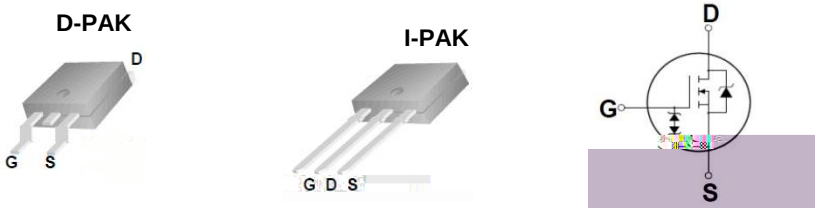
TMD830AZ(G)/TMU830AZ(G)

N-channel MOSFET

BV_{DSS}	I_D	$R_{DS(on)}$
500V	4.5A	< 1.5Ω

Features

- Low gate charge
- 100% avalanche tested
- Improved dv/dt capability
- RoHS compliant
- Halogen free package
- JEDEC Qualification
- Improved ESD performance



Device	Package	Marking	Remark
TMD830AZ / TMU830AZ	D-PAK/I-PAK	TMD830AZ / TMU830AZ	RoHS
TMD830AZG / TMU830AZG	D-PAK/I-PAK	TMD830AZG / TMU830AZG	Halogen Free

Absolute Maximum Ratings

Parameter		Symbol	TMD830AZ(G)/TMU830AZ(G)	Unit
Drain-Source Voltage		V_{DSS}	500	V
Gate-Source Voltage		V_{GS}	30	V
Continuous Drain Current	T_C = 25	I_D	4.5	A
	T_C = 100		3.27	A
Pulsed Drain Current (Note 1)		I_{DM}	18	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	254	mJ
Repetitive Avalanche Current (Note 1)		I_{AR}	4.5	A
Repetitive Avalanche Energy (Note 1)		E_{AR}	9.84	mJ
Power Dissipation	T_C = 25	P_D	98.4	W
	Derate above 25		0.78	W/
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.5	V/ns
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55~150	
Maximum lead temperature for soldering purposes,		T_L	300	

* Limited only by maximum junction temperature

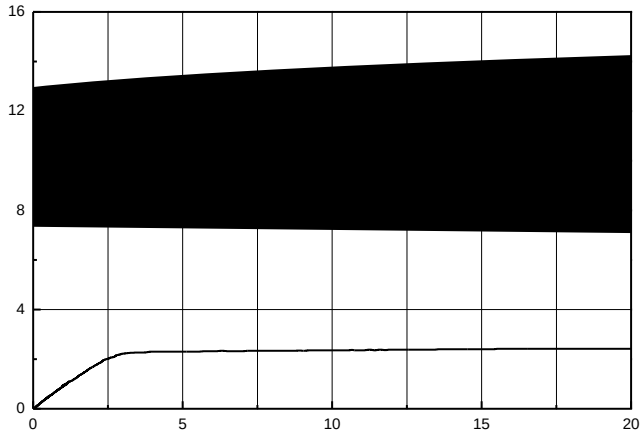
Thermal Characteristics

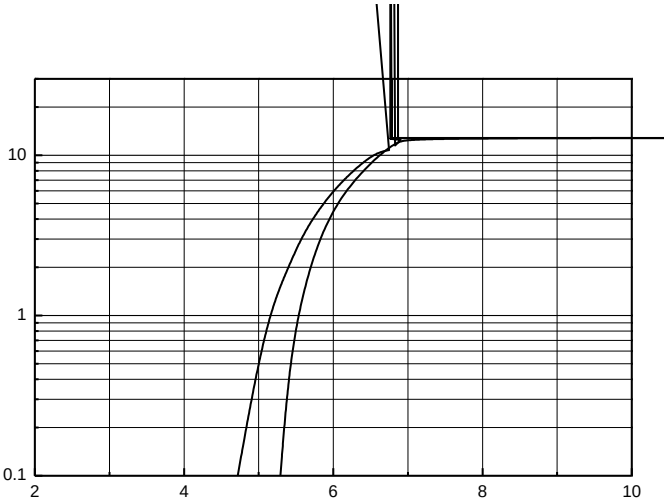
Parameter	Symbol	TMD830AZ(G)/TMU830AZ(G)	Unit
Maximum Thermal resistance, Junction-to-Case	$R_{\theta JC}$	1.27	/W
Maximum Thermal resistance, Junction-to-Ambient	$R_{\theta JA}$	110	/W

