7A, 650V N-CHANNEL POWER MOSFET

Features

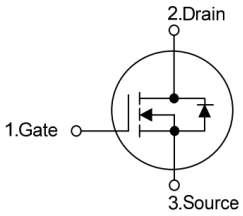
- $R_{DS(on)}$=1.45Ω(Max.) @V_{GS}=10V,I_D=3.5A
- Low gate charge
- Low Ciss
- Fast switching

TO220F

TO252

Applications

- LED Power Supplies
- Cell Phone Charger
- Standby Power



Key Performance and Package Parameters

Order codes	V_{DS}	I_D	$R_{DS(ON)}$, Typ	T_{vjmax}	Marking	Package
XD007M065BX1H3	650V	7A	1.1Ω	150℃	D7M65BX1	TO220F-3L
XD007M065BX1G3	650V	7A	1.1Ω	150℃	D7M65BX1	TO252-2L

Absolute Maximum Ratings (T_c= 25℃ unless otherwise noted.)

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	650	V
V_{GSS}	Gate-Source Voltage	±30	V
I_D	Continuous Drain Current (T_C=25 ℃)	7	A
	Continuous Drain Current (T_C=100℃)	3.5	A
I_{DM}	Pulsed Drain Current	28	A
P_D	Maximum Power Dissipation (TC=25 ℃)	35.2	W
	Maximum Power Dissipation (TC=100℃)	14	W
E_{AS}	Avalanche Energy, Single pulse(L=30mH) (note1)	333	mJ
T_J	Operating Junction Temperature Range	-55 to 150	℃
T_{STG}	Storage Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Condition	Max.	Units
$R_{\theta JC}$	Thermal Resistance-Junction to case (Steady State)	TO-220F-3L	3.55	℃/W
$R_{\theta JC}$	Thermal Resistance-Junction to case (Steady State)	TO-252-2L	1.25	℃/W

Electrical Characteristics (T_c= 25℃ unless otherwise noted.)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}= 0V, I_{DS}= 250uA	650	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=650V, V_{GS}=0V	---	---	1.0	uA
I_{GSS}	Gate Leakage Current, Forward	V_{GS}=30V, V_{DS}= 0V	---	---	100	nA
	Gate Leakage Current, Reverse	V_{GS}= -30V, V_{DS}= 0V	---	---	-100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_{DS}= 250uA	2	3	4	V
$R_{DS(ON)}$	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=3.5A	--	1.1	1.45	Ω
Qg	Total Gate Charge	V_{DS}=520V	---	22.1	---	nC
Qgs	Gate-Source Charge	V_{GS}=10V	---	5.8	---	nC
Qgd	Gate-Drain Charge	I_{DS}=7A	---	5.4	---	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=325V, V_{GE}=10V	---	15.6	---	nS
t_r	Turn-on Rise Time	I_{DS}=7A, R_G=10Ω	--	20.5	--	nS
$t_{d(off)}$	Turn-off Delay Time			35.6	---	nS
t_f	Turn-off Fall Time		---	23.6	---	nS
C_{iss}	Input Capacitance	V_{DS}=25V	---	1205	---	pF
C_{oss}	Output Capacitance	V_{GS}=0V	---	80	---	pF
C_{rss}	Reverse Transfer Capacitance	f = 1MHz	---	23	---	pF

Diode Characteristics of Diode (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V_{SD}	Diode Forward Voltage	ISD=7A, V_{GS}=0V	---	---	1.5	V
t_{rr}	Diode Reverse Recovery Time	V_{DS}=30V,I_{SD}=1A,	---	382	---	ns
Q_{rr}	Diode Reverse Recovery Charge	dI_{SD}/dt=100A/μs	---	1980	---	nC

Notes:

