



XM120080T4B

1200V SiC Power MOSFET

Features

V_{DS}	R_{DSON}	$I_D@25^{\circ}C$
1200 V	80 m Ω	35 A

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitance
- Easy to Parallel and Simple to Drive

Benefits

- Higher System Efficiency
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequency

Applications

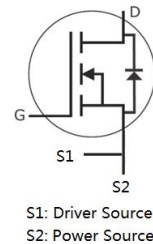
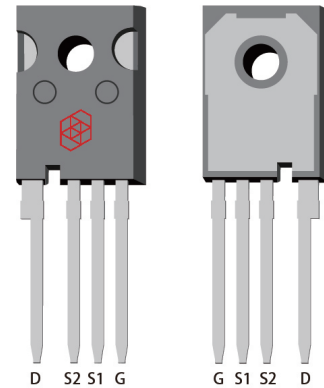
- Power Supplies
- Motor Drives
- High Voltage DC/DC Converters
- Switch Mode Power Supplies
- Pulsed Power applications

Contents

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Ordering

Type	Package	Qty
XM120080T4B	TO-247-4	30



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Absolute **Max.** Ratings ($T_c=25^\circ\text{C}$ unless otherwise specified)

	Symbol	Parameter	Value	Unit	Test Conditions
1	V_{DSmax}	Drain-Source Voltage	1200	V	$V_{GS}=0V, I_D=100\mu A$
2	V_{GSmax}	Gate-Source Voltage	-10/+25	V	Absolute maximum values
3	V_{GSop}	Gate-Source Voltage	-5/+20	V	Recommended operational values
4	I_D	Continuous Drain Current	35	A	$V_{GS}=20V, T_c=25^\circ\text{C}$
			24.5		$V_{GS}=20V, T_c=100^\circ\text{C}$
5	$I_{D(pulse)}$	Pulsed Drain Current	80	A	Pulse width t_p limited by T_{Jmax}
6	P_D	Power Dissipation	192	W	$T_c=25^\circ\text{C}, T_J=150^\circ\text{C}$
7	T_J, T_{STG}	Operating Junction and Storage Temperature	-55 to +150	$^\circ\text{C}$	

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Electrical Characteristics (T_C=25°C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
V _{(BR)DSS}	Drain-Source Breakdown Voltage	1200	/	/	V	V _{GS} =0V, I _D =100μA	
V _{GS(th)}	Gate Threshold Voltage	2.0	2.4	4.0	V	V _{DS} =V _{GS} , I _D =5mA	Fig. 11
		/	1.8	/		V _{DS} =V _{GS} , I _D =5mA, T _J =150°C	
I _{DSS}	Zero Gate Voltage Drain Current	/	1	100	μA	V _{DS} =1200V, V _{GS} =0V	
I _{GSS+}	Gate-Source Leakage Current	/	10	250	nA	V _{DS} =0V, V _{GS} =25V	
I _{GSS-}	Gate-Source Leakage Current	/	10	250	nA	V _{DS} =0V, V _{GS} =-10V	
R _{DS(on)}	Drain-Source On-State Resistance	/	80	98	mΩ	V _{GS} =20V, I _D =20A	Fig. 4,5,6
		/	140	/		V _{GS} =20V, I _D =20A, T _J =150°C	
C _{iss}	Input Capacitance	/	1475	/	pF	V _{GS} =0V V _{DS} =1000V f=1MHz V _{AC} =25mV	Fig. 15,16
C _{oss}	Output Capacitance	/	94	/			
C _{riss}	Reverse Transfer Capacitance	/	11	/			
E _{oss}	C _{oss} Stored Energy	/	52	/			
E _{ON}	Turn-On Switching Energy	/	564	/	μJ	V _{DS} =800V, V _{GS} =-5V/20V I _D =20A, R _{G(ext)} =2.5Ω, L=200μH	
E _{OFF}	Turn-Off Switching Energy	/	260	/			
t _{d(on)}	Turn-On Delay Time	/	9.3	/	ns	V _{DS} =800V, V _{GS} =-5V/20V, I _D =20A R _{G(ext)} =2.5Ω, R _L =40Ω	
t _r	Rise Time	/	9.5	/			
t _{d(off)}	Turn-Off Delay Time	/	18	/			
t _f	Fall Time	/	7.6	/			
R _{G(int)}	Internal Gate Resistance	/	3.1	/	Ω	f=1MHz, V _{AC} =25mV	
Q _{GS}	Gate to Source Charge	/	24	/	nC	V _{DS} =800V V _{GS} =-5V/20V I _D =20A	
Q _{GD}	Gate to Drain Charge	/	15	/			
Q _G	Total Gate Charge	/	79	/			