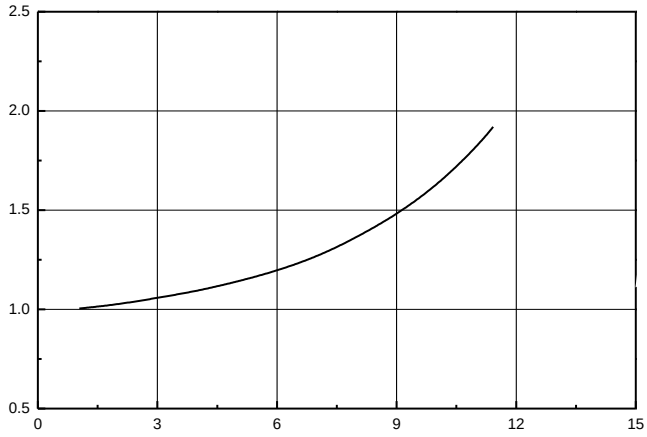
Electrical Characteristics : T_C=25 , unless otherwise noted

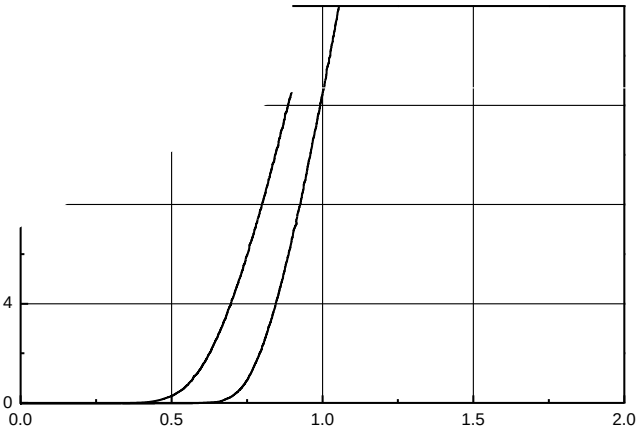
Parameter	Symbol	Test condition	Min	Typ	Max	Units
OFF						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250 µA	500	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 500 V, V_{GS} = 0 V	--	--	1	µA
		V_{DS} = 400 V, T_C = 125°C	--	--	10	µA
Forward Gate-Source Leakage Current	I_{GSSF}	V_{GS} = 30 V, V_{DS} = 0 V	--	--	100	µA
Reverse Gate-Source Leakage Current	I_{GSSR}	V_{GS} = -30 V, V_{DS} = 0 V	--	--	-100	µA
ON						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	3	--	5	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 2.25 A	--	1.2	1.5	Ω
Forward Transconductance (Note 4)	g_{FS}	V_{DS} = 30 V, I_D = 2.25 A	--	6	--	S
DYNAMIC						
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	645	--	pF
Output Capacitance	C_{oss}		--	78	--	pF
Reverse Transfer Capacitance	C_{rss}		--	11	--	pF
SWITCHING						
Turn-On Delay Time (Note 4,5)	$t_{d(on)}$	V_{DD} = 250 V, I_D = 4.5 A, R_G = 25	--	19	--	ns
Turn-On Rise Time (Note 4,5)	t_r		--	28	--	ns
Turn-Off Delay Time (Note 4,5)	$t_{d(off)}$		--	49	--	ns
Turn-Off Fall Time (Note 4,5)	t_f		--	19	--	ns
Total Gate Charge (Note 4,5)	Q_g	V_{DS} = 400 V, I_D = 4.5 A, V_{GS} = 10 V	--	15	--	nC
Gate-Source Charge (Note 4,5)	Q_{gs}		--	3	--	nC
Gate-Drain Charge (Note 4,5)	Q_{gd}		--	7	--	nC
SOURCE DRAIN DIODE						
Maximum Continuous Drain-Source Diode Forward Current	I_S	----	--	--	4.5	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}	----	--	--	18	A
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 4.5 A	--	--	1.5	V
Reverse Recovery Time (Note 4)	t_{rr}	V_{GS} = 0 V, I_S = 4.5 A, dI_F / dt = 100 A/µs	--	260	--	ns
Reverse Recovery Charge (Note 4)	Q_{rr}		--	1.4	--	µC

