40V N-Channel MOSFET

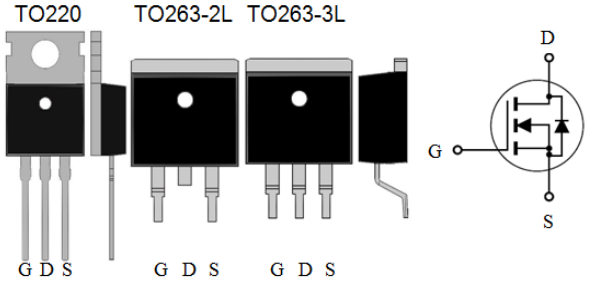
Applications:

- Power Supply
- DC-DC Converters
- DC-AC Inverters

V_{DS}	$R_{DS(ON)}$(MAX)	I_D
40V	2.0mΩ	252A

Features:

- Lead Free
- Low $R_{DS(ON)}$ to Minimize Conductive Loss
- Low Gate Charge for Fast Switching Application
- Optimized $V_{(BR)DSS}$ Ruggedness



Pin Definition and Inner Circuit

Ordering Information

Park Number	Package	Brand
MXP4002AT	TO220	MXP
MXP4002AF	TO263-2L	
MXP4002AE	TO263-3L	

Absolute Maximum Ratings

T_C=25℃ unless otherwise specified

Symbol	Parameter		Value	Unit
V_{DSS}	Drain-to-Source Voltage		40	V
I_D	Continuous Drain Current	Silicon Limited	252	A
		Package Limited	80	
I_{DM}	Pulsed Drain Current @V_{GS}=10V		1009	
P_D	Power Dissipation		242	W
V_{GS}	Gate-to-Source Voltage		+/-20	V
T_J and T_{stg}	Operating Junction and Storage Temperature Range		-55 to 175	℃

Avalanche Characteristics

T_C=25℃ unless otherwise specified

Symbol	Parameter	Value	Unit
E_{AS}①	Single Pulse Avalanche Energy (V_{DS}=20V, V_{GS}=10V, Rg=25Ω, L=1mH)	200	mJ
I_{AS}	Single Pulse Avalanche Current	Figure 9	A

Thermal Resistance

Symbol	Parameter	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.62	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62	℃/W

① : Guarantee number.

40V N-Channel MOSFET

OFF Characteristics

T_J=25℃ unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	40	-	-	V	V_{GS}=0V, I_D=250uA
I_{DSS}	Drain-to-Source Leakage Current	-	-	1	uA	V_{DS}=32V, V_{GS}=0V
		-	-	100		V_{DS}=32V, V_{GS}=0V, T_J=125 ℃
I_{GSS}	Gate-to-Source Forward Leakage	-	-	100	nA	V_{GS}=+20V
	Gate-to-Source Reverse Leakage	-	-	100		V_{GS}= -20V

ON Characteristics

T_J=25℃ unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	-	1.6	2.0	mΩ	V_{GS}=10V, I_D=80A
$V_{GS(th)}$	Gate Threshold Voltage	2	-	4	V	V_{GS}=V_{DS}, I_D=250uA

Dynamic Characteristics

T_J=25℃ unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
Ciss	Input Capacitance	-	8487.6	-	pF	V_{GS}=0V, V_{DS}=20V, f=1.0MHz
Coss	Output Capacitance	-	1182.8	-		
Crss	Reverse Transfer Capacitance	-	651.6	-		
Qg	Total Gate Charge	-	136.3	-	nC	V_{DD}=20V, I_D=80A, V_{GS}=10V
Qgs	Gate-to-Source Charge	-	36.0	-		
Qgd	Gate-to-Drain ("Miller") Charge	-	23.4	-		
Td(on)	Turn-on Delay Time	-	30.7	-	ns	V_{DD}=20V, I_D=40A, V_{GS}=10V, R_G=10Ω, R_L=0.5Ω
Tr	Rise Time	-	81.1	-		
Td(off)	Turn-off Delay Time	-	185.7	-		
Tf	Fall Time	-	91.3	-		

