JSD09N20

Single N-Ch 200V Fast Switching MOSFETs

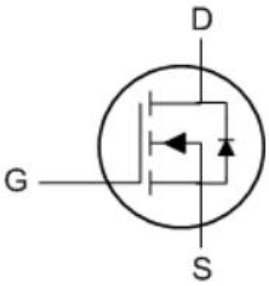
Features

- Proprietary New Planar Technology
- Fast Recovery Body Diode
- Low Gate Charge Minimize Switching Loss

BVDSS		200	V
ID@VGS = 10V , TC = 25 °C		9.0	A
RDSON(MAX)	VGS = 10 V , ID = 4.5 A	300	mΩ

Application

- CRT, TV/Monitor
- Other Applications

Equivalent Circuit	Outline
	**TO-252** 

Package Marking and Ordering Information

Device Marking	Date Code	Device Package	Quantity
D09N20	YWWXXX	TO-252	2500 pcs

Thermal Characteristic

Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	75	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case [1]	1.5	℃/W

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current, V_{GS} @ 10V [1] (T_C=25℃)	9.0	A
	Continuous Drain Current, V_{GS} @ 10V [1] (T_C=100℃)	5.7	
I_{DM}	Pulsed Drain Current [2]	36	A
P_D	Total Power Dissipation [4] (Tc=25℃)	83	W
	Total Power Dissipation [4] (Tc=100℃)	33	
E_{AS}	Single Pulse Avalanche Energy [3]	255	mJ
I_{AS}	Avalanche Current	10.1	A
T_J,T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	℃

Electrical Characteristics (T_J=25℃ unless otherwise noted)

Staic Characteristics						
Symbol	**Parameter**	**Conditions**	**Min**	**Typ**	**Max**	**Unit**
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V , I_D = 250 μA	200			V
$R_{DS(ON)}$	Drain-Source On-State Resistance [2]	V_{GS} = 10 V , I_D = 4.5 A		210	300	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS} , I_D = 250 μA	1.0		2.0	V
I_{DSS}	Drain-Source Leakage Current (T_J=25℃)	V_{DS} = 200 V , V_{GS} = 0V			1	μA
	Drain-Source Leakage Current (T_J=125℃)	V_{DS} = 160 V , V_{GS} = 0V			100	
I_{GSS}	Gate-Body Leakage Current	V_{GS} = ±20 V , V_{DS} = 0V			±100	nA
gfs	Forward Transconductance	V_{DS} = 20 V , I_D = 9 A		9		S

Dynamic Characteristics						
Symbol	**Parameter**	**Conditions**	**Min**	**Typ**	**Max**	**Unit**
C_{iss}	Input Capacitance	V_{DS} = 25V V_{GS} = 0 V f=1.0MHz		974		pF
C_{oss}	Output Capacitance			88		pF
C_{rss}	Reverse Transfer Capacitance			6.4		pF
Switching Times						
Symbol	**Parameter**	**Conditions**	**Min**	**Typ**	**Max**	**Unit**
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 100 V V_{GS} = 10 V R_G = 12 Ω I_D = 9 A		11.6		nS
t_r	Turn-On Rise Time			4.2		nS
$t_{d(off)}$	Turn-Off Delay Time			48.7		nS
t_f	Turn-Off Fall Time			8.9		nS
Q_g	Total Gate Charge (10 V)	V_{DS} = 150 V V_{GS} = 10 V I_D = 9 A		21		nC
Q_{gs}	Gate-Source Charge			2.9		nC
Q_{gd}	Gate-Drain Charge			4.9		nC

Source-Drain Diode Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_S	Continuous Source Current [1,5]	V_G=V_D=0V, Force Current			9.0	A
I_{SM}	Pulsed Source Current [2,5]				36	A
V_{SD}	Diode Forward Voltage [2]	I_S = 9 A, V_{GS}=0V , T_J=25℃			1.5	V
t_{rr}	Reverse Recovery Time	I_F = 9 A , dI/dt = 100A/μs, T_J=25℃		102		nS
Q_{rr}	Reverse Recovery Charge			336		nC

Notes:

1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

2.The data tested by pulsed : Pulse Width ≤ 300μs , Duty Cycle ≤ 2%.