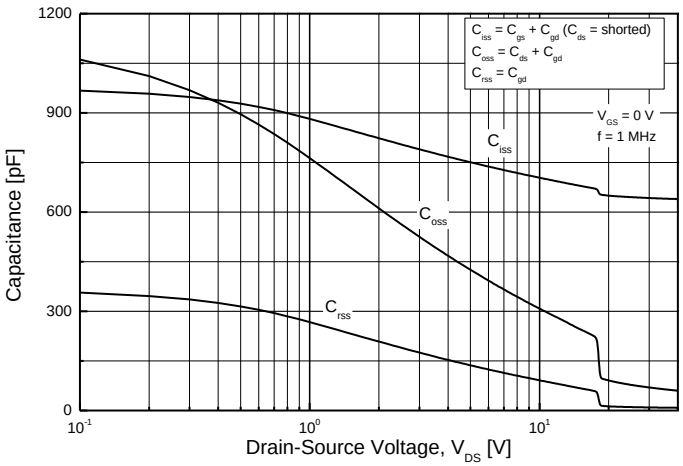
Note :
1. Repeated rating : Pulse width limited by safe operating area
2. L=22.6mH, I_{AS} = 4.5A, V_{DD} = 50V, R_G = 25 , Starting T_J= 25
3 I_{SD} 4.5A, di/dt µs , V_{DD} $_{DS}$, Starting T_J= 25
µ
5. Essentially Independent of Operating Temperature Typical Characteristics