Source-Drain Diode Characteristics

T_J=25℃ unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
V_{SD}	Diode Forward Voltage	-	-	1.2	V	I_S=80A, V_{GS}=0V
Trr	Reverse Recovery Time	-	69.3	-	ns	Is=80A, di/dt=100A/μs
Qrr	Reverse Recovery Charge	-	66.2	-	nC	

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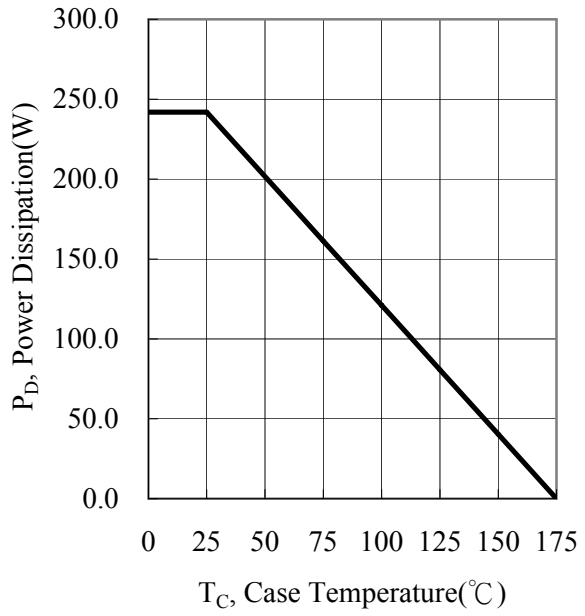
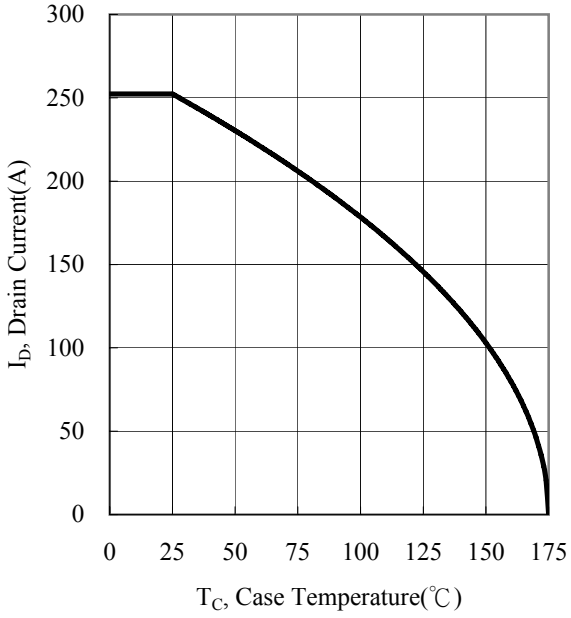
40V N-Channel MOSFET