1. L=30mH, V_{DD}=50V, R_G=25Ω, Starting T_J=25℃.

Typical Characteristics

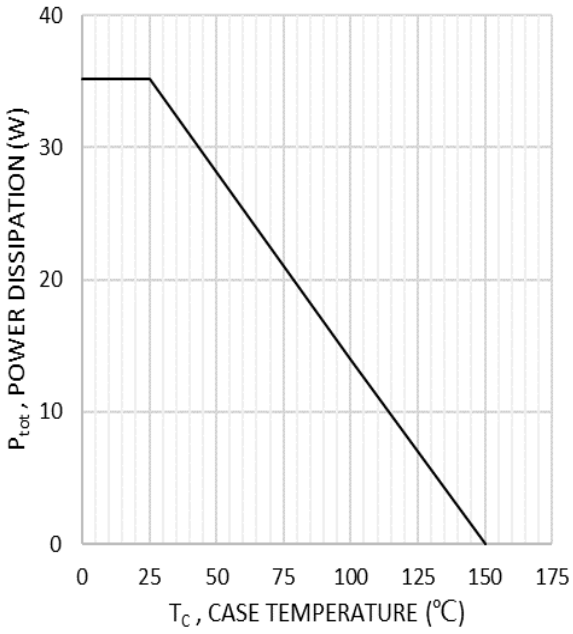


Fig.1 Power Dissipation

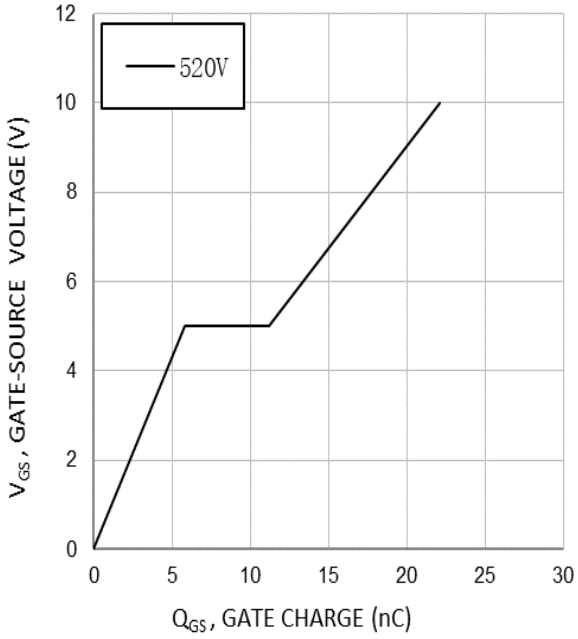


Fig.2 Gate Charge

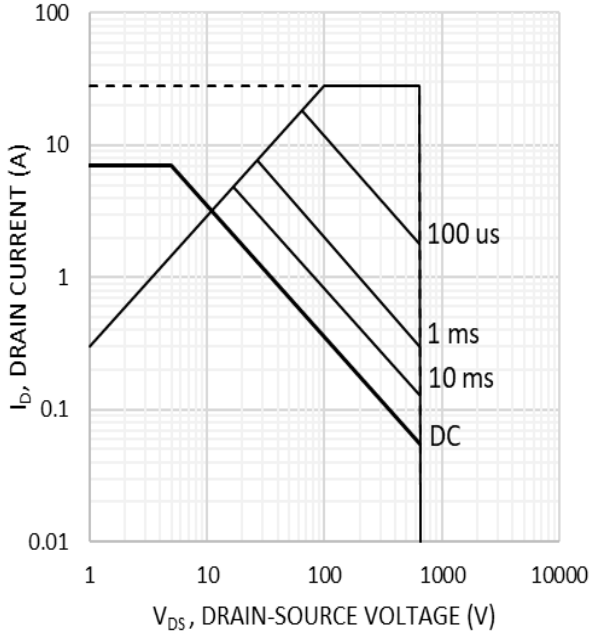