3.The E_{AS} data shows Max. rating . The test condition is V_{DD} = 50V , V_{GS} = 10V , L = 5mH , I_{AS} = 10.1 A.

4.The power dissipation is limited by 150℃ junction temperature.

5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

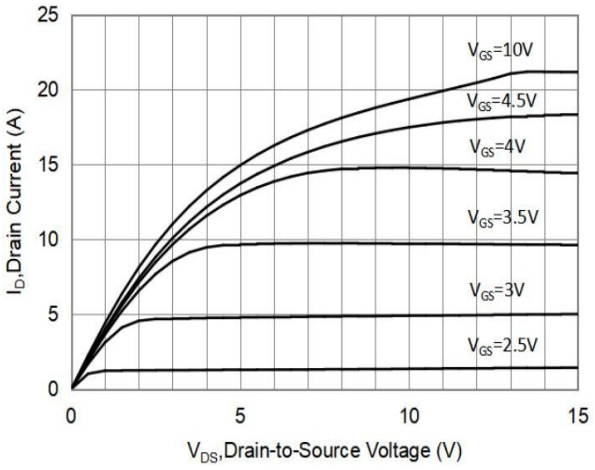


Fig.1 Typical Output Characteristics

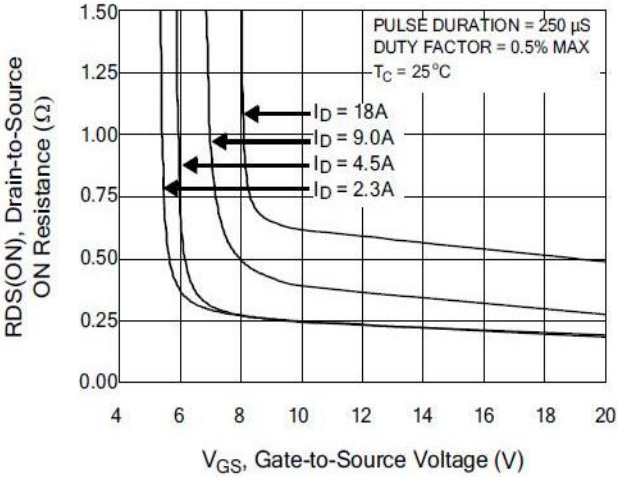


Fig.2 On-Resistance vs. G-S Voltage

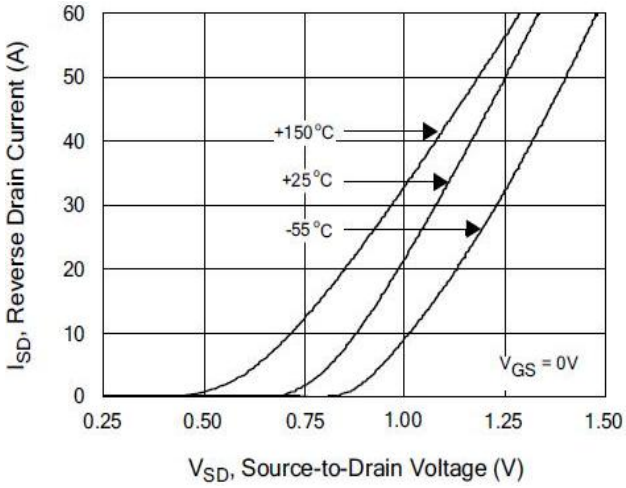


Fig.3 Forward Characteristics Of Reverse

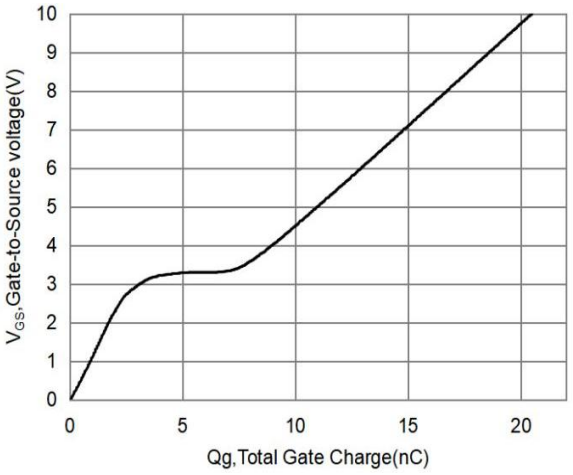


Fig.4 Gate-Charge Characteristics

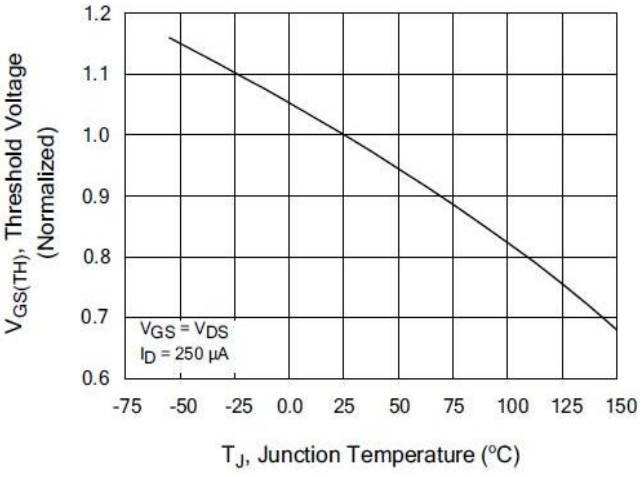