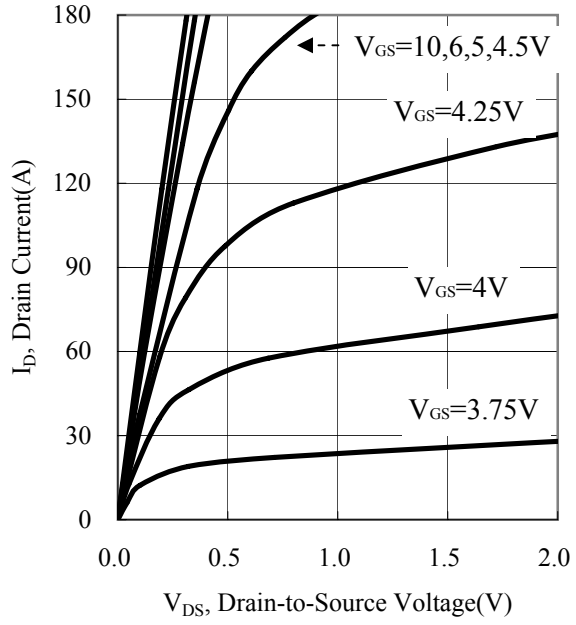
1. Power Dissipation



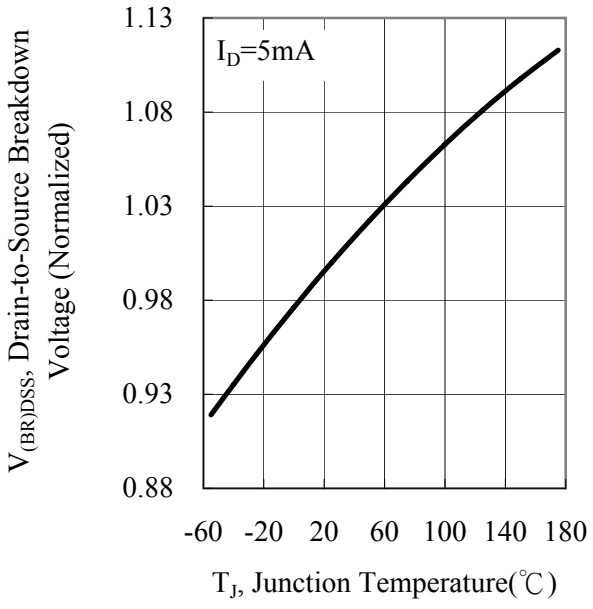
2. Drain Current



3. Output Characteristics T_C=25°C



4. Drain-to-Source Breakdown Voltage



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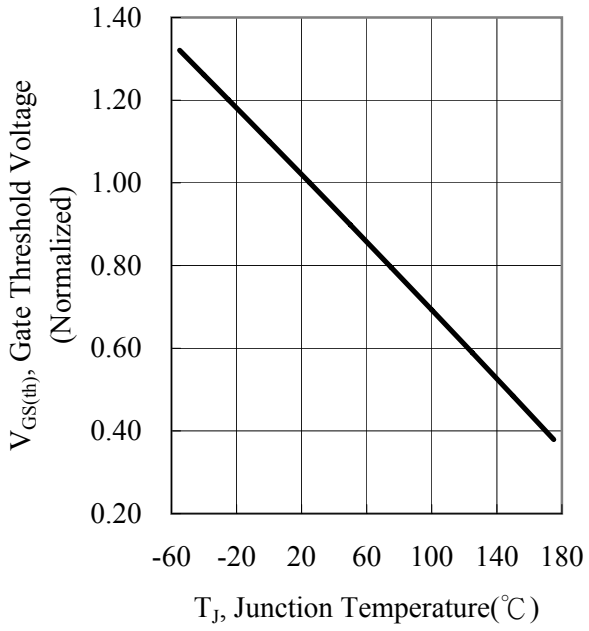
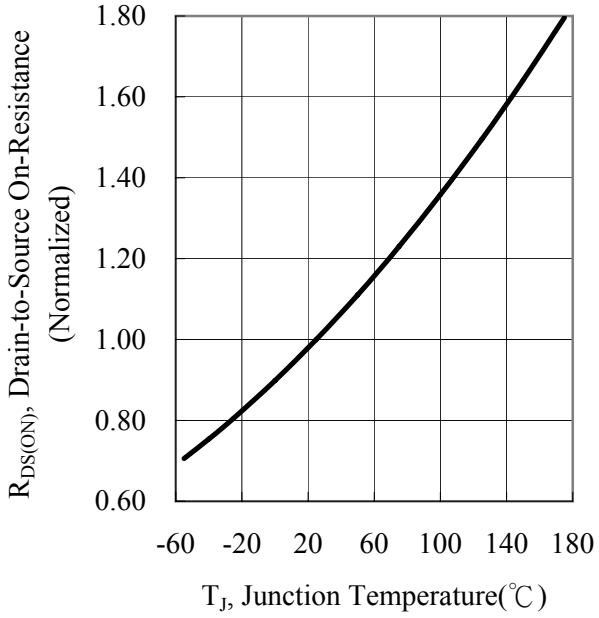
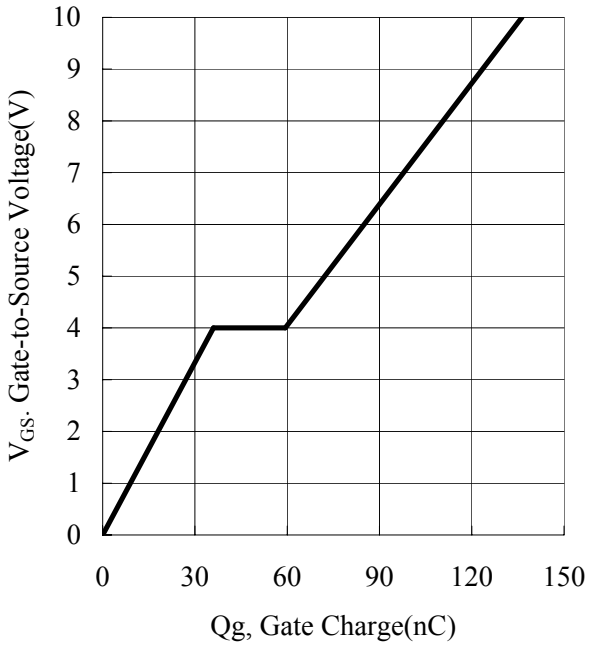
5. Gate Threshold Voltage