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Reverse Diode Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_{SD}	Diode Forward Voltage	3.6	/	V	$V_{GS}=-5V, I_{SD}=10A$	Fig. 8,9,10
		3.3	/		$V_{GS}=-5V, I_{SD}=10A, T_J=150^{\circ}C$	
I_S	Continuous Diode Forward Current	/	44	A	$T_C=25^{\circ}C$	
t_{rr}	Reverse Recover Time	35	/	ns	$V_R=800V, I_{SD}=20A$	
Q_{rr}	Reverse Recovery Charge	91	/	nC		
I_{rrm}	Peak Reverse Recovery Current	4.5	/	A		

Thermal Characteristics (Typical)

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case	0.6	/	$^{\circ}C/W$		
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	/	40			

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Electrical Performance

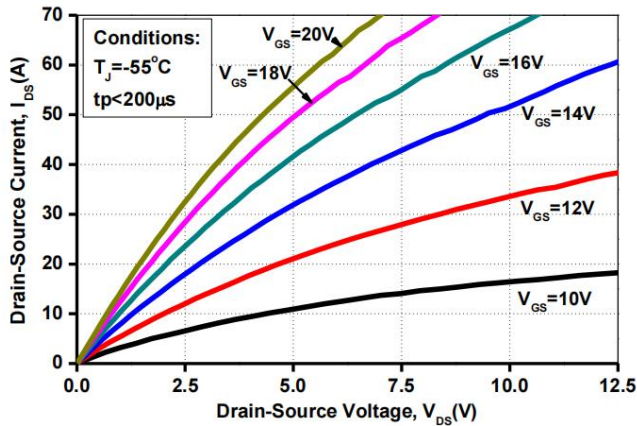


Fig 1. Out Characteristics $T_J = -55^\circ\text{C}$

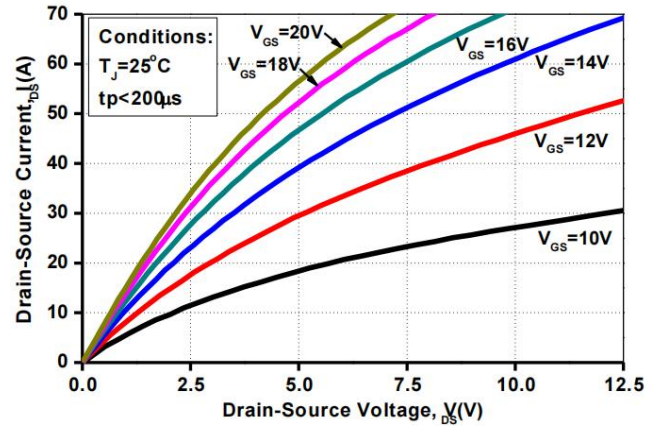


Fig 2. Out Characteristics $T_J = 25^\circ\text{C}$

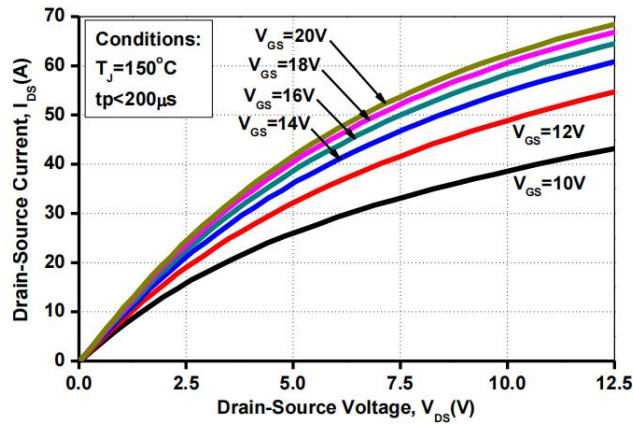


Fig 3. Out Characteristics $T_J = 150^\circ\text{C}$

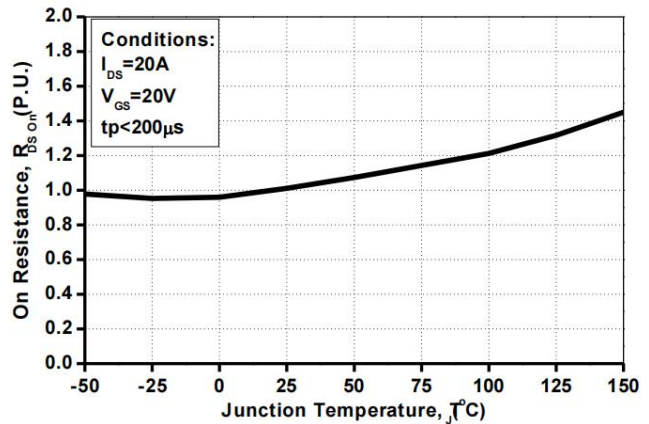


Fig 4. Normalized On-Resistance vs. Temperature

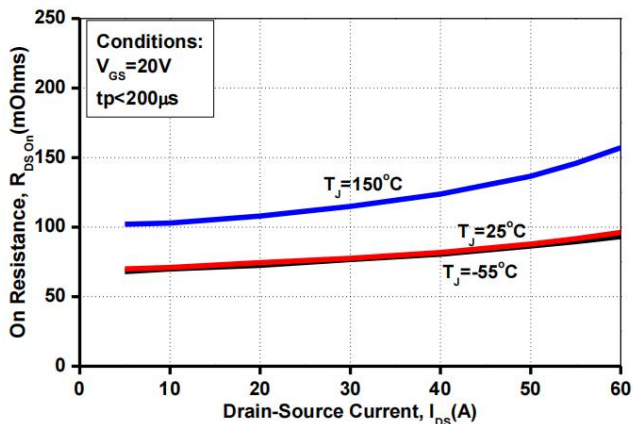


Fig 5. On-Resistance vs. Drain Current For Various Temperature

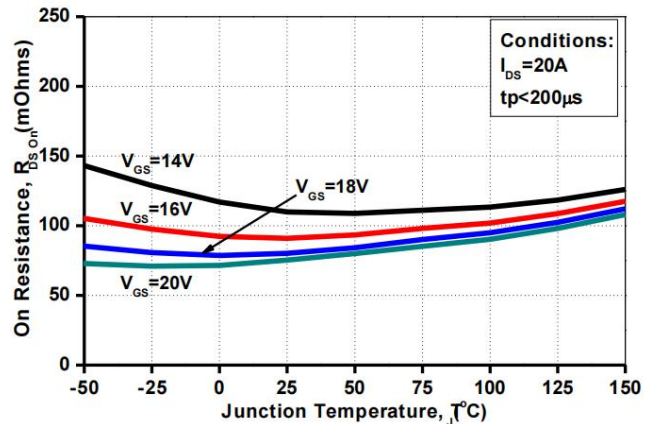


Fig 6. On-Resistance vs. Temperature For Various Gate Voltage

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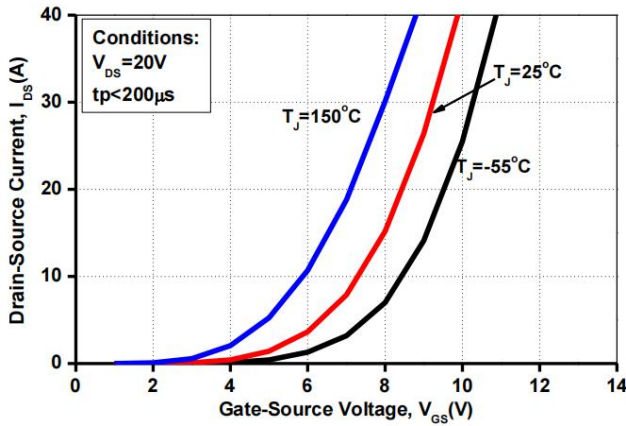


