

# APM9435

## P-Channel Power MOSFET

### 描述 / Descriptions

SOP-8 塑封封装 P 沟道 Power Trench MOS 场效应管。  
P-Channel Power Trench MOSFET in a SOP-8 Plastic Package.

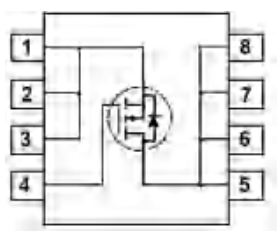
### 特征 / Features

低栅极电荷，开关速度快，高性能的沟槽技术极低的  $R_{DS(ON)}$ ，高功率和电流处理能力快。  
Low gate charge, Fast switching speed, High performance trench technology for extremely, low  $R_{DS(ON)}$ , High power and current handling capability.

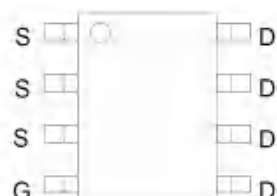
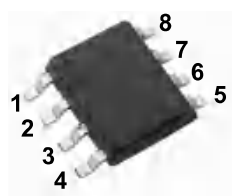
### 用途 / Applications

电源管理，负荷开关，电池保护。  
Power management, Load switch, Battery protection.

### 内部等效电路 / Equivalent Circuit



### 引脚排列 / Pinning



PIN1、PIN 2、PIN 3 : S      PIN 4 : G

PIN5、PIN 6、PIN 7、PIN 8 : D

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**极限参数 / Absolute Maximum Ratings(Ta=25°C)**

参数 Parameter	符号 Symbol	数值 Rating	单位 Unit
Drain-Source Voltage	$V_{DSS}$	-30	V
Gate-Source Voltage	$V_{GS}$	±20	V
Drain Current –Continuous –Pulsed (note 1a)	$I_D$	-5.3	A
		-50	A
Power Dissipation for Single Operation (note 1a) (note 1b) (note 1c)	$P_D$	2.5	W
		1.2	
		1.0	
Thermal Resistance, Junction-to-Ambient (note 1a)	$R_{\theta JA}$	50	°C/W
Thermal Resistance, Junction-to-Ambient (note 1c)	$R_{\theta JA}$	125	°C/W
Thermal Resistance, Junction-to case (note 1)	$R_{\theta JC}$	25	°C/W
Operating and Junction Temperature Range	$T_j$ $T_{stg}$	-55~175	°C

**电性能参数 / Electrical Characteristics(Ta=25°C)**

参数 Parameter	符号 Symbol	测试条件 Test Conditions	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
Drain-Source Breakdown Voltage	$V_{DSS}$	$V_{GS}=0V$ $I_D=-250\mu A$	-30			V
Breakdown Voltage Temperature Coefficient	$\Delta B_{V_{DSS}}/\Delta T_J$	$I_D=-250\mu A$ Referenced to 25°C		-23		mV/°C
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-24V$ $V_{GS}=0V$			-1.0	μA
Gate-Body Leakage Current Forward	$I_{GSS}$	$V_{GS}=\pm 20V$ $V_{DS}=0V$			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ $I_D=-250\mu A$	-1.0	-1.7	-3.0	V
Gate Threshold Voltage Temperature Coefficient	$\Delta V_{GS(th)}/\Delta T_J$	$I_D=-250\mu A$ Referenced to 25°C		4.5		mV/°C
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-10V$ $I_D=-5.3A$		50	58	mΩ
		$V_{GS}=-4.5V$ $I_D=-4A$		65	80	
		$V_{GS}=-10V$ $I_D=-5.3A$ $T_J=125^\circ C$		57	77	
On-State Drain Current	$I_{D(on)}$	$V_{GS}=-10V$ $V_{DS}=-5V$	-25			A
Forward Transconductance	$g_{FS}$	$V_{DS}=-5V$ $I_D=-5.3A$		10		S

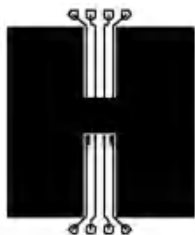
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**P-Channel Power MOSFET**
**电性能参数 / Electrical Characteristics(Ta=25°C)**

参数 Parameter	符号 Symbol	测试条件 Test Conditions	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
Input Capacitance	$C_{iss}$	$V_{DS}=-15V$ $V_{GS}=0V$ $f=1.0MHz$		528		pF
Output Capacitance	$C_{oss}$			132		
Reverse Transfer Capacitance	$C_{rss}$			70		
Total Gate Charge	$Q_g$	$V_{DS}=-15V$ $I_D=-4A$ $V_{GS}=-10V$		10	14	nC
Gate-Source Charge	$Q_{gs}$			2.2		
Gate-Drain Charge	$Q_{gd}$			2.0		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=-15V$ $I_D=-1A$ $V_{GS}=-10V$ $R_{GEN}=6W$		7.0	14	ns
Turn-On Rise Time	$t_r$			13	24	
Turn-Off Delay Time	$t_{d(off)}$			14	25	
Turn-Off Fall Time	$t_f$			9.0	17	
Continuous Drain-Source Diode Forward Current	$I_S$				-2.1	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V$ $I_S=-2.1A$ (Note2)		-0.8	-1.2	V

**Notes:**

1.  $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.  $R_{\theta JC}$  is guaranteed by design while  $R_{\theta CA}$  is determined by the user's board design.

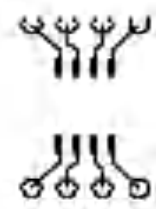
a) 50°C/W when mounted on a 1.0 in<sup>2</sup> pad of 2 oz. copper.



b) 105°C/W when mounted on a 0.04in<sup>2</sup> pad of 2 oz. copper.



c) 125°C/W when mounted on a minimum pad.



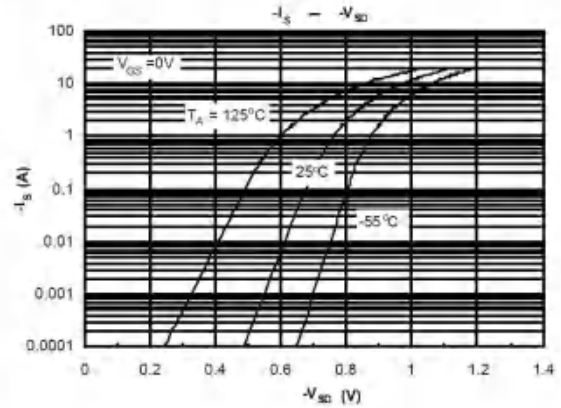
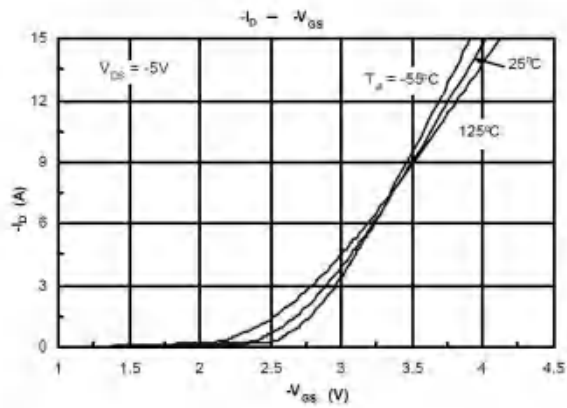
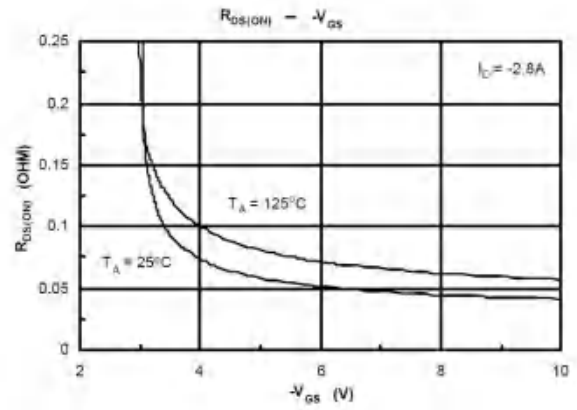
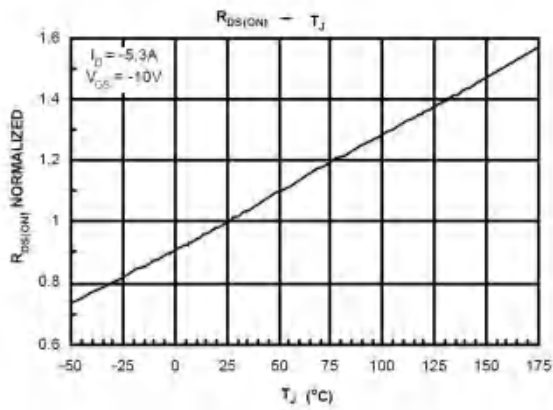
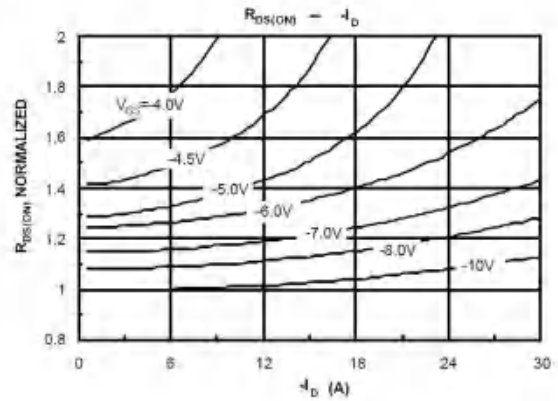
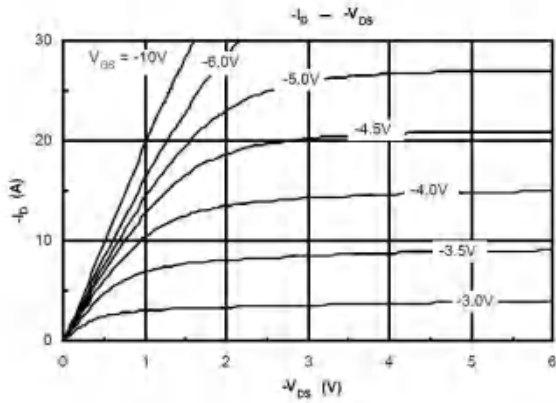
Scale 1 : 1 on letter size paper

2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

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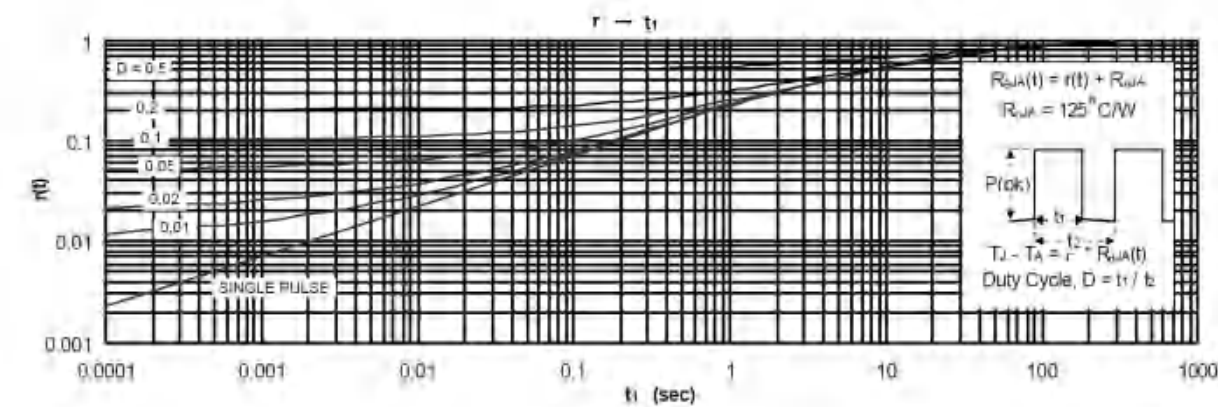
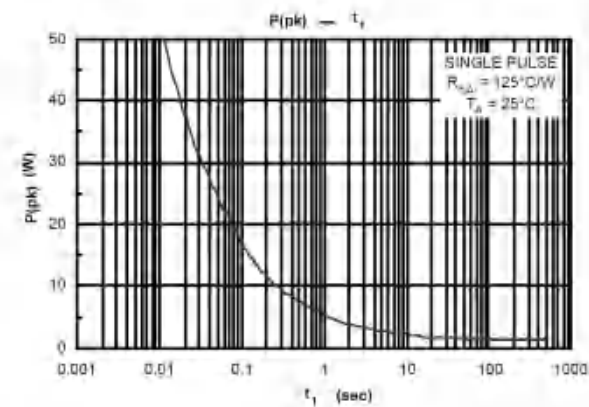
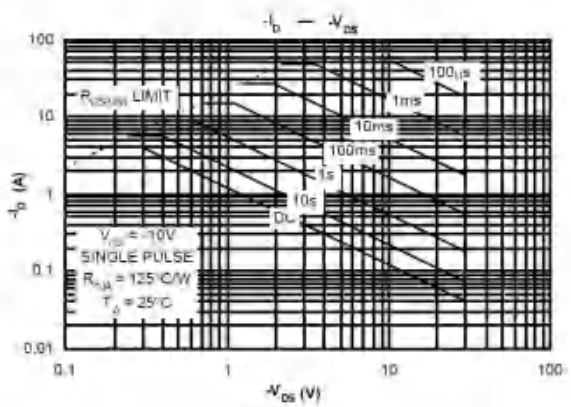
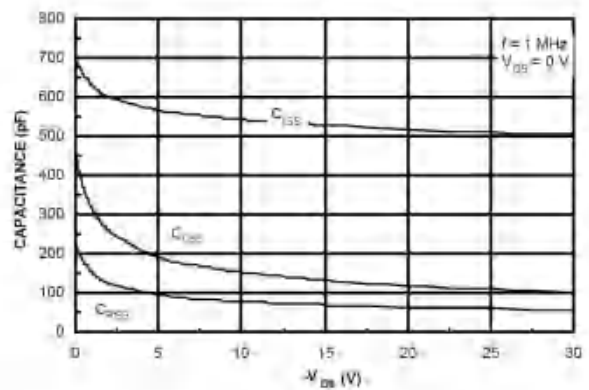
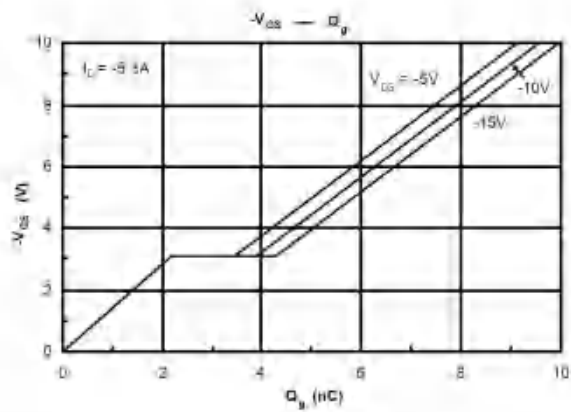
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### 电参数曲线图 / Electrical Characteristic Curve



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电参数曲线图 / Electrical Characteristic Curve