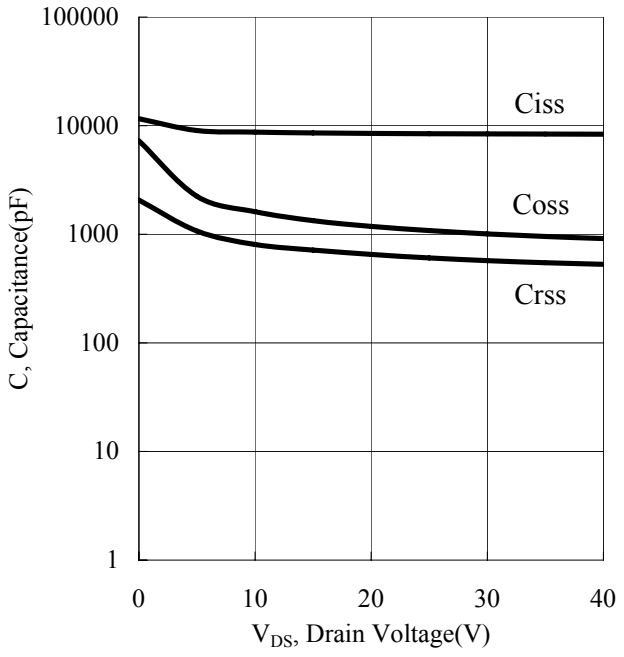
6. Drain-to-Source On-Resistance



7. Typ. Gate Charge



8. Typ. Capacitance



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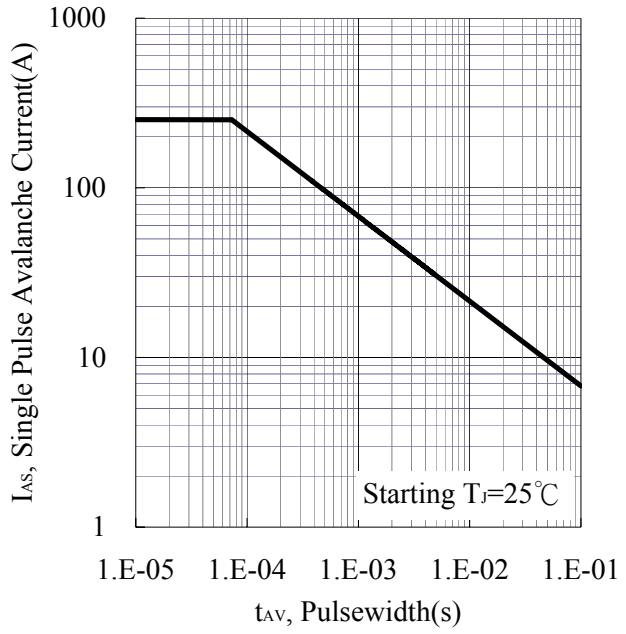