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

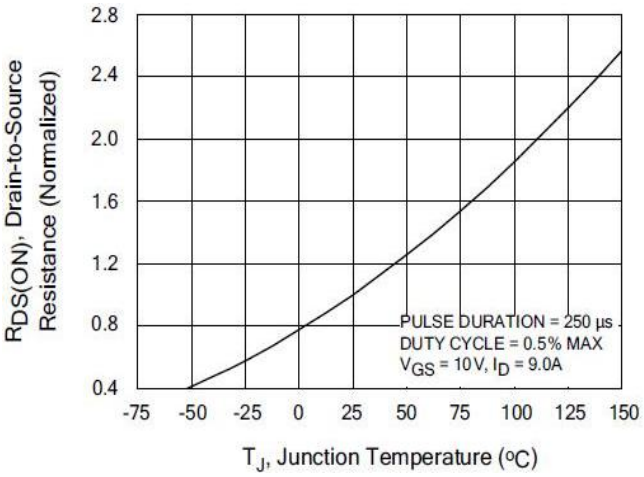


Fig.6 Normalized R_{DSON} vs. T_J

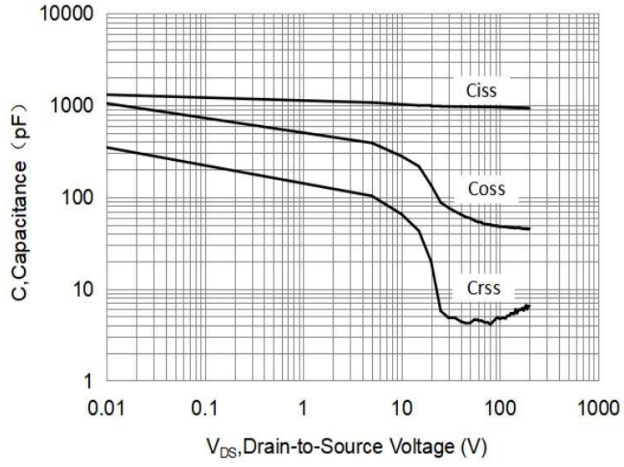


Fig.7 Capacitance

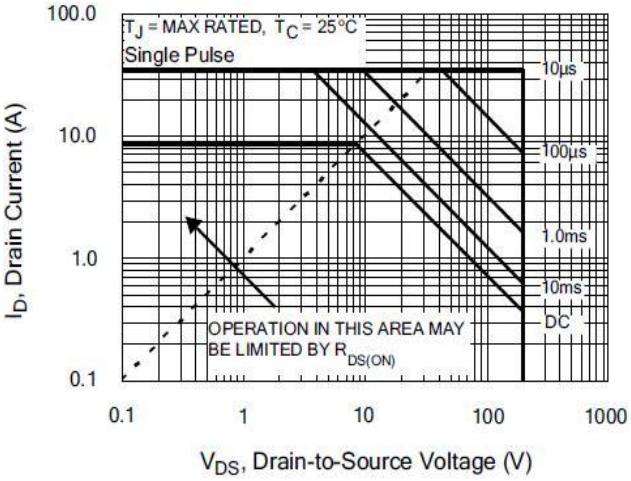


Fig.8 Safe Operating Area

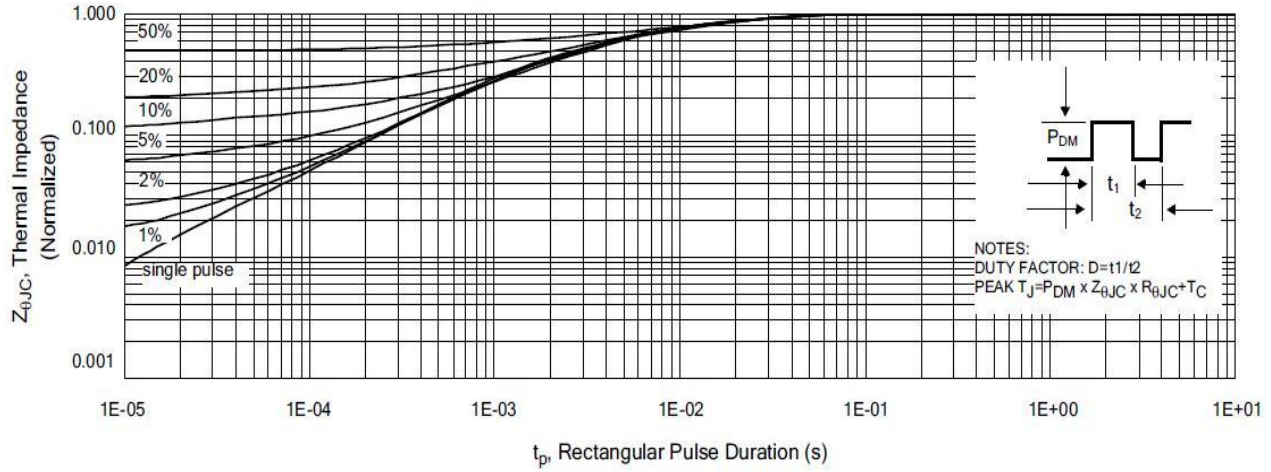