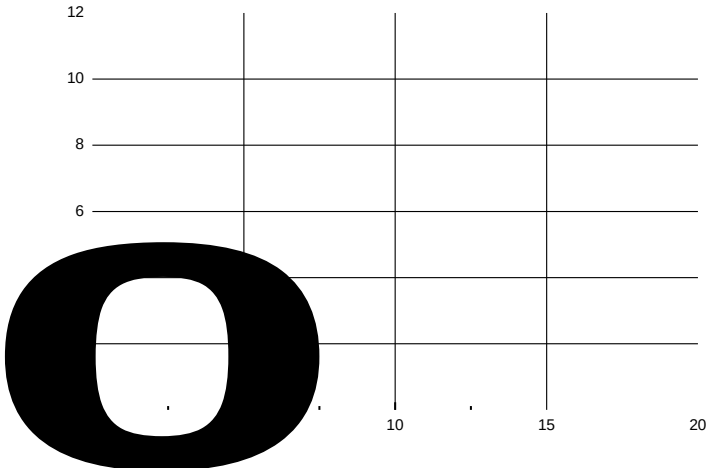

16
12
8
4
0
0
5
10
15
20

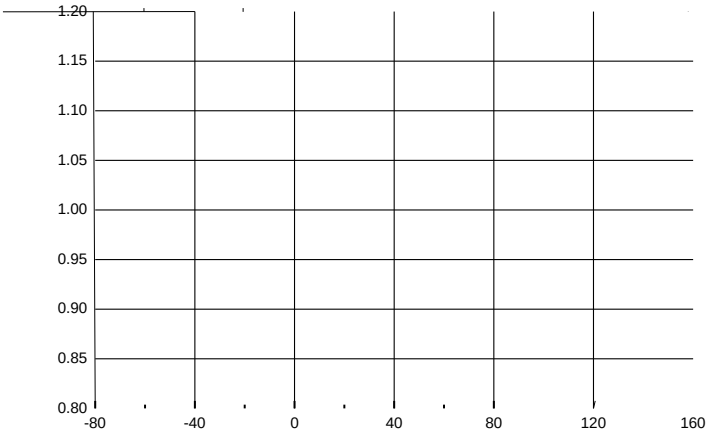

10
1
0.1
2
4
6
8
10

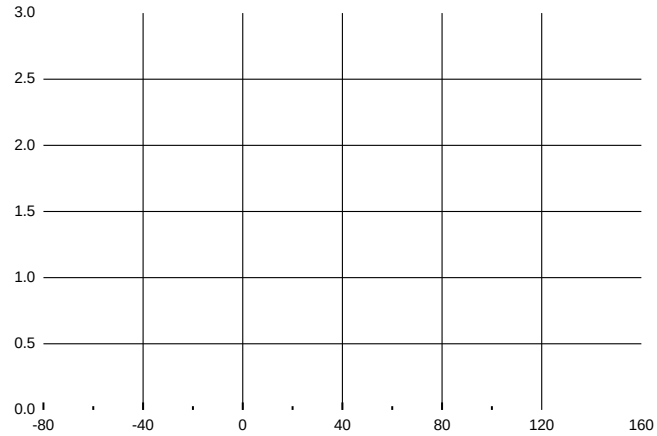

2.5
2.0
1.5
1.0
0.5
0
3
6
9
12
15

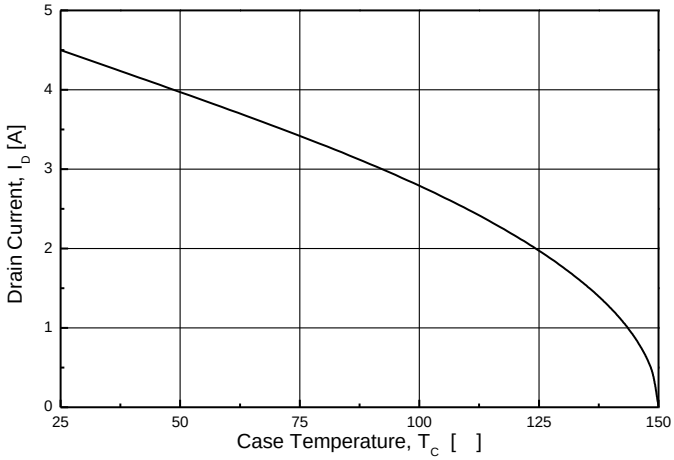

4
0
0.0
0.5
1.0
1.5
2.0

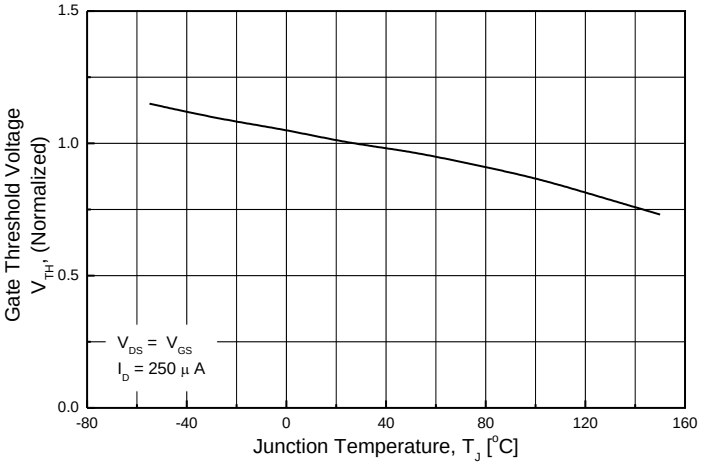

1200
900
600
300
0
Capacitance [pF]
$C_{iss} = C_{gs} + C_{gd}$ (C_{ds} = shorted)
$C_{oss} = C_{ds} + C_{gd}$
$C_{rss} = C_{gd}$
V_{GS} = 0 V
f = 1 MHz
C_{iss}
C_{oss}
C_{rss}
10^{-1}
10^{0}
10^{1}
Drain-Source Voltage, V_{DS} [V]