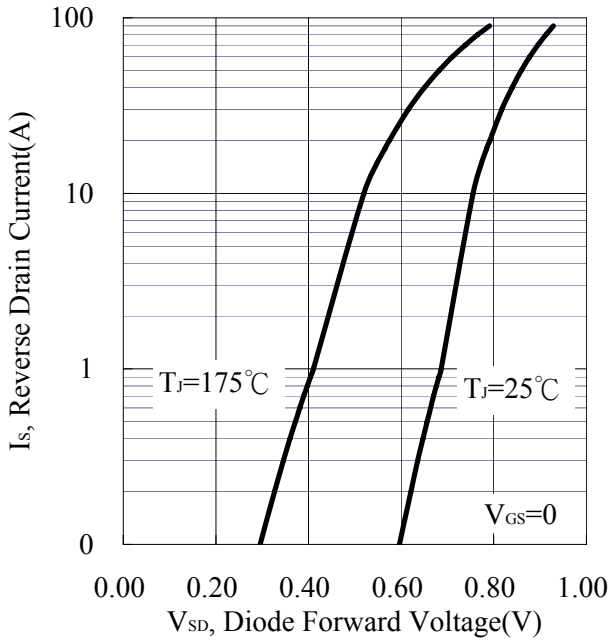
40V N-Channel MOSFET

9. Avalance Characteristics	10. Forward Characteristics of reverse diode
	

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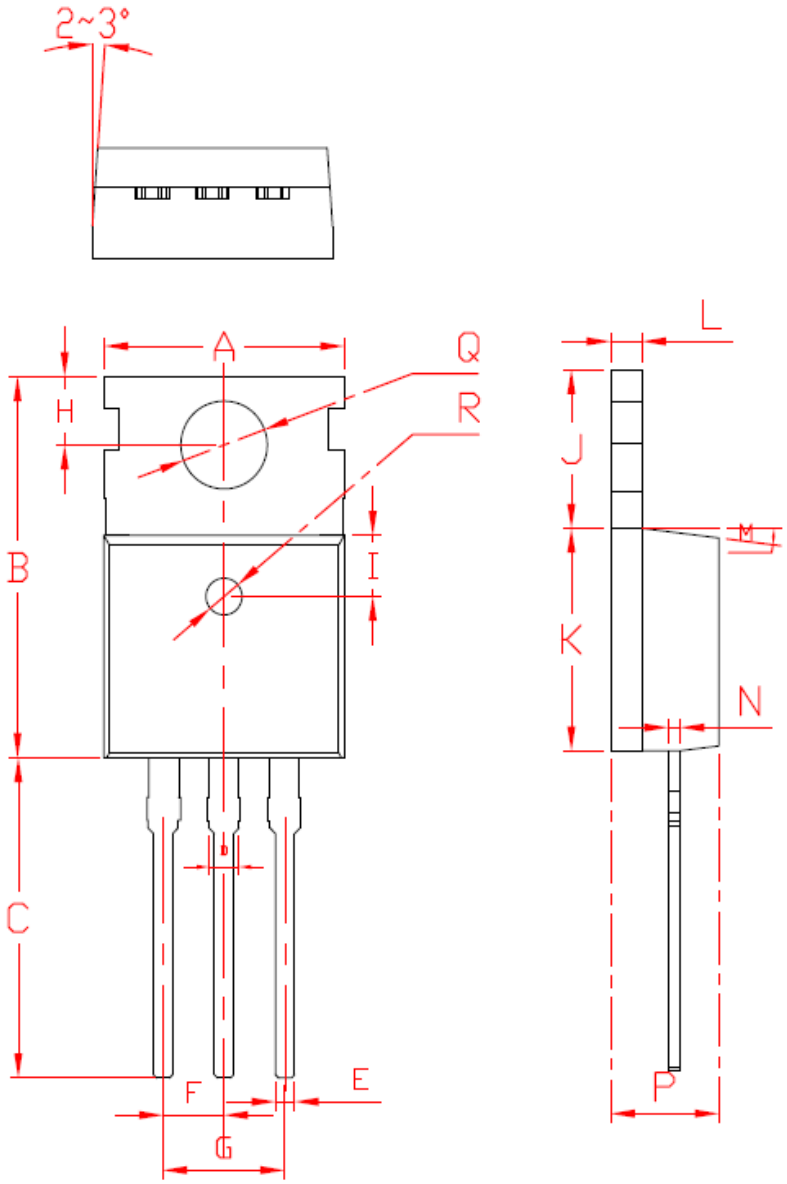
TO220