Fig.3 Safe Operation Area

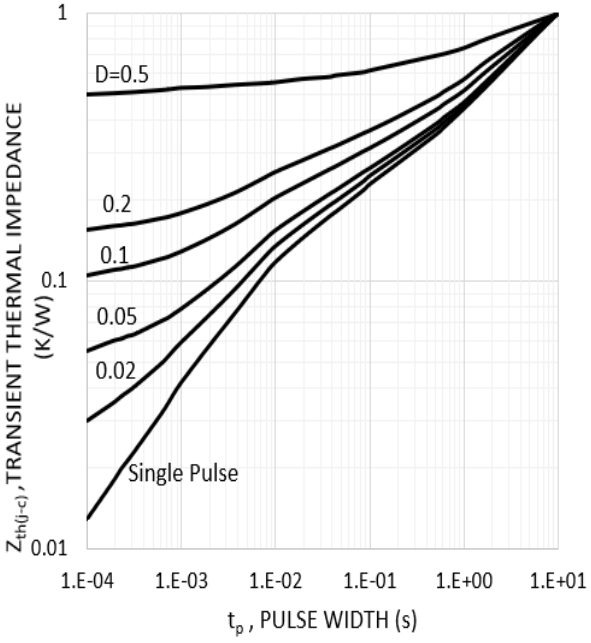


Fig.4 Thermal Transient Impedance

Typical Characteristics

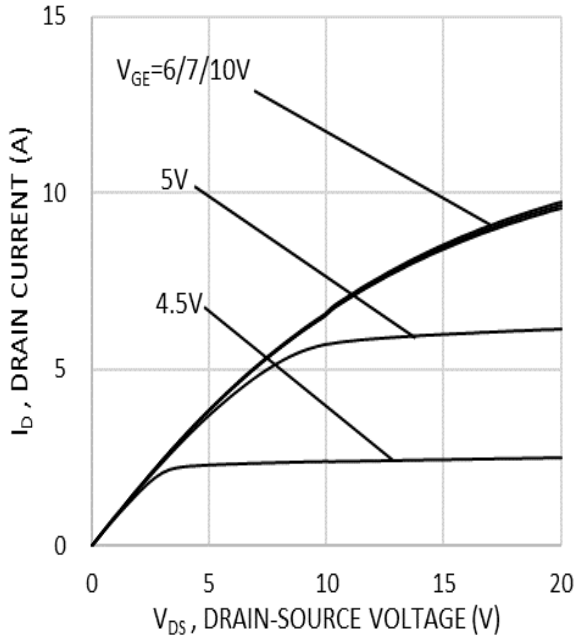


Fig.5 Output Characteristics

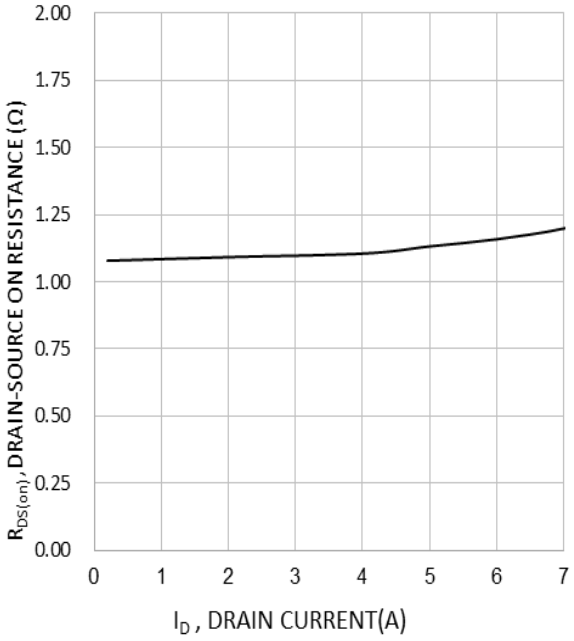