Fig.9 Normalized Maximum Transient Thermal Impedance

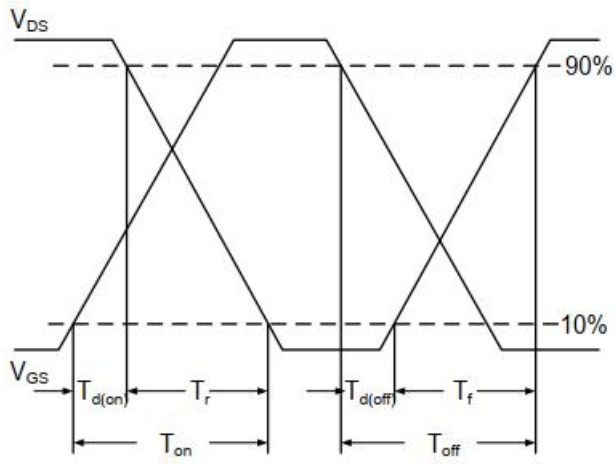


Fig.10 Switching Time Waveform

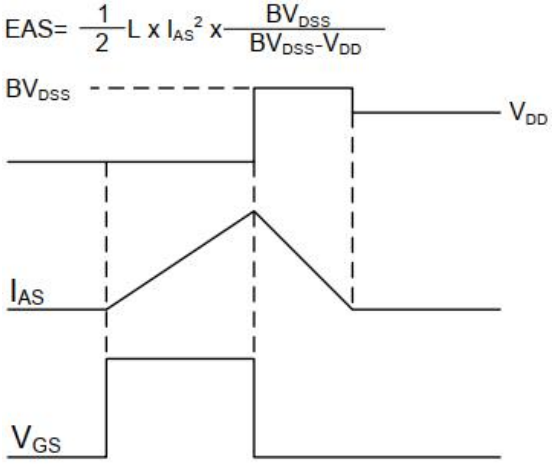


Fig.11 Unclamped Inductive Switching Waveform

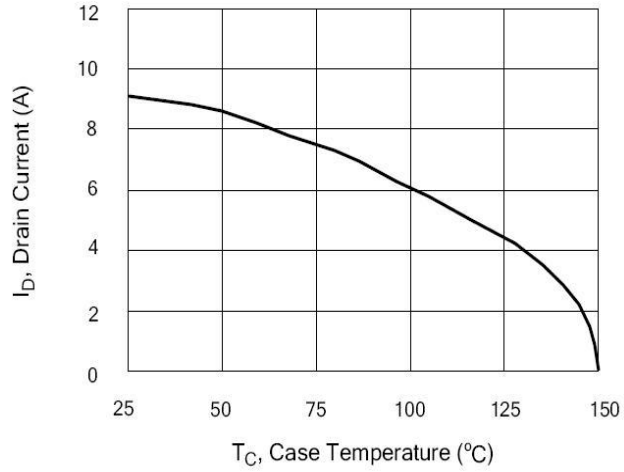


Fig.12 Drian Current