Fig 7. Transfer Characteristic for Various Junction temperature

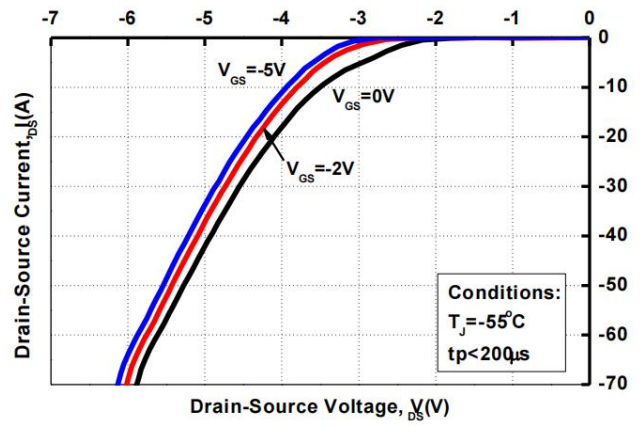


Fig 8. Body Diode Characteristic at -55 °C

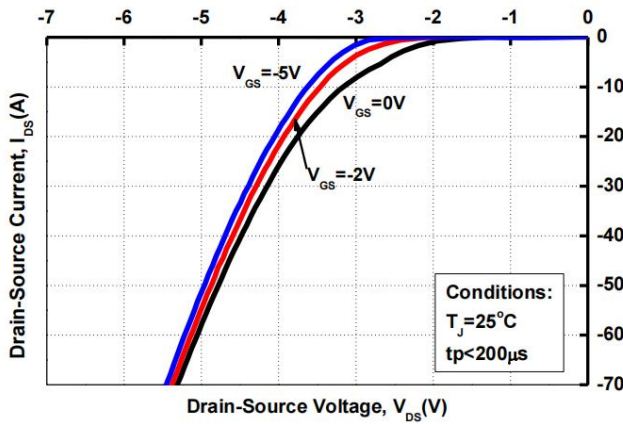


Fig 9. Body Diode Characteristic at 25 °C

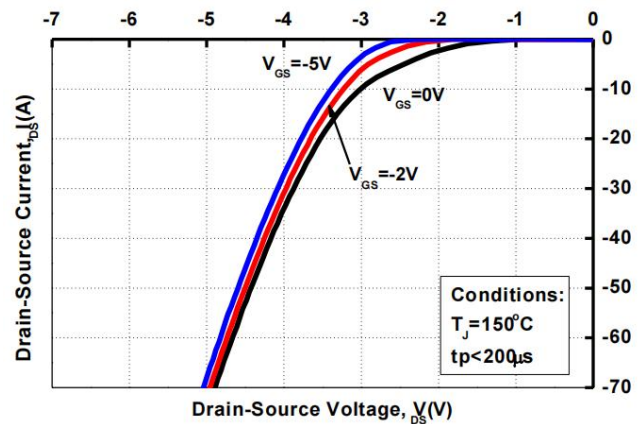


Fig 10. Body Diode Characteristic at 150 °C

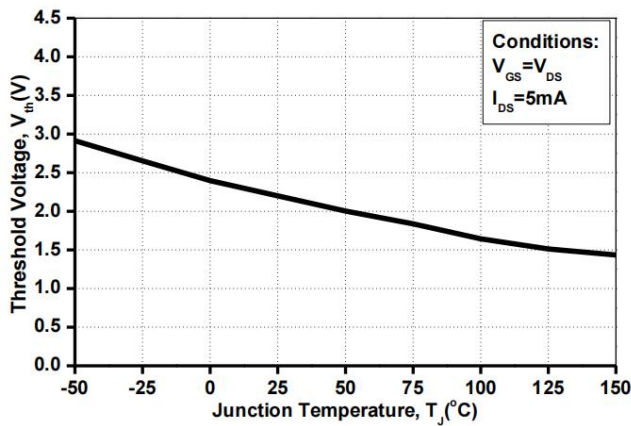


Fig 11. Threshold Voltage vs. Temperature