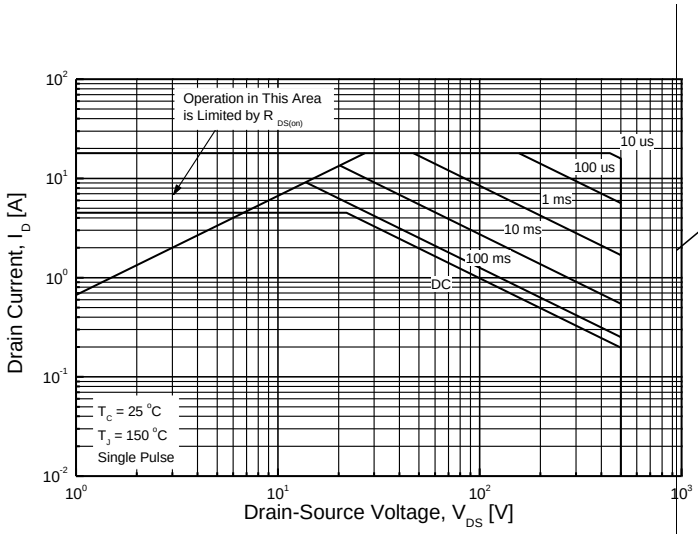

12
10
8
6
10
15
20

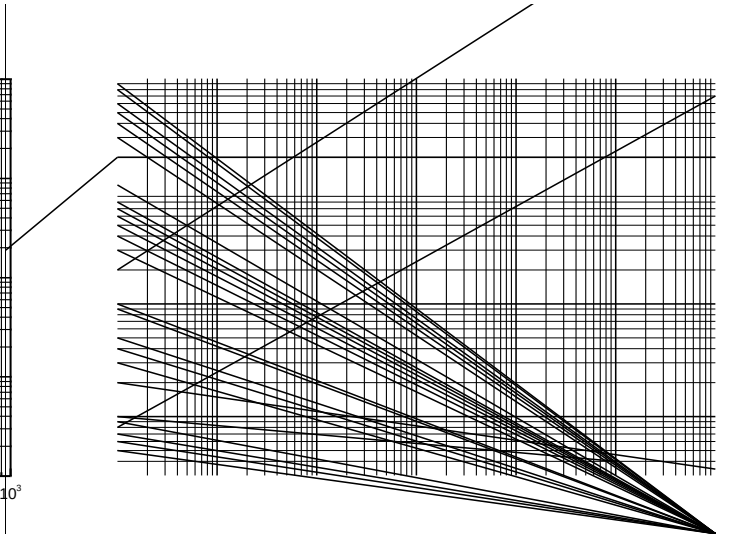

1.20
1.15
1.10
1.05
1.00
0.95
0.90
0.85
0.80
-80
-40
0
40
80
120
160


3.0
2.5
2.0
1.5
1.0
0.5
0.0
-80
-40
0
40
80
120
160

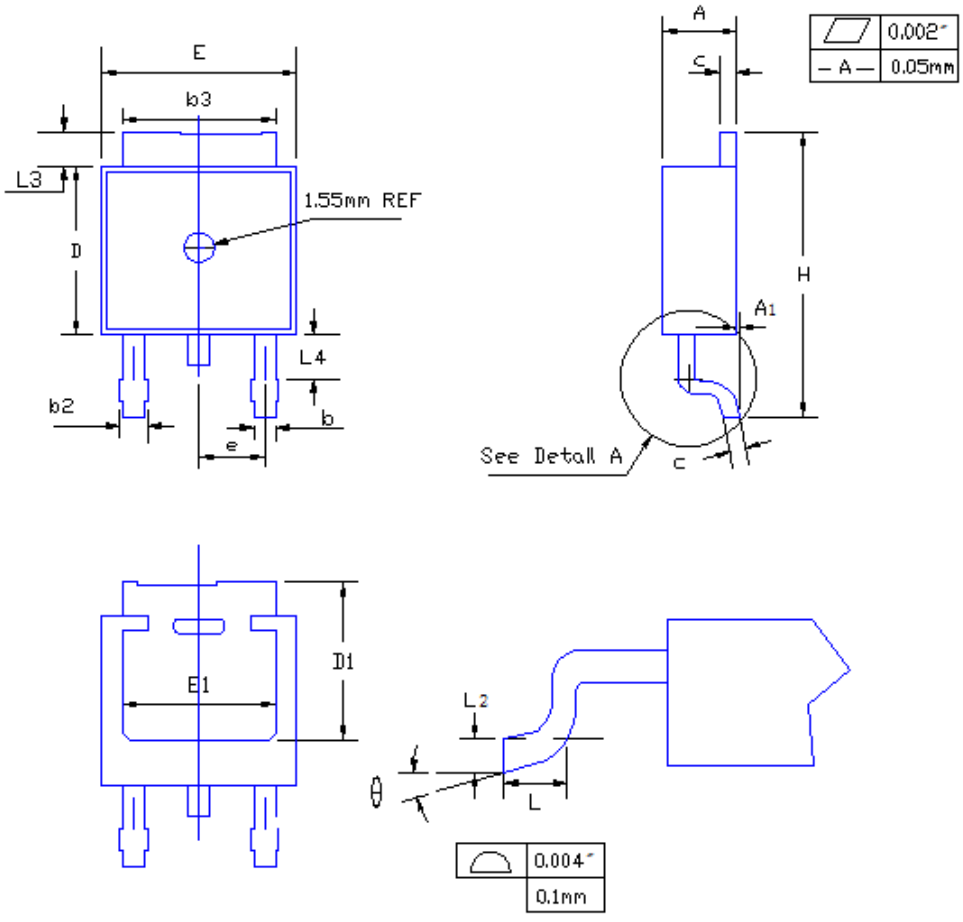

Drain Current, I_D [A]
5
4
3
2
1
0
25
50
75
100
125
150
Case Temperature, T_C [ ]