Fig.6 Drain-Source On Resistance

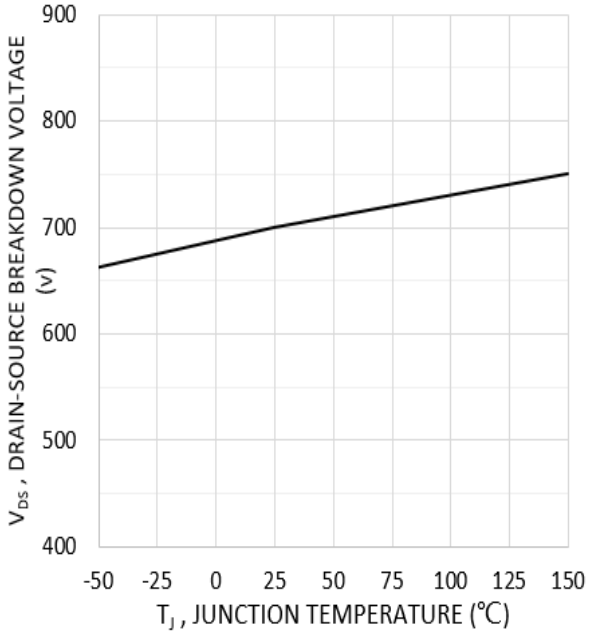


Fig.7 Drain-source Breakdown Voltage

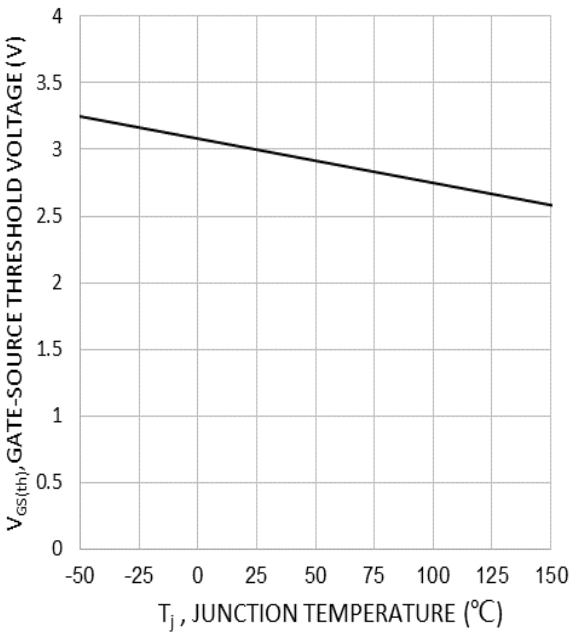


Fig.8 Gate Threshold Voltage

Typical Characteristics

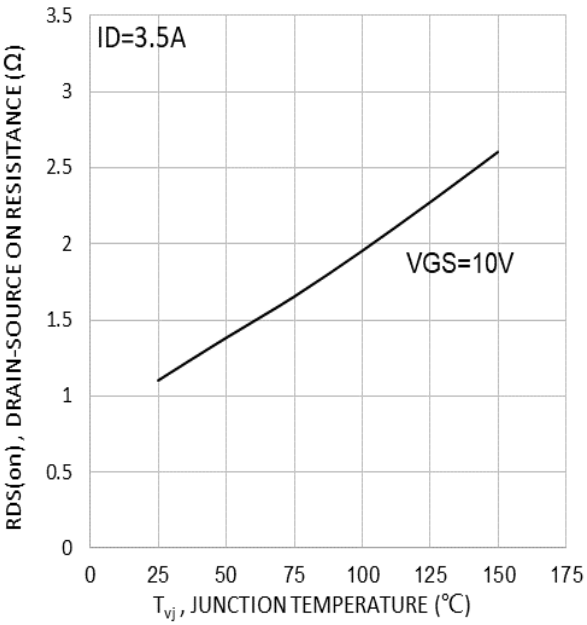