1. Outline Dimension



Symbol	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
Min	9.8	15.4	12.75					2.73		6.4	9	1.29		0.48	2.35	4.4	3.5	1.4
Non	10	15.6	13.1	1.31	0.8	2.54	5.08	2.8	2.5	6.5	9.1	1.3	1.27	0.5	2.4	4.5	3.6	1.5
Max	10.2	15.8	13.17					2.87		6.6	9.2	1.32		0.56	2.5	4.7	3.63	1.6

UNIT : mm

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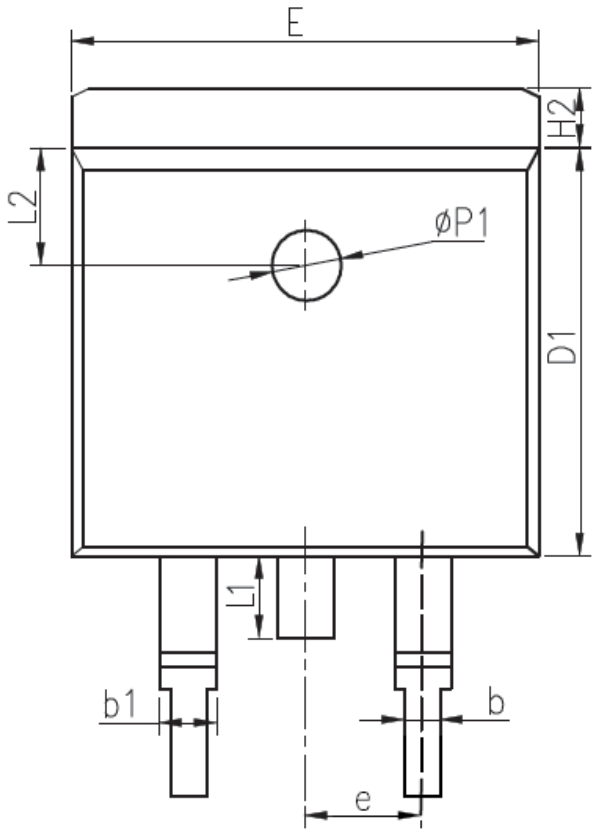
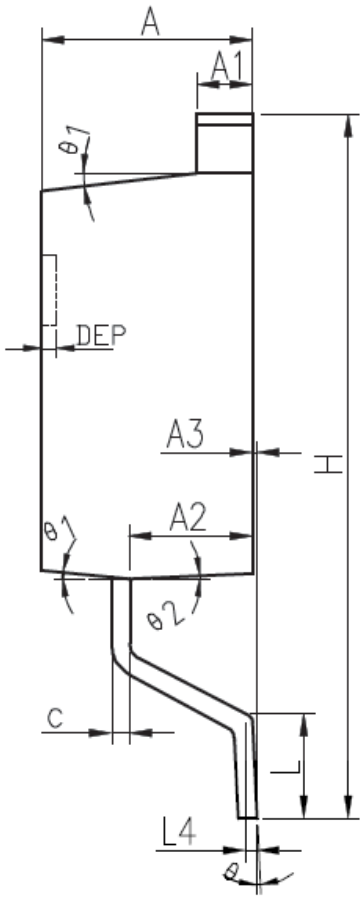
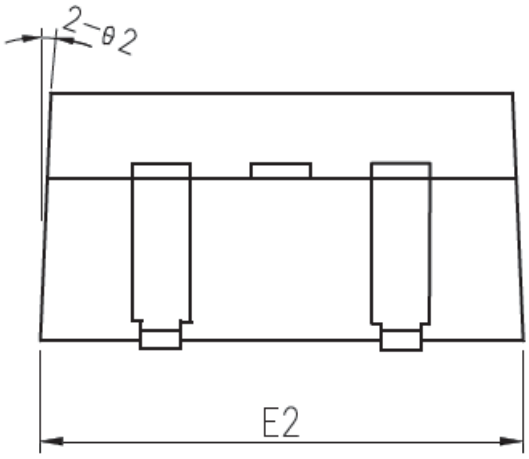
TO263-2L