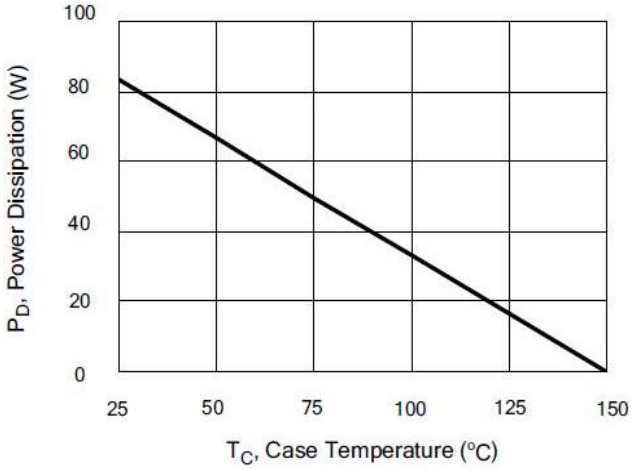


Fig.13 Power Dissipation

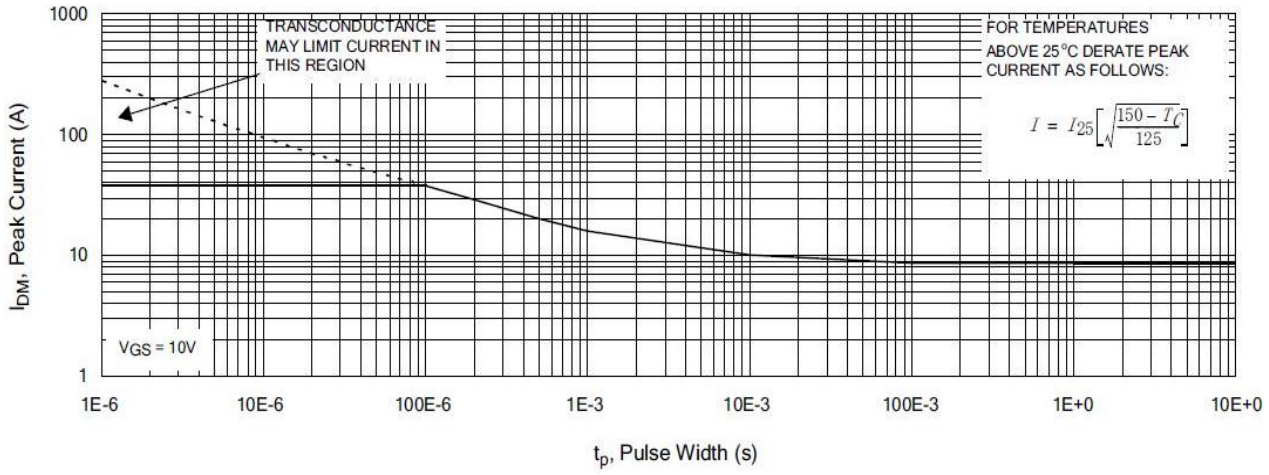


Fig.14 Peak Current Capability

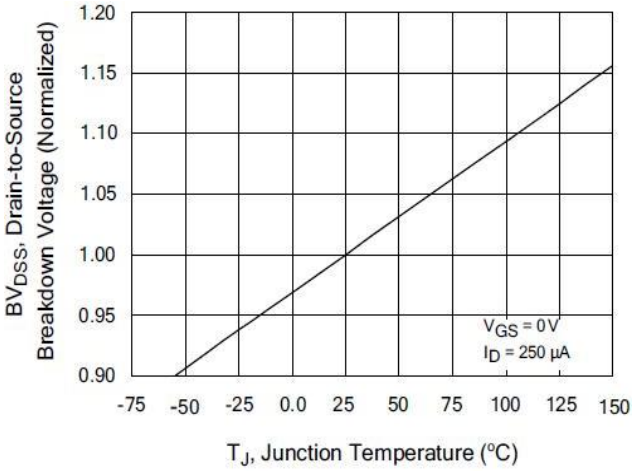


Fig.15 Normalized BV_{DSS} v.s T_J

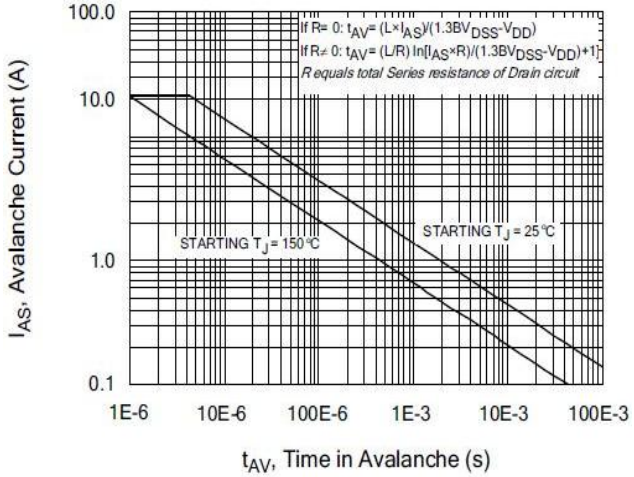
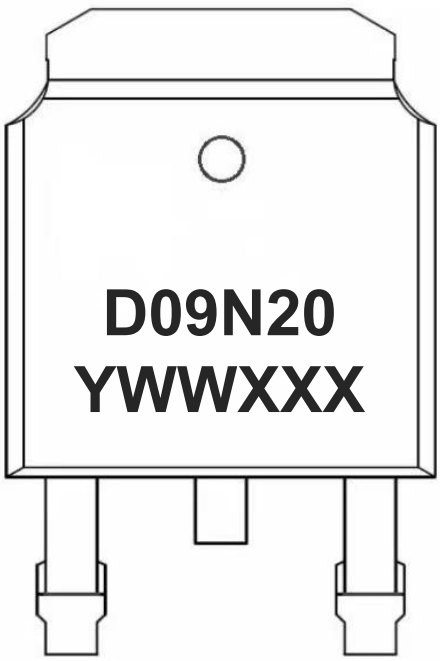