Fig.9 Drain-Source On Resistance

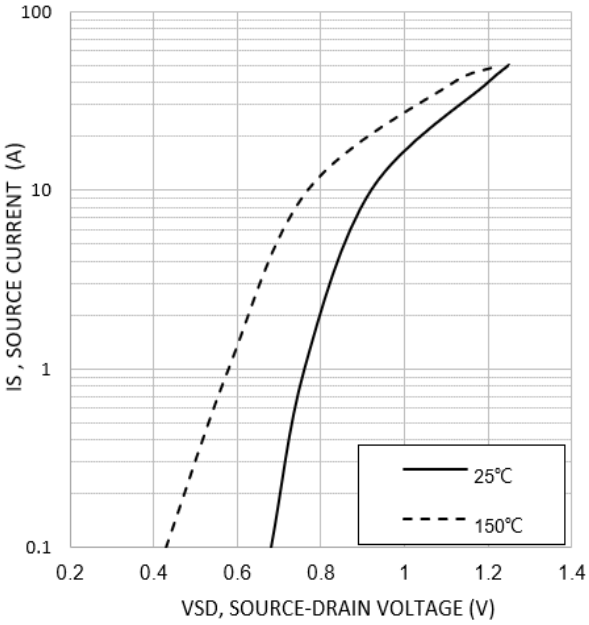


Fig.10 Source-Drain Diode Forward

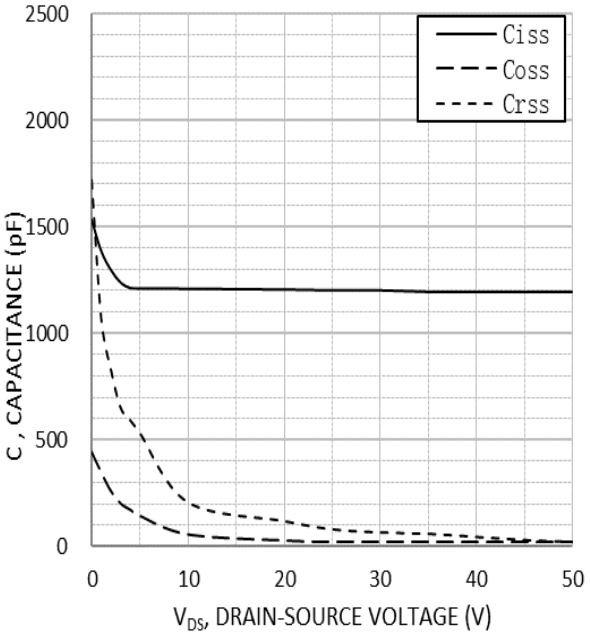
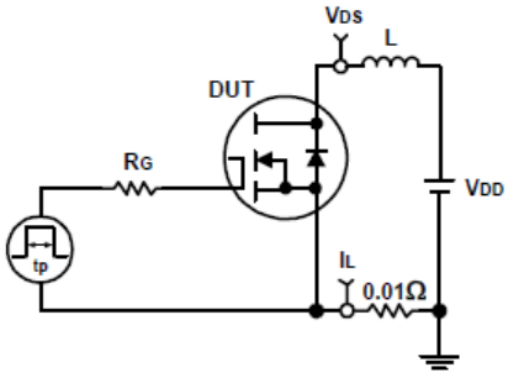
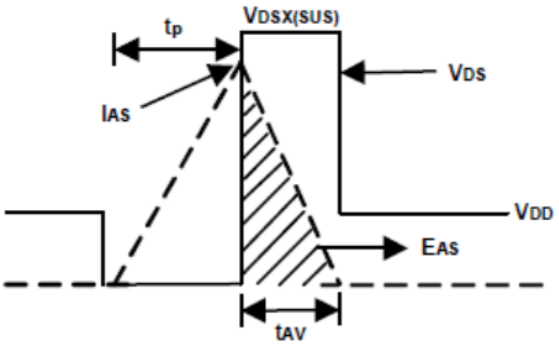