1. Outline Dimension







SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185
A1	1.22	1.27	1.32	0.048	0.050	0.052
A2	2.59	2.69	2.79	0.102	0.106	0.110
A3	0.00	0.10	0.20	0.000	0.004	0.008
b	0.77	0.813	0.90	0.030	0.032	0.035
b1	1.20	1.270	1.36	0.047	0.050	0.054
c	0.34	0.381	0.47	0.013	0.015	0.019
D1	8.60	8.70	8.80	0.339	0.343	0.346
E	10.00	10.16	10.26	0.394	0.400	0.404
E2	10.00	10.10	10.20	0.394	0.398	0.402
e		2.54 BSC			0.100 BSC	
H	14.70	15.10	15.50	0.579	0.594	0.610
H2	1.17	1.27	1.40	0.046	0.050	0.055
L	2.00	2.30	2.60	0.079	0.091	0.102
L1	1.45	1.55	1.70	0.057	0.061	0.067
L2		2.50 REF			0.098 REF	
L4		0.25 BSC			0.010 BSC	
θ	0°	5°	8°	0°	5°	8°
θ1	5°	7°	9°	5°	7°	9°
θ2	1°	3°	5°	1°	3°	5°
ΦP1	1.40	1.50	1.60	0.055	0.059	0.063
DEP	0.05	0.10	0.20	0.002	0.004	0.008

