



# MC10N020AL

## 主要参数 MAIN CHARACTERISTICS

$I_D$	45A
$V_{DSS}$	100V
$R_{dson-max}$ (@ $V_{gs}=10V$ )	20m $\Omega$
$Q_g-typ$	30.5nC

### 用途

- 电信与工业领域隔离 DC/DC 转换
- 同步整流领域 DC/DC 与 AC/DC 转换

### 产品特性

- 低栅极电荷
- 低  $R_{dson}$
- 开关速度快
- 产品全部经过雪崩测试
- 高抗  $dv/dt$  能力
- RoHS 产品

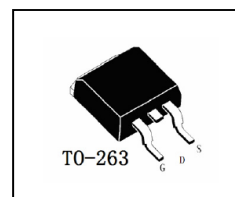
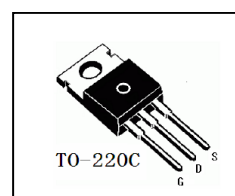
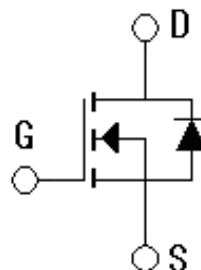
### APPLICATIONS

- Isolated DC/DC Converters in Telecom and Industrial
- Synchronous Rectification in DC/DC and AC/DC Converters

### FEATURES

- Low gate charge
- Low  $R_{dson}$
- Fast switching
- 100% avalanche tested
- Improved  $dv/dt$  capability
- RoHS product

## 封装 Package



## 订货信息 ORDER MESSAGE

订货型号 Order codes				印 记 Marking	封 装 Package
有卤-条管 Halogen-Tube	无卤-条管 Halogen-Free-Tube	有卤-编带 Halogen-Reel	无卤-编带 Halogen-Free-Reel		
MC10N020AL-C-B	MC10N020AL -C-BR	N/A	N/A	MC10N020AL	TO-220C
MC10N020AL-S-B	MC10N020AL -S-BR	MC10N020AL -S-A	MC10N020AL -S-AR	MC10N020AL	TO-263



## 绝对最大额定值 ABSOLUTE RATINGS (Tc=25℃)

项 目 Parameter	符 号 Symbol	数 值 Value	单 位 Unit
		MC10N020AL	
最高漏极-源极直流电压 Drain-Source Voltage	V <sub>DSS</sub>	100	V
连续漏极电流 Drain Current -continuous	I <sub>D</sub> T=25℃	45*	A
	I <sub>D</sub> T=100℃	29*	A
最大脉冲漏极电流 (注1) Drain Current - pulse (note 1)	I <sub>DM</sub>	180*	A
最高栅源电压 Gate-Source Voltage	V <sub>GSS</sub>	±20	V
单脉冲雪崩能量 (注2) Single Pulsed Avalanche Energy (note 2)	E <sub>AS</sub>	100	mJ
雪崩电流 (注1) Avalanche Current (note 1)	I <sub>AS</sub>	20	A
耗散功率 Power Dissipation	P <sub>D</sub> T <sub>C</sub> =25℃ -Derate above 25℃	83	W
		0.67	W/℃
最高结温及存储温度 Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55~+150	℃
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T <sub>L</sub>	300	℃

\*漏极电流由最高结温限制

\*Drain current limited by maximum junction temperature



## 电特性 ELECTRICAL CHARACTERISTICS

项 目 Parameter	符 号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单 位 Units
<b>关态特性 Off –Characteristics</b>						
漏—源击穿电压 Drain-Source Voltage	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0V$	100	-	-	V
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=100V, V_{GS}=0V,$ $T_C=25^\circ C$	-	-	10	$\mu A$
正向栅极体漏电流 Gate-body leakage current, forward	$I_{GSSF}$	$V_{DS}=0V, V_{GS}=11V$	-	-	100	nA
反向栅极体漏电流 Gate-body leakage current, reverse	$I_{GSSR}$	$V_{DS}=0V, V_{GS}=-11V$	-	-	-100	nA
<b>通态特性 On-Characteristics</b>						
阈值电压 Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D=250\mu A$	1	2	3	V
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D=20A$	-	17.5	20	m $\Omega$
		$V_{GS} = 4.5V, I_D=20A$	-	23	27	m $\Omega$
正向跨导 Forward Transconductance	$g_{fs}$	$V_{DS} = 5V, I_D=50A$ (note 4)	-	30	-	S
<b>动态特性 Dynamic Characteristics</b>						
栅电阻 Gate resistance	$R_g$	$f=1.0MHz, open\ drain$	-	2.3	-	$\Omega$
输入电容 Input capacitance	$C_{iss}$	$V_{DS}=50V,$ $V_{GS}=0V,$ $f=1.0MHz$	-	2250	-	pF
输出电容 Output capacitance	$C_{oss}$		-	170	-	pF
反向传输电容 Reverse transfer capacitance	$C_{rss}$		-	35	-	pF