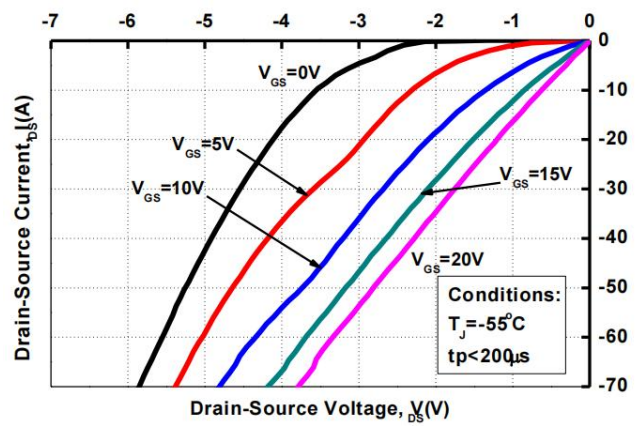


Fig 12. 3rd Quadrant Characteristic at -55 °C

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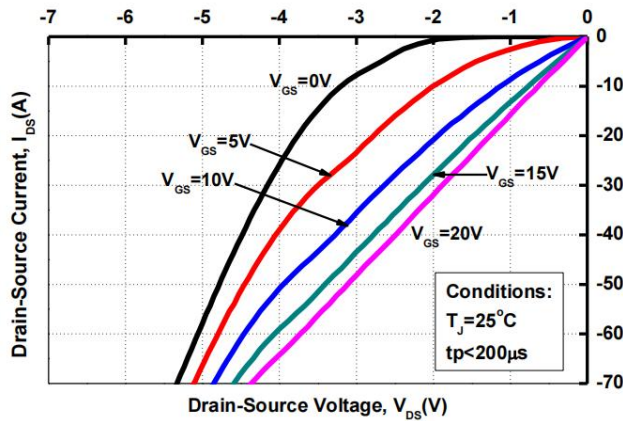


Fig 13. 3rd Quadrant Characteristic at 25 °C

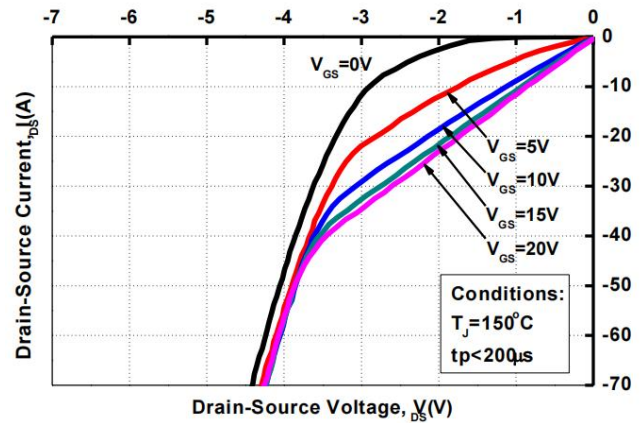


Fig 14. 3rd Quadrant Characteristic at 150 °C

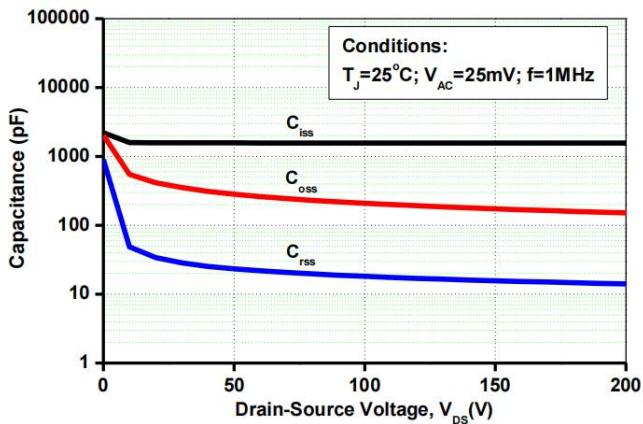


Fig 15. Capacitance vs. Drain-Source Voltage (0-200V)