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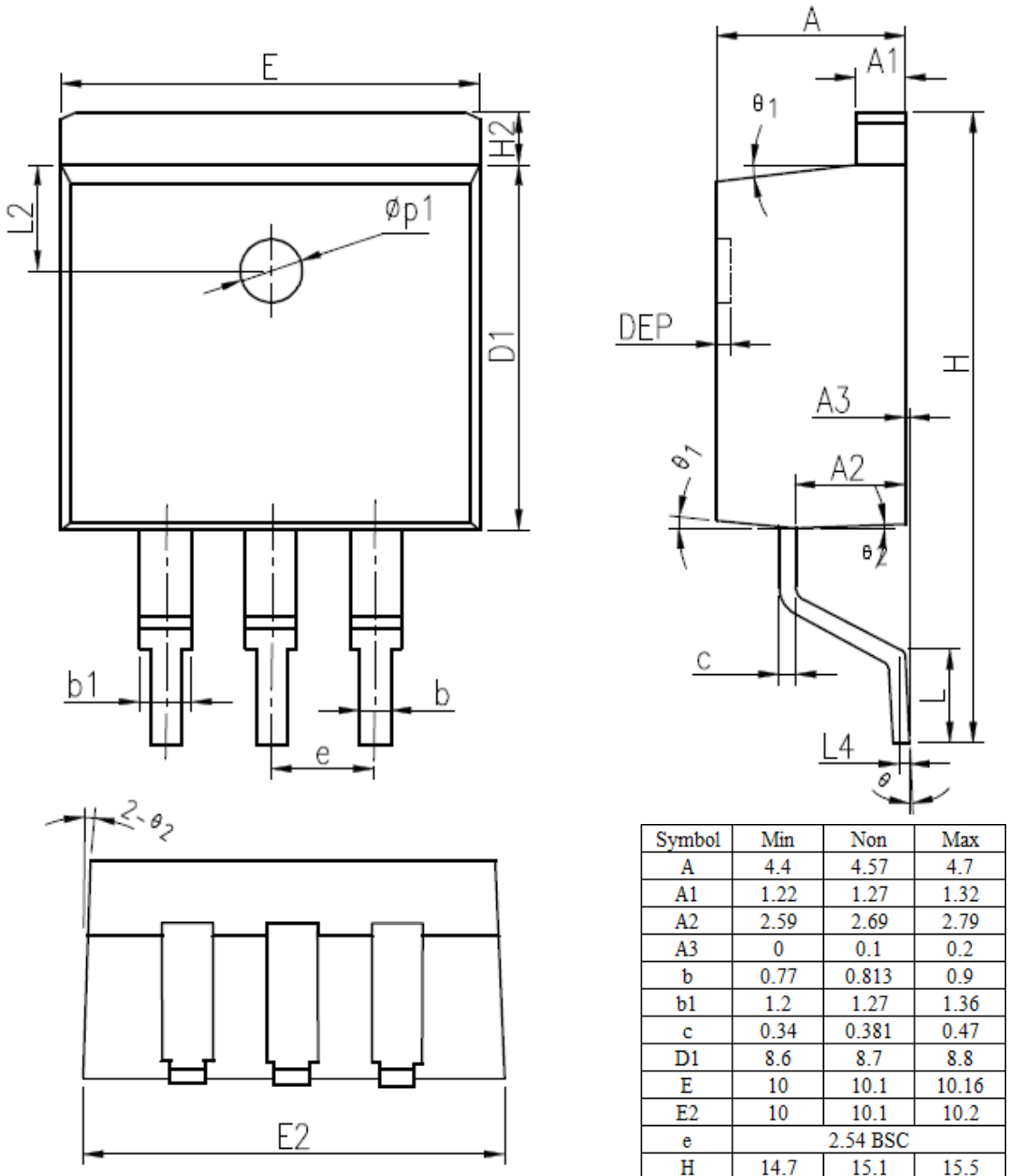
TO263-3L

1. Outline Dimension



Symbol	Min	Non	Max
A	4.4	4.57	4.7
A1	1.22	1.27	1.32
A2	2.59	2.69	2.79
A3	0	0.1	0.2
b	0.77	0.813	0.9
b1	1.2	1.27	1.36
c	0.34	0.381	0.47
D1	8.6	8.7	8.8
E	10	10.1	10.16
E2	10	10.1	10.2
e	2.54 BSC		
H	14.7	15.1	15.5
H2	1.17	1.27	1.4
L	2	2.3	2.6
L2	2.5 REF		
L4	0.25 BSC		
θ	0	5	8
θ1	5	7	9
θ2	1	3	5
ΦP1	1.4	1.5	1.6
DEP	0.05	0.1	0.2

UNIT : mm

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