Fig.16 Unclamped Inductive Switching Capability

Marking Information



1 st line： **HuaYuanWei Logo (left)**

2 nd line： **Device Package, Part Number, Channel and Version**

3 rd line： **Date Code [Y WW XX X]**

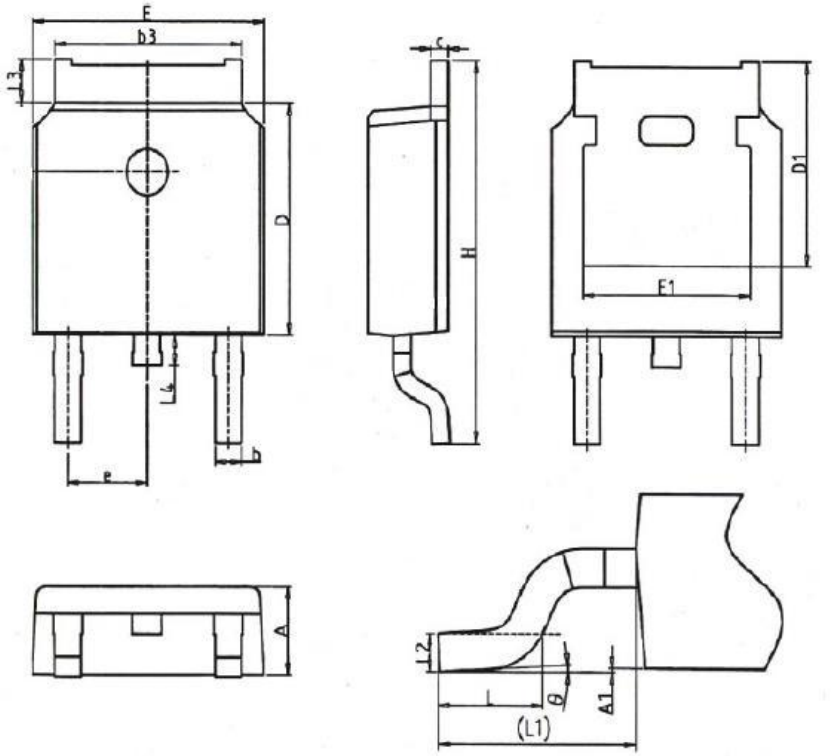
① **Y** **：** Year (2021=M, 2022=N……)

② **W W** **：** Week (01-53)

③ **X X** **：** Serial Number (01-99, AA-ZZ)

④ **X** **：** Factory Code (A-Z)

TO-252 Package Outline



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.18	2.40	0.086	0.095
A1	-	0.2	-	0.008
b	0.68	0.9	0.026	0.036
b3	4.95	5.46	0.194	0.215
c	0.43	0.89	0.017	0.035
D	5.97	6.22	0.235	0.245
D1	5.300REF		0.209REF	
E	6.35	6.73	0.250	0.265
E1	4.32	--	0.170	-
e	2.286BSC		0.09BSC	
H	9.4	10.5	0.370	0.413
L	1.38	1.78	0.054	0.070
L1	2.90REF		0.114REF	
L2	0.51BSC		0.020BSC	
L3	0.88	1.28	0.034	0.050
L4	0.5	1	0.019	0.039
Θ	0°	8°	0°	8°