## 电特性 ELECTRICAL CHARACTERISTICS

开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	$t_{d(on)}$	$V_{DD}=50V, V_{GS}=10V$	-	11	-	ns
上升时间 Turn-On rise time	$t_r$		-	50	-	ns
延迟时间 Turn-Off delay time	$t_{d(off)}$	$I_D=30A, R_G=5.0\Omega$ , (note 3, 4)	-	29	-	ns
下降时间 Turn-Off Fall time	$t_f$		-	75	-	ns
栅极电荷总量 Total Gate Charge	$Q_g$	$V_{DS}=50V, V_{GS}=10V$ $I_D=30A$ (note 3, 4)	-	30.5	-	nC
栅-源电荷 Gate-Source charge	$Q_{gs}$		-	12	-	nC
栅-漏电荷 Gate-Drain charge	$Q_{gd}$		-	2.5	-	nC
漏-源二极管特性及最大额定值 Drain-Source Diode Characteristics and Maximum Ratings						
正向最大连续电流 Maximum Continuous Drain-Source Diode Forward Current	$I_S$	$T_C=25^\circ C$	-	-	45	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current	$I_{SM}$	$T_C=25^\circ C$	-	-	180	A
正向压降 Drain-Source Diode Forward Voltage	$V_{SD}$	$T_J=25^\circ C, V_{GS}=0V, I_{SD}=20A$	-	0.9	1.3	V
反向恢复时间 Reverse recovery time	$T_{rr}$	$V_{GS}=0V, I_S=30A$ $dI_F/dt=100A/\mu s$ (note 4)		55		ns
反向恢复电荷 Reverse recovery charge	$Q_{rr}$			95		nc

## 热特性 THERMAL CHARACTERISTIC

项 目 Parameter	符 号 Symbol	最大 Max	单 位 Unit
		MC10N020AL	
结到管壳的热阻 Thermal Resistance, Junction to Case	$R_{th(j-c)}$	1.50	$^\circ C/W$
结到环境的热阻 Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	62.5	$^\circ C/W$

注释:

1: 脉冲宽度由最高结温限制

2:  $I_{AS}=20A, V_{DD}=50V, V_{GS}=10V, L=0.3mH, R_G=25\Omega$ , 起始结温  $T_J=25^\circ C$ 3: 脉冲测试: 脉冲宽度 $\leq 300\mu s$ , 占空比 $\leq 2\%$ 

4: 基本与工作温度无关

Notes:

1: Pulse width limited by maximum junction temperature

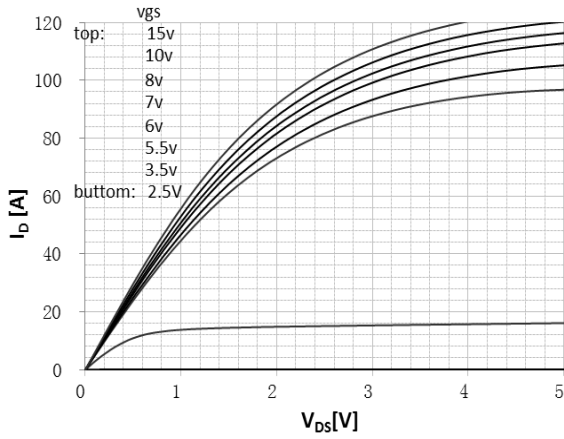
2:  $I_{AS}=20A, V_{DD}=50V, V_{GS}=10V, L=0.3mH, R_G=25\Omega$ , Starting  $T_J=25^\circ C$ 3: Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ 

4: Essentially independent of operating temperature

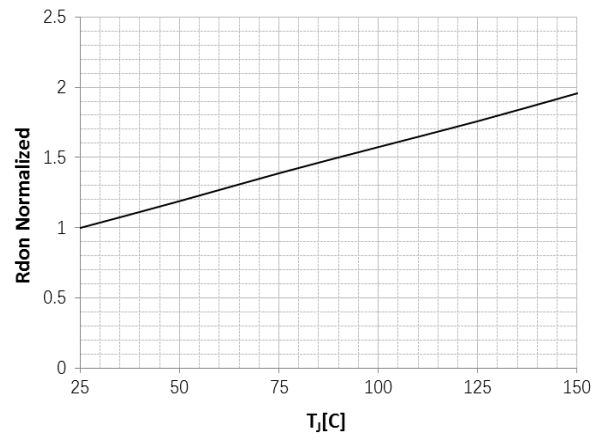


特征曲线 ELECTRICAL CHARACTERISTICS (curves),  $T_J = 25\text{ }^\circ\text{C}$

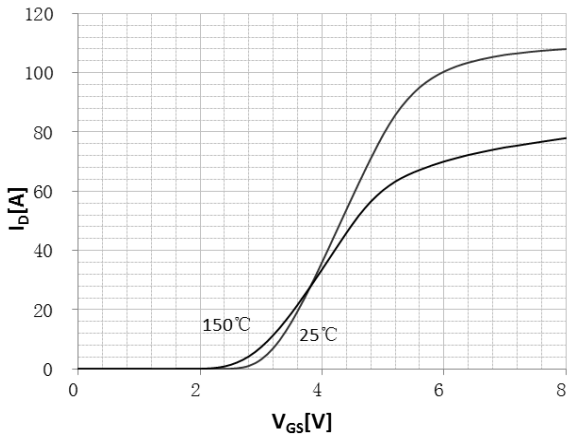
On-Region Characteristics



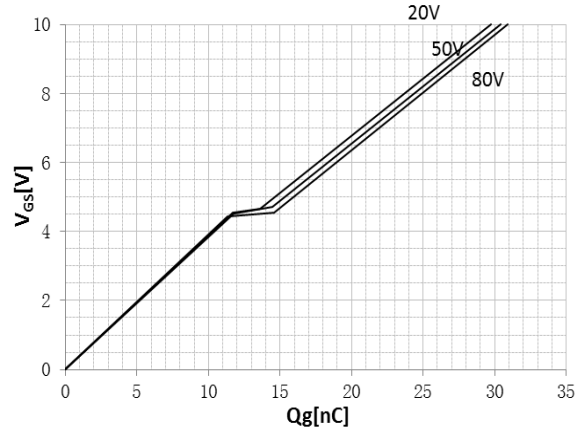
RDSON vs. Tj



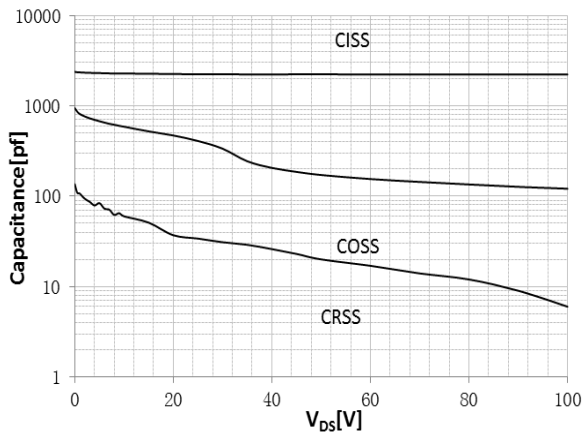
Transfer Characteristics



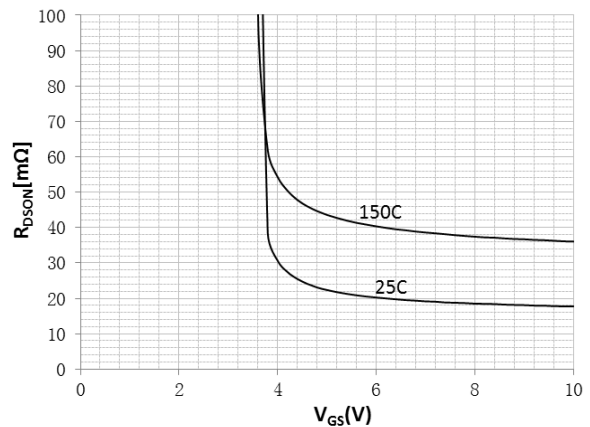
Gate Charge Characteristics



Capacitance Characteristics

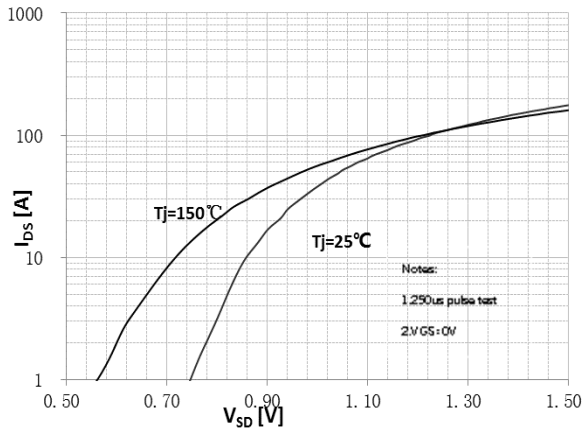


Drain-Source on resistance

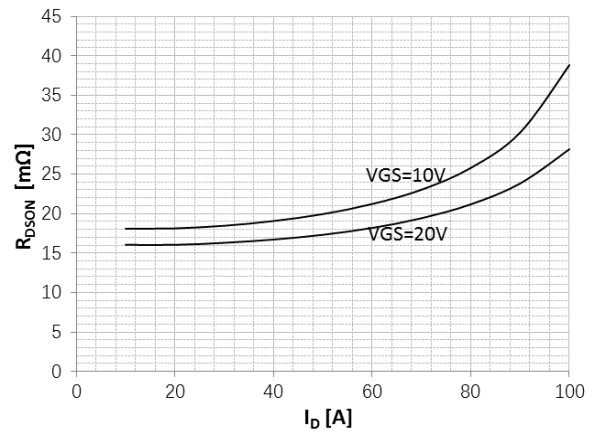




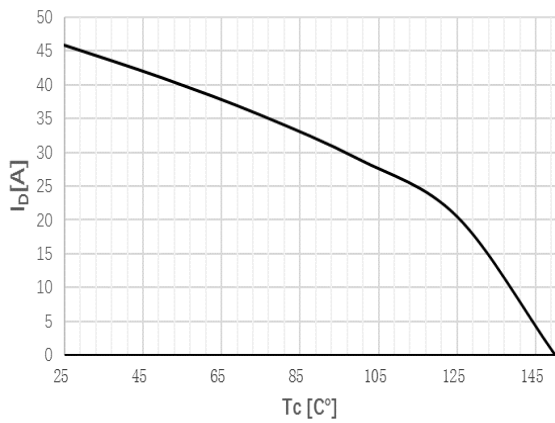
**Body Diode Forward Voltage Variation vs. Source Current and Temperature**



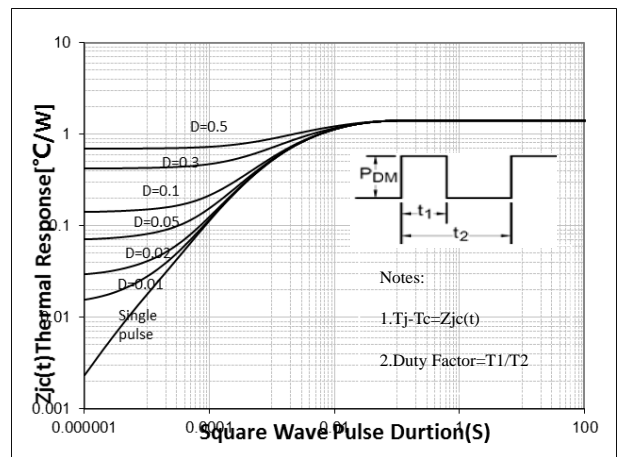
**On-Resistance Variaton vs. Drain Current and Gate Voltage**



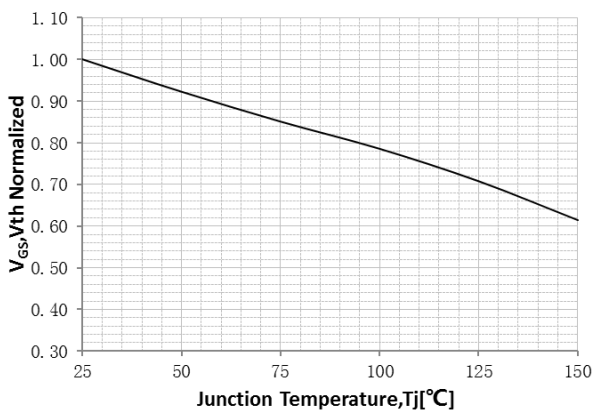
**Drain Current Dissipation vs Tc**



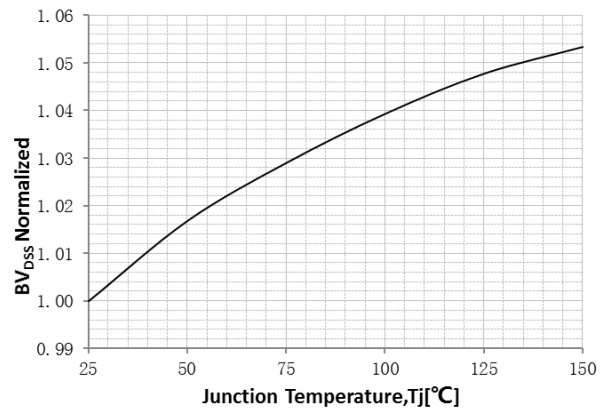
**Transient Thermal Impedance**



**Gate Threshold Voltage Variation vs Tj**

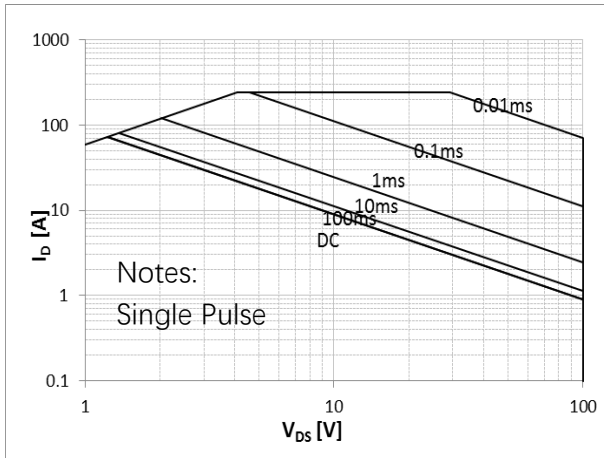


**Breakdown Voltage Variation vs Tj**

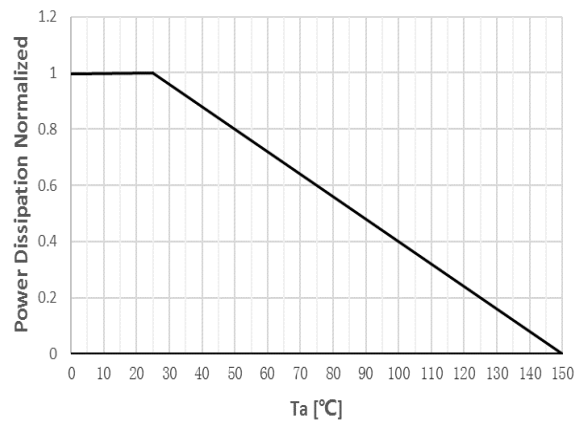




Maximum Safe Operation



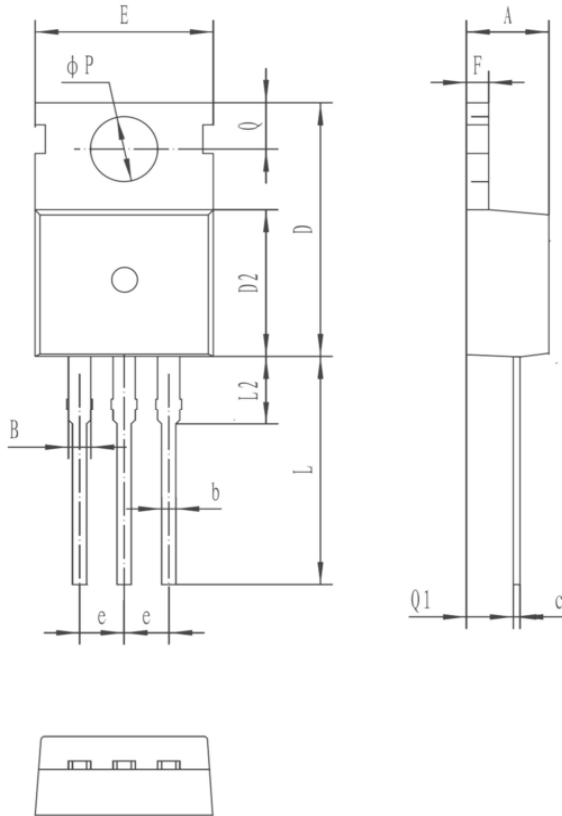
Power Dissipation vs Ta





外形尺寸 PACKAGE MECHANICAL DATA

**TO-220C**



符号 symbol	MIN	MAX
A	4.30	4.70
B	1.10	1.40
b	0.70	0.95
c	0.40	0.65
D	15.20	16.20
D2	9.00	9.40
E	9.70	10.10
e	2.39	2.69
F	1.25	1.40
L	12.60	13.60
L2	2.80	3.20
Q	2.60	3.00
Q1	2.20	2.60
P	3.50	3.80

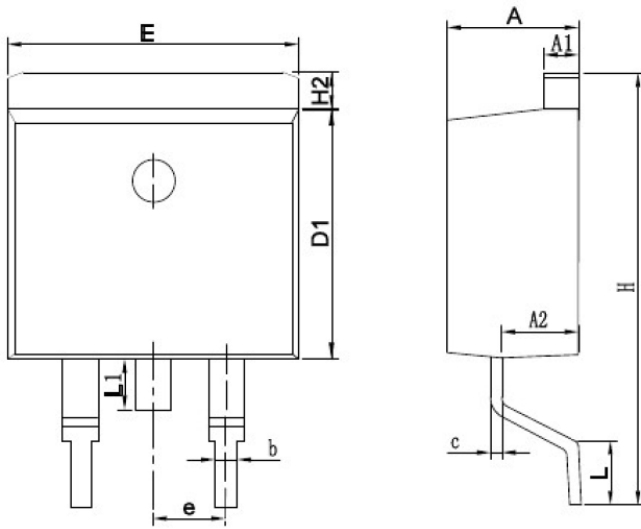




外形尺寸 PACKAGE MECHANICAL DATA

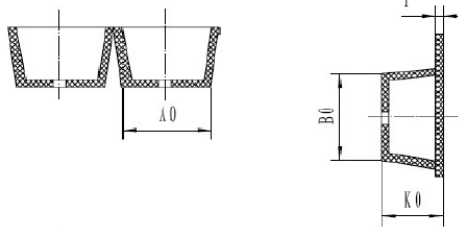
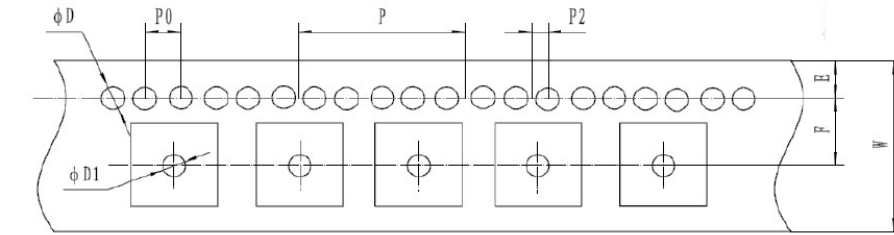
TO-263

单位 Unit: mm



SYMBOL	MM	
	MIN	MAX
A	4.30	4.80
A1	1.12	1.42
A2	2.54	2.84
b	0.67	1.00
c	0.29	0.52
D1	8.40	9.00
E	9.80	10.46
e	2.54BSC	
H	14.00	16.00
H2	1.12	1.45
L	1.50	3.10
L1	1.45	1.70

编带 REEL



产品尺寸规格 (UNIT: mm)				
规格	W	AO	E	D
尺寸	24 ± 0.3	10.9 ± 0.1	1.75 ± 0.1	1.5 ± 0.1/-0
规格	D1	P0	P	T
尺寸	1.5 ± 0.1/-0	4 ± 0.1	2 ± 0.1	0.35 ± 0.05
规格	K0	BO		
尺寸	4.9 ± 0.1	16.0 ± 0.1		



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