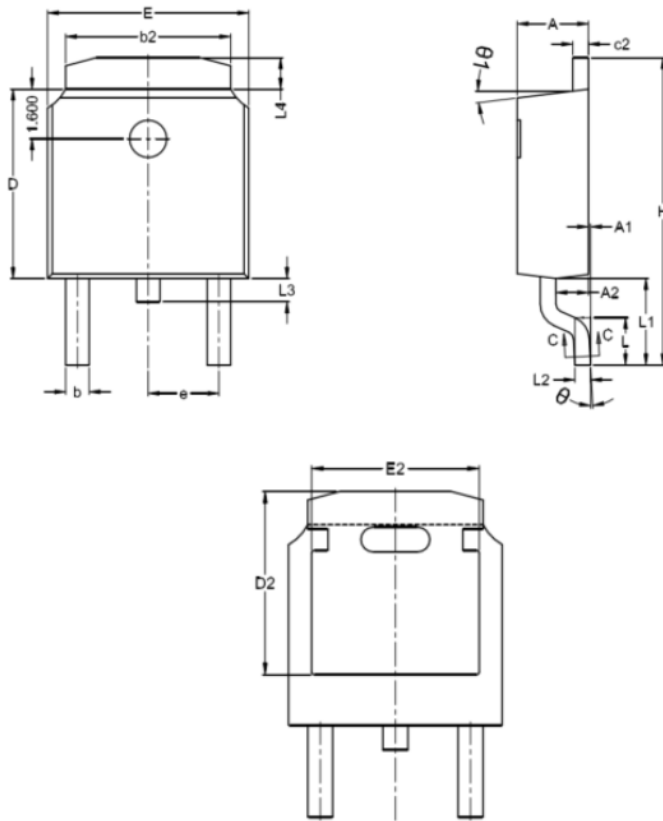
Mechanical Dimensions for TO-220



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

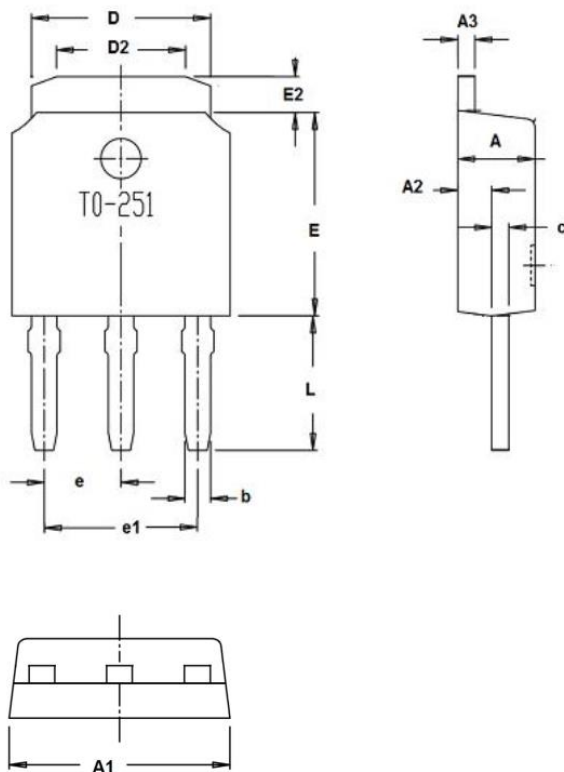
Mechanical Dimensions for TO-252



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	2.10	2.50
A1	0	0.15
b	0.7	0.9
b2	5.13	5.54
c	0.44	0.65
c2	0.45	0.65
D	6.00	6.20
D2	5.37	5.78
E	6.30	6.90
E2	4.90	5.30
e	2.23	2.33
H	9.7	10.5
L	1.38	1.73
L1	2.58	3.00
L2	0.50	0.52
L3	0.60	1.00
L4	0.81	1.42

Mechanical Dimensions for TO-251-L4.0

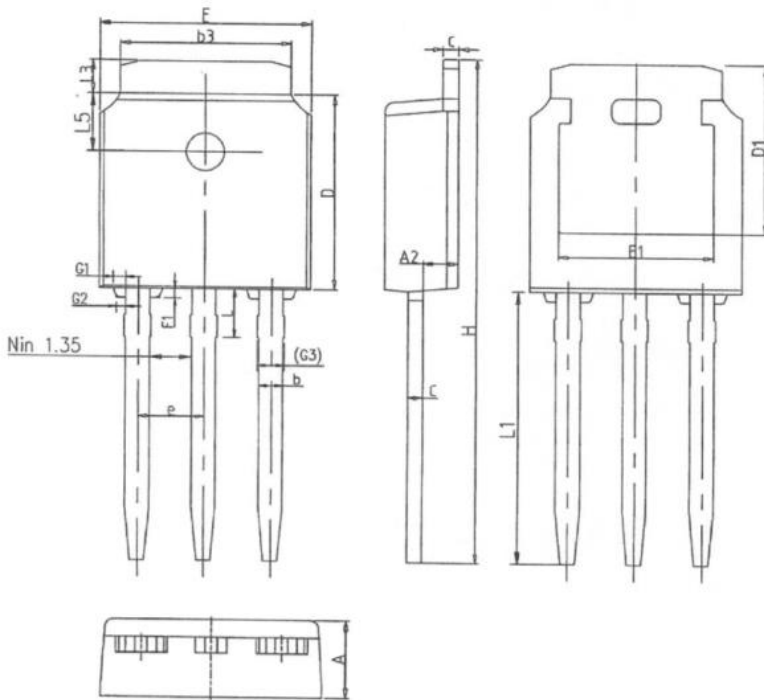


COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	2.15	2.45
A1	6.3	6.9
A2	0.9	1.1
A3	Typ0.5	
b	0.74	0.86
c	0.9	1.1
D	5.33	5.53
D2	3.56	4.05
E	6.0	6.2
e	Typ2.29	
e1	Typ4.58	
L	3.7	4.3

Mechanical Dimensions for TO-251-L9.4

COMMON DIMENSIONS



SYMBOL	MM	
	MIN	MAX
A	2.20	2.40
A2	0.97	1.17
b	0.58	0.78
b3	5.20	5.50
c	0.43	0.63
D	5.98	6.22
D1	5.30REF	
E	6.40	6.80
e	1.98	2.59
F1	0.23	0.37
G2	0.33	0.47
G3	0.64	0.80
H	16.22	16.82
L1	9.15	9.65
L3	0.88	1.28

Ordering Information

Part	Package	Marking	Packing method	Minimum packing number
DTP8N65F	TO-220F	DTP8N65F	Tube	50 / Tube
DTP8N65	TO-220	DTP8N65	Tube	50 / Tube
DTU8N65	TO-252	DTU8N65	Tape and reel	2.5K / Reel
DTL8N65	TO-251-L4.0	DTL8N65	Tube	80 / Tube
	TO-251-L9.4		Tube	75 / Tube

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