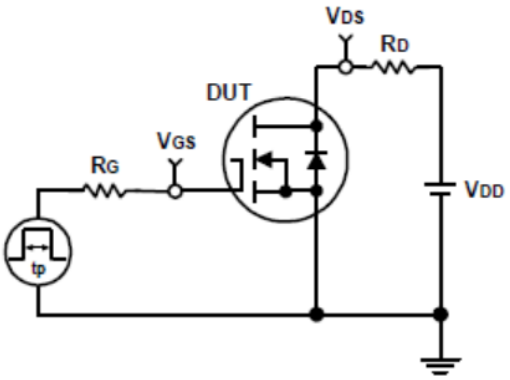
Fig.11 Capacitance

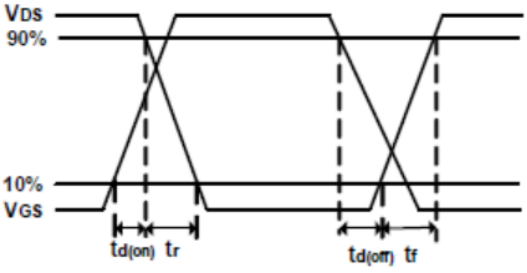
Avalanche Test Circuit and Waveforms





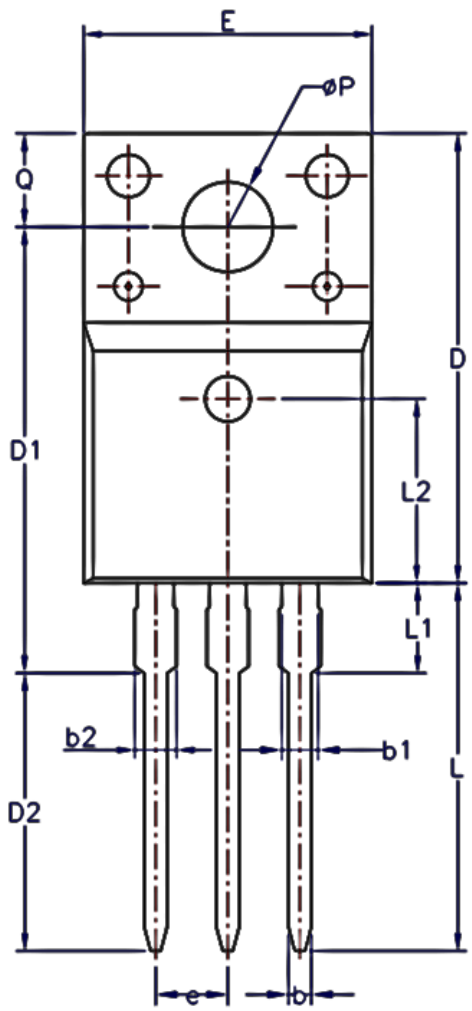
Switching Time Test Circuit and Waveforms