Gate Threshold Voltage
V_{TH}, (Normalized)
1.5
1.0
0.5
0.0
V_{DS} = V_{GS}
I_D = 250 μ A
-80
-40
0
40
80
120
160
Junction Temperature, T_J [°C]


Drain Current, I_D [A]
10^2
10^1
10^0
10^{-1}
10^{-2}
Operation in This Area
is Limited by $R_{DS(on)}$
10 us
100 us
1 ms
10 ms
100 ms
DC
T_C = 25 °C
T_J = 150 °C
Single Pulse
10^0
10^1
10^2
10^3
Drain-Source Voltage, V_{DS} [V]

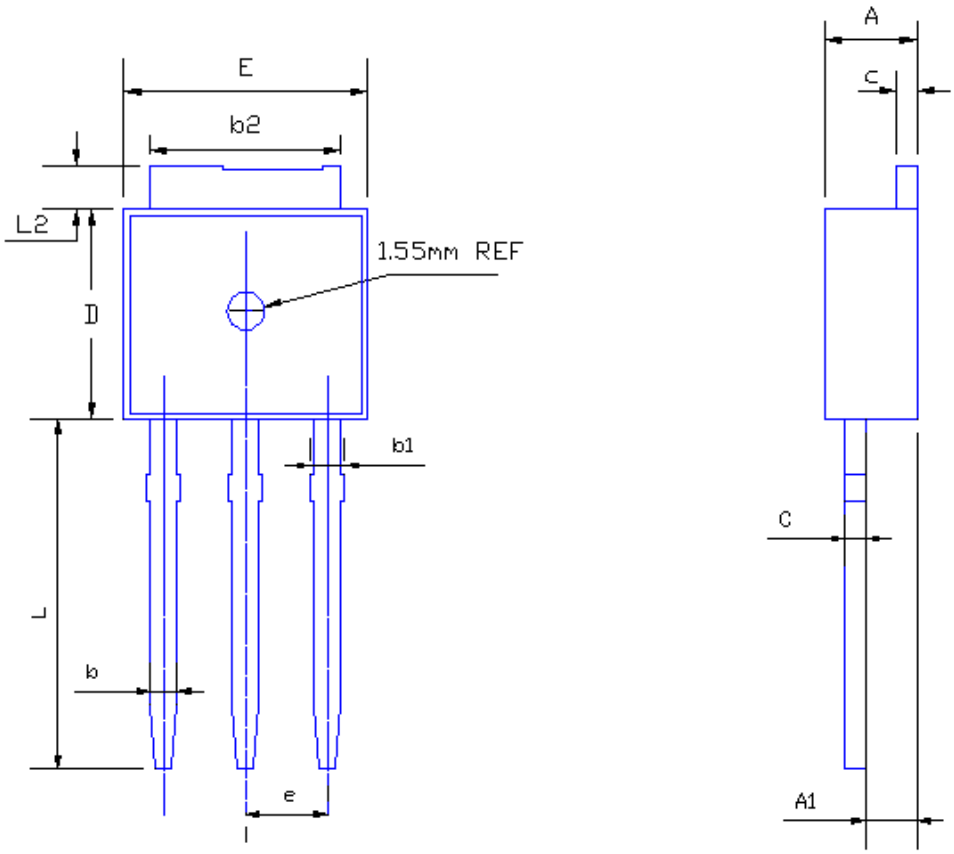


TO-252 (D-PAK) MECHANICAL DATA



SYMBOL	MILLIMETERS	
	MIN	MAX
A	2.19	2.38
A1	–	0.13
b	0.64	0.89
b2	0.84	1.14
b3	5.21	5.46
c	0.46	0.61
D	5.97	6.22
D1	5.21	—
E	6.35	6.73
E1	4.83	—
e	2.29BSC	
H	9.65	10.41
L	1.40	1.78
L2	0.51BSC	
L3	0.89	1.27
L4	0.64	1.01
θ	0	8

TO-251 (I-PAK) MECHANICAL DATA



SYMBOL	MILLIMETERS	
	MIN	MAX
A	2.19	2.38
A1	1.04	1.23
b	0.64	0.89
b1	0.84	1.14
b2	5.23	5.48
c	0.46	0.61
D	5.91	6.28
E	6.21	6.59
e	2.28 TYP	
L	8.89	9.65
L2	0.89	1.27