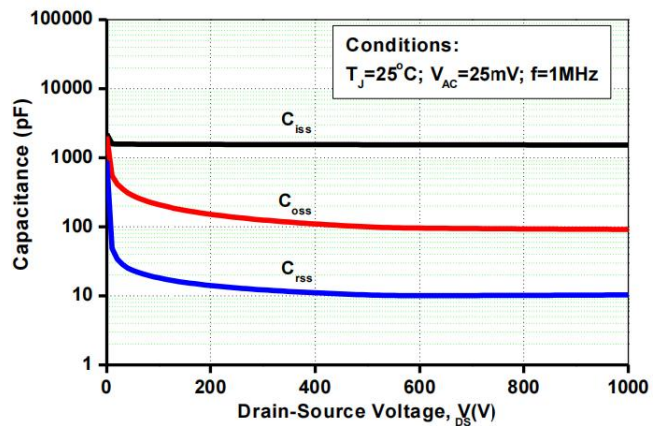


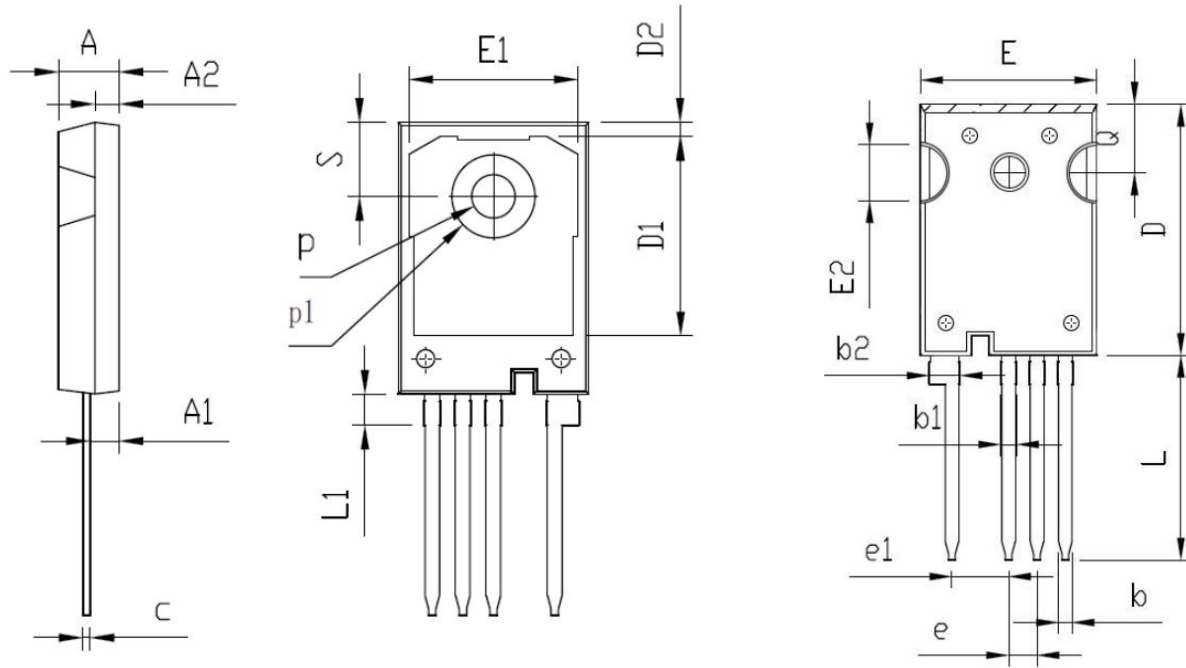
Fig 16. Capacitance vs. Drain-Source Voltage (0-1000V)

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Package Dimensions

Package To-247-4



SYMBOLS	DIMENSIONS IN MILLIMETERS			SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX		MIN	NOM	MAX
A		5.00		e1		5.08	
A1		2.40		E		15.80	
A2		2.00		E1		14.00	
b		1.20		E2		5.00	
b1		1.30		L		18.38	
b2		2.65		L1		2.58	
c		0.60		p		3.60	
D		22.54		p1		6.80	
D1		16.50		Q		6.15	
D2		1.17		S		6.15	
e		2.54					

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Revision History

Revision History

Document revision	Date	Description of changes
2.0	2023.10.11	Target datasheet