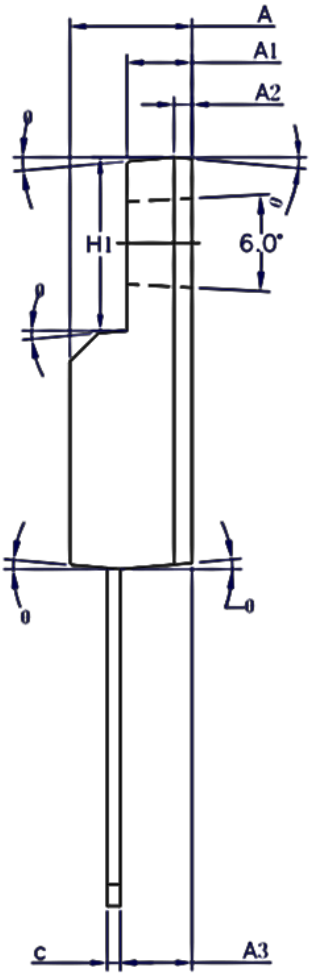


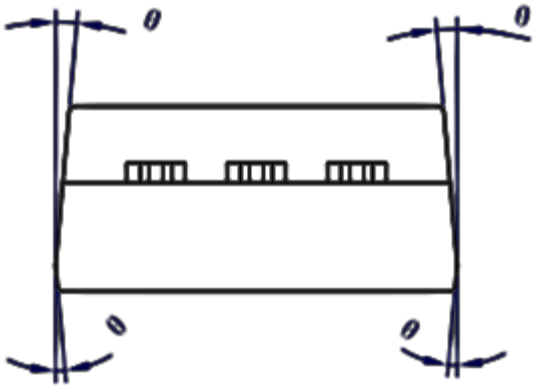


Package Information

TO-220F-3L

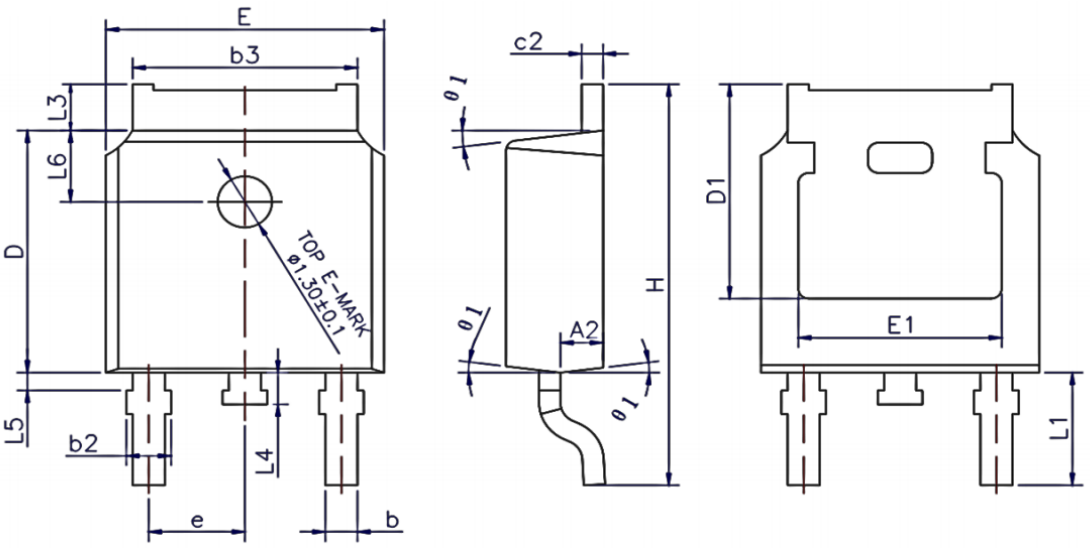


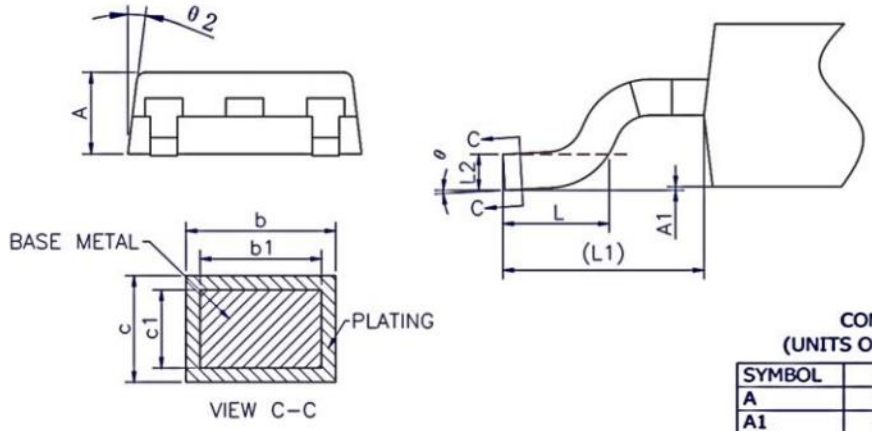




SYMBOL	MIN	NOM	MAX
A	4.50	4.70	4.83
A1	2.34	2.54	2.74
A2		0.70 REF	
A3	2.56	2.76	2.93
b	0.70	–	0.90
b1	1.18	–	1.38
b2	–	–	1.47
c	0.45	0.50	0.60
D	15.67	15.87	16.07
D1	15.55	15.75	15.95
D2	9.60	9.80	10.0
E	9.96	10.16	10.36
e		2.54BSC	
H1	6.48	6.68	6.88
L	12.68	12.98	13.28
L1	–	–	3.50
L2		6.50REF	
øP	3.08	3.18	3.28
Q	3.20	–	3.40
θ1	1°	3°	5°

TO-252-2L





NOTES:
ALL DIMENSIONS REFER TO JEDEC STANDARED TO-252 AA DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS

COMMON DIMENSIONS
(UNITS OF MEASURE =MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0	---	0.10
A2	0.90	1.01	1.10
b	0.72	---	0.85
b1	0.71	0.76	0.81
b2	0.72	---	0.90
b3	5.13	5.33	5.46
c	0.47	---	0.60
c1	0.46	0.51	0.56
c2	0.47	---	0.60
D	6.00	6.10	6.20
D1	5.25	---	---
E	6.50	6.60	6.70
E1	4.70	---	---
e	2.186	2.286	2.386
H	9.80	10.10	10.40
L	1.40	1.50	1.70
L1	2.90 REF		
L2	0.508 BSC		
L3	0.90	---	1.25
L4	0.60	0.80	1.00
L5	0.15	---	0.75
L6	1.80 REF		
θ	0°	---	8°
θ1	5°	7°	9°
θ2	5°	7°	9°

Revision History

Ver.	Date	Change Notice
1.0	2022/05/19	Release