



# MC10N020

## 主要参数 MAIN CHARACTERISTICS

$I_D$	45A
$V_{DSS}$	100V
$R_{dson-typ}$ (@ $V_{gs}=10V$ )	17m $\Omega$
$Q_g-typ$	21nC

### 用途

- 高功率 DC/DC 转换与功率开关
- 同步整流领域 DC/DC 与 AC/DC 转换
- 直流电机控制

### 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
- 高可靠性
- RoHS 产品

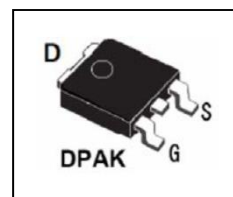
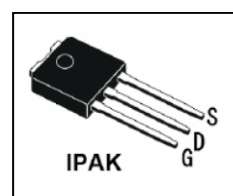
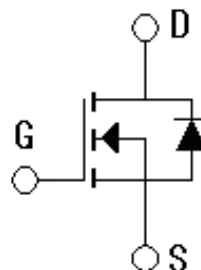
### APPLICATIONS

- High power DC/DC Converters and switch mode power supplies
- Synchronous Rectification in DC/DC and AC/DC Converters
- DC Motor Control

### FEATURES

- Low gate charge
- Low  $R_{dson}$
- Fast switching
- 100% avalanche tested
- Highest reliability
- 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		
MC10N020-V-B	MC10N020-V-BR	N/A	N/A	MC10N020	IPAK
MC10N020-R-B	MC10N020-R-BR	MC10N020-R-A	MC10N020-R-AR	MC10N020	DPAK

绝对最大额定值 ABSOLUTE RATINGS ( $T_c=25^\circ\text{C}$ )

项 目 Parameter	符 号 Symbol	数 值 Value	单 位 Unit
		MC10N020	
最高漏极-源极直流电压 Drain-Source Voltage	$V_{DSS}$	100	V
连续漏极电流 Drain Current -continuous	$I_D$ $T=25^\circ\text{C}$	45*	A
	$I_D$ $T=100^\circ\text{C}$	29*	A
最大脉冲漏极电流 (注1) Drain Current - pulse (note 1)	$I_{DM}$	180*	A
最高栅源电压 Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
单脉冲雪崩能量 (注2) Single Pulsed Avalanche Energy (note 2)	$E_{AS}$	130	mJ
雪崩电流 (注1) Avalanche Current (note 1)	$I_{AS}$	23	A
耗散功率 Power Dissipation	$P_D$ $T_c=25^\circ\text{C}$ -Derate above $25^\circ\text{C}$	96	W
		0.77	W/ $^\circ\text{C}$
最高结温及存储温度 Operating and Storage Temperature Range	$T_J, T_{STG}$	$-55 \sim +150$	$^\circ\text{C}$
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	$T_L$	300	$^\circ\text{C}$

\*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	$I_{GSSF}$	$V_{DS}=0V, V_{GS}=20V$	-	-	100	nA
反向栅极体漏电流 Gate-body leakage current, reverse	$I_{GSSR}$	$V_{DS}=0V, V_{GS}=-20V$	-	-	-100	nA
<b>通态特性 On-Characteristics</b>						
阈值电压 Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D=250\mu A$	2	2.5	4	V
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=20A$	-	17	20	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	$R_g$	$f=1.0MHz, open\ drain$	-	1.5	-	$\Omega$
输入电容 Input capacitance	$C_{iss}$	$V_{DS}=50V,$ $V_{GS}=0V,$ $f=1.0MHz$	-	1400	-	pF
输出电容 Output capacitance	$C_{oss}$		-	175	-	pF
反向传输电容 Reverse transfer capacitance	$C_{rss}$		-	7	-	pF

**电特性 ELECTRICAL CHARACTERISTICS**

开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	$t_d(\text{on})$	$V_{DD}=50V, V_{GS}=10V$	-	11	-	ns
上升时间 Turn-On rise time	$t_r$		-	60	-	ns
延迟时间 Turn-Off delay time	$t_d(\text{off})$	$I_D=30A, R_G=5.0\Omega$ , (note 3, 4)	-	17	-	ns
下降时间 Turn-Off Fall time	$t_f$		-	57	-	ns
栅极电荷总量 Total Gate Charge	$Q_g$	$V_{DS}=50V, V_{GS}=10V$ $I_D=30A$ (note 3, 4)	-	21	-	nC
栅-源电荷 Gate-Source charge	$Q_{gs}$		-	10	-	nC
栅-漏电荷 Gate-Drain charge	$Q_{gd}$		-	3.7	-	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	$I_S$	$T_C=25^\circ\text{C}$	-	-	45	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current	$I_{SM}$	$T_C=25^\circ\text{C}$	-	-	180	A
正向压降 Drain-Source Diode Forward Voltage	$V_{SD}$	$T_J=25^\circ\text{C}, V_{GS}=0V, I_{SD}=20A$	-	0.9	1.3	V
反向恢复时间 Reverse recovery time	$T_{rr}$	$V_{GS}=0V, I_S=30A$ $dI_F/dt=100A/\mu\text{s}$ (note 4)		55		ns
反向恢复电荷 Reverse recovery charge	$Q_{rr}$			100		nc

**热特性 THERMAL CHARACTERISTIC**

项 目 Parameter	符 号 Symbol	最大 Max	单 位 Unit
		MC10N020	
结到管壳的热阻 Thermal Resistance, Junction to Case	$R_{th(j-c)}$	1.50	$^\circ\text{C}/\text{W}$
结到环境的热阻 Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	62.5	$^\circ\text{C}/\text{W}$

注释:

1: 脉冲宽度由最高结温限制

2:  $I_{AS}=23A, V_{DD}=50V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$ , 起始结温  $T_J=25^\circ\text{C}$ 3: 脉冲测试: 脉冲宽度 $\leq 300\mu\text{s}$ , 占空比 $\leq 2\%$ 

4: 基本与工作温度无关

Notes:

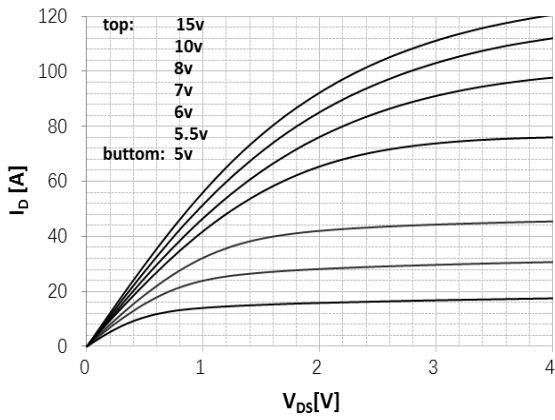
1: Pulse width limited by maximum junction temperature

2:  $I_{AS}=23A, V_{DD}=50V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$ 3: Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ 

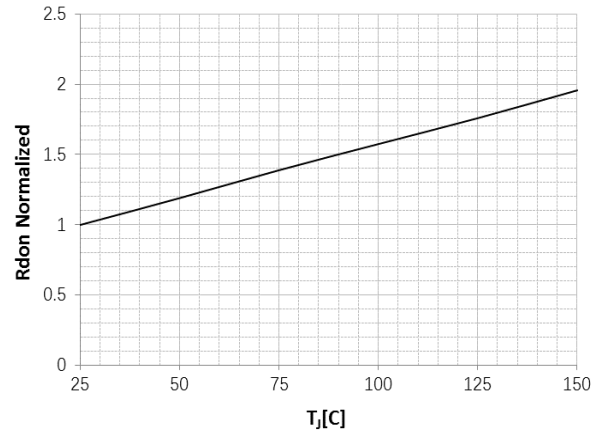
4: Essentially independent of operating temperature



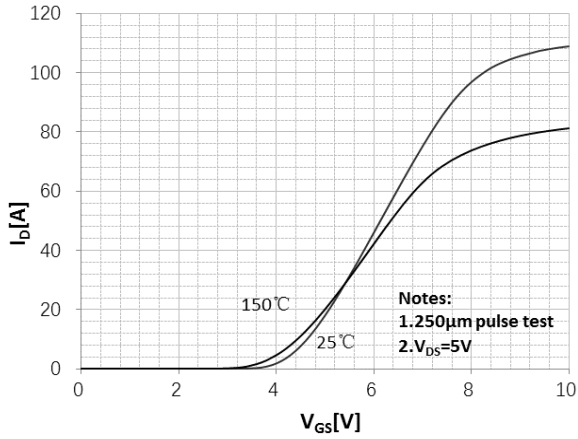
On-Region Characteristics



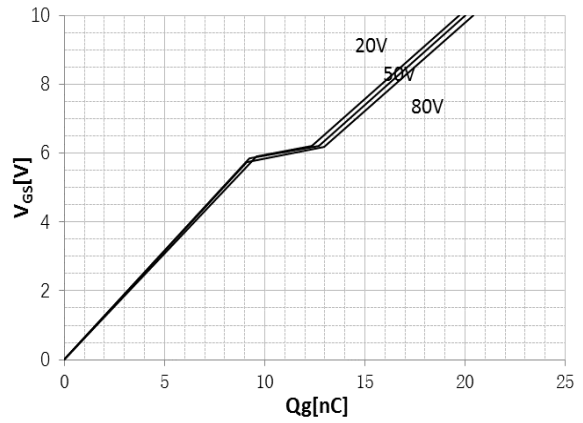
RDSON vs.Tj



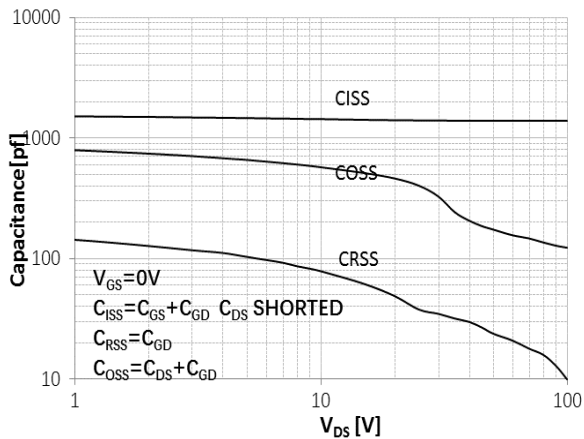
Transfer Characteristics



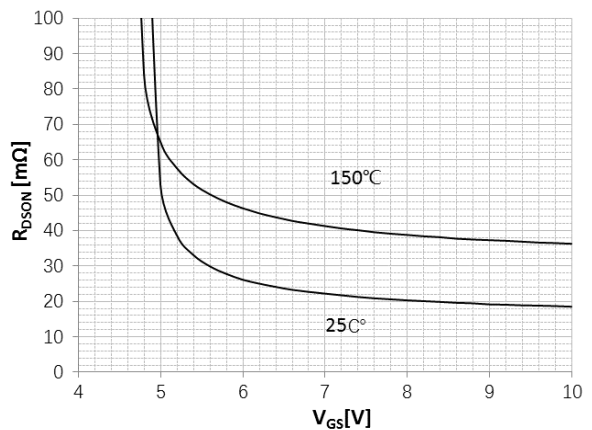
Gate Charge Characteristics



Capacitance Characteristics

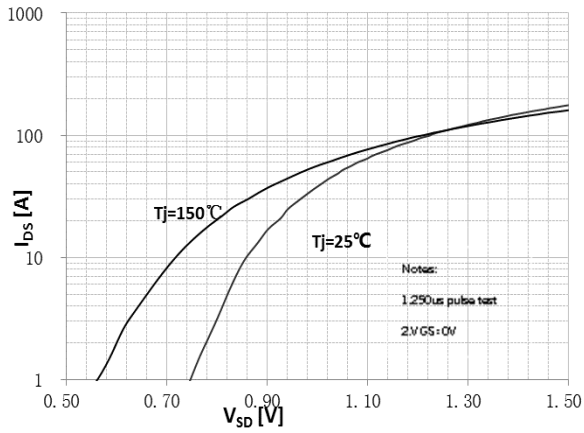


Drain-Source on resistance

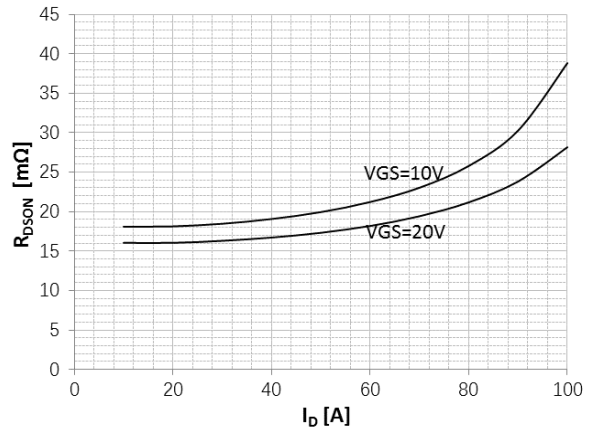




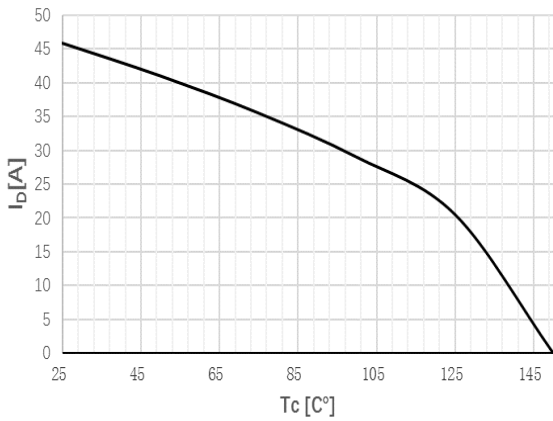
**Body Diode Forward Voltage Variation vs. Source Current and Temperature**



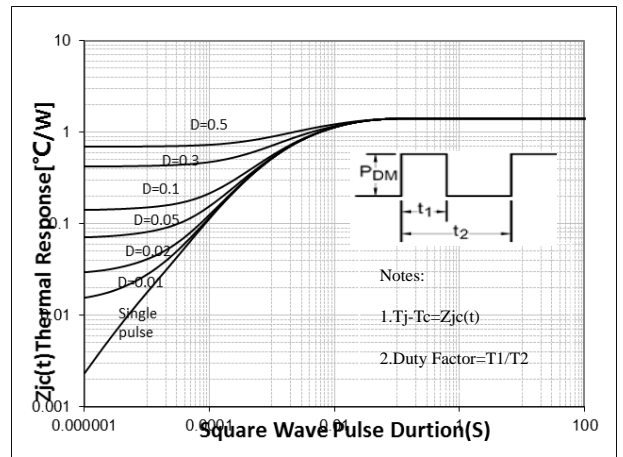
**On-Resistance Variaton vs. Drain Current and Gate Voltage**



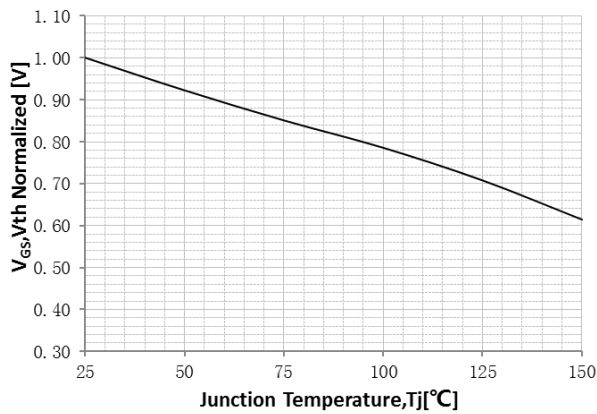
**Drain Current Dissipation vs Tc**



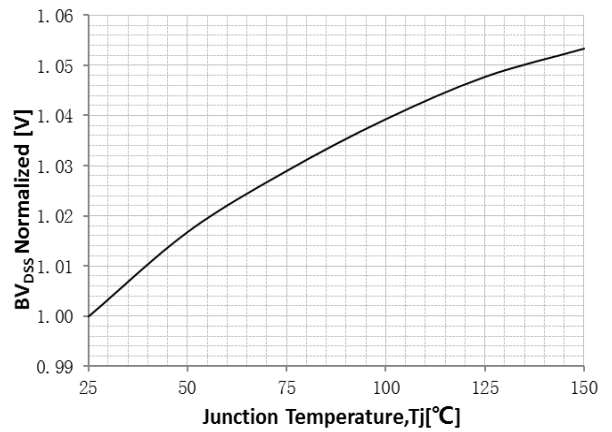
**Transient Thermal Impedance**



**Gate Threshold Voltage Variation vs Tj**

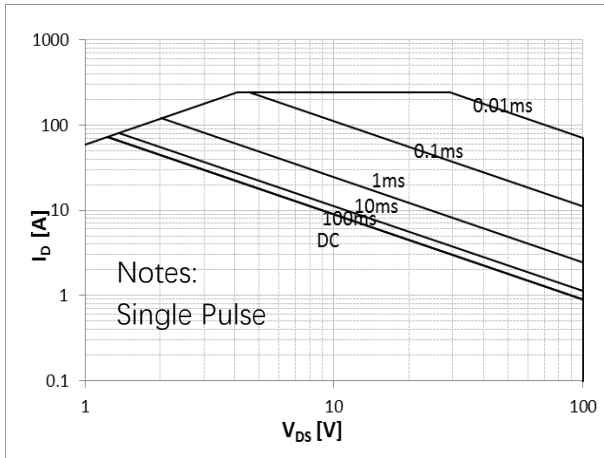


**Breakdown Voltage Variation vs Tj**

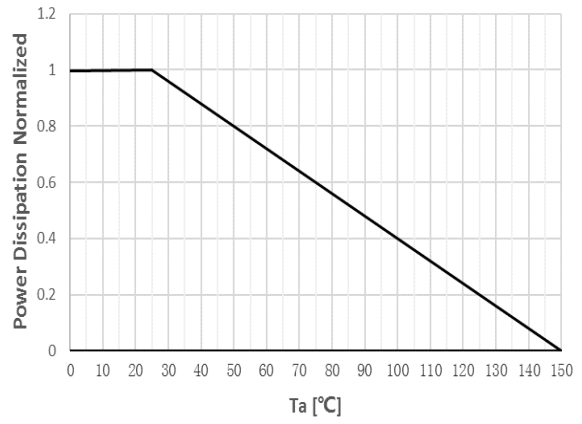




Maximum Safe Operation



Power Dissipation vs Ta

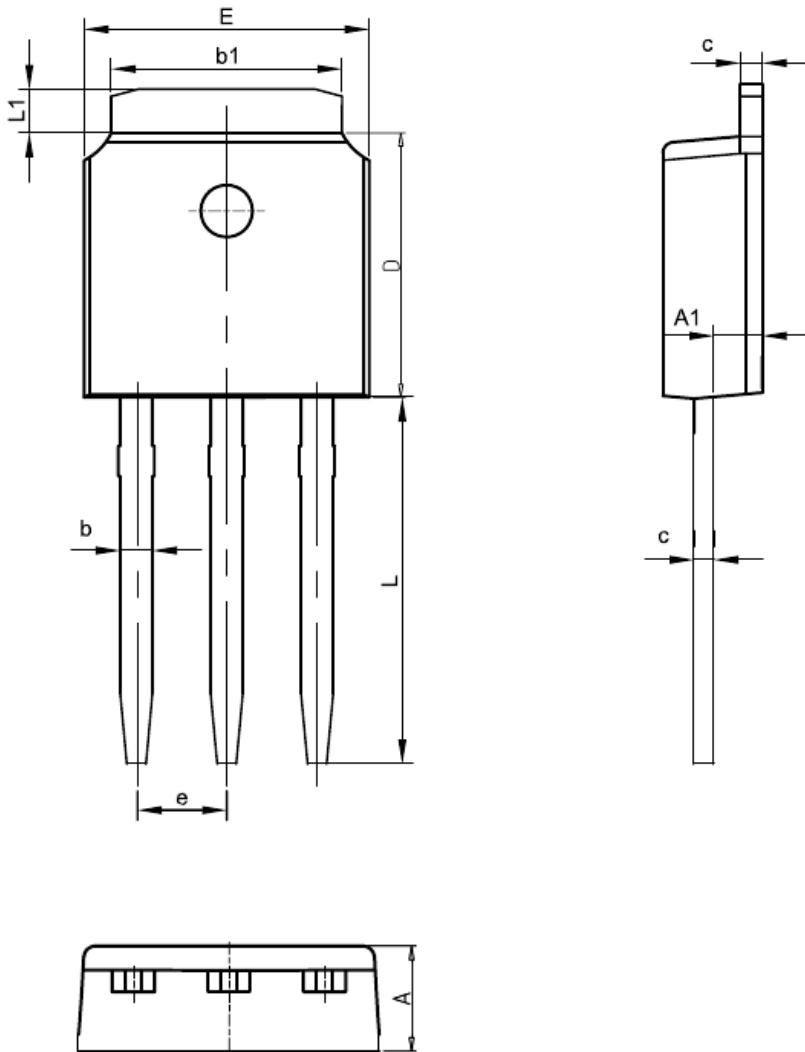




## 外形尺寸 PACKAGE MECHANICAL DATA

IPAK

单位 Unit: mm



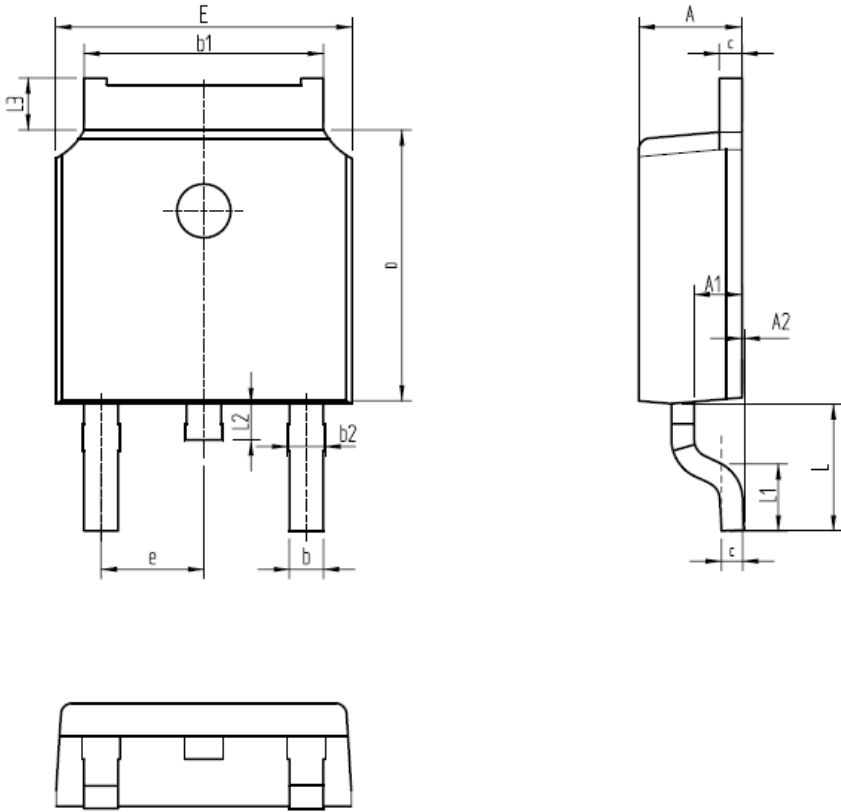
SYMBOL	MM	
	MIN	MAX
A	2.1	2.5
A1	0.87	1.27
b	0.63	0.93
b1	5.13	5.53
c	0.40	0.60
D	5.80	6.40
E	6.30	6.90
L	9.10	9.70
e	2.286BSC	
L1	0.82	1.22





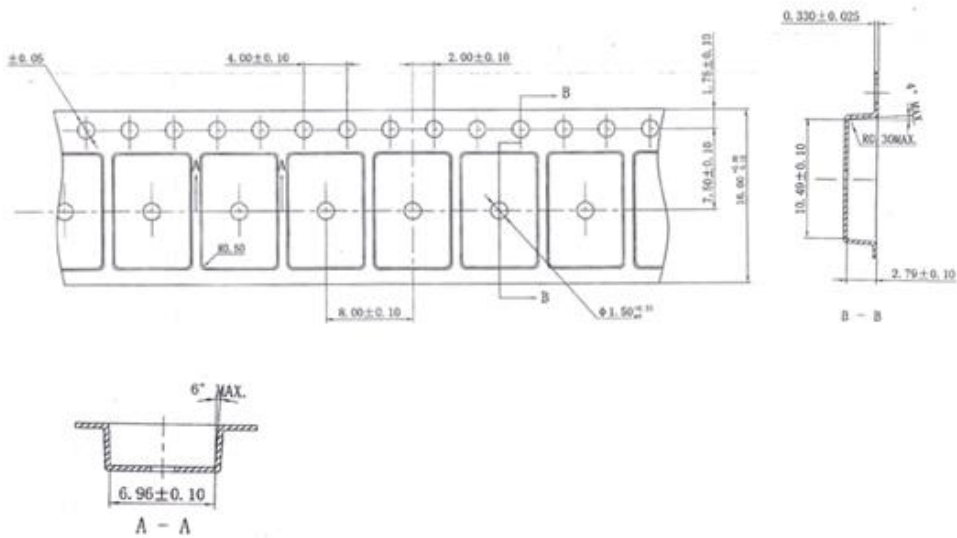
外形尺寸 PACKAGE MECHANICAL DATA  
DPAK

单位 Unit: mm



SYMBOL	mm	
	MIN	MAX
A	2.16	2.41
A1	0.97	1.17
A2	0.00	0.15
b	0.63	0.93
b1	5.13	5.53
b2	0.66	0.96
c	0.40	0.60
D	5.80	6.40
E	6.30	6.90
e	2.286BSC	
L	2.50	3.30
L1	1.20	1.80
L2	0.60	1.00
L3	0.85	1.30

编带 REEL





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3. Please do not exceed the absolute maximum ratings of the device when circuit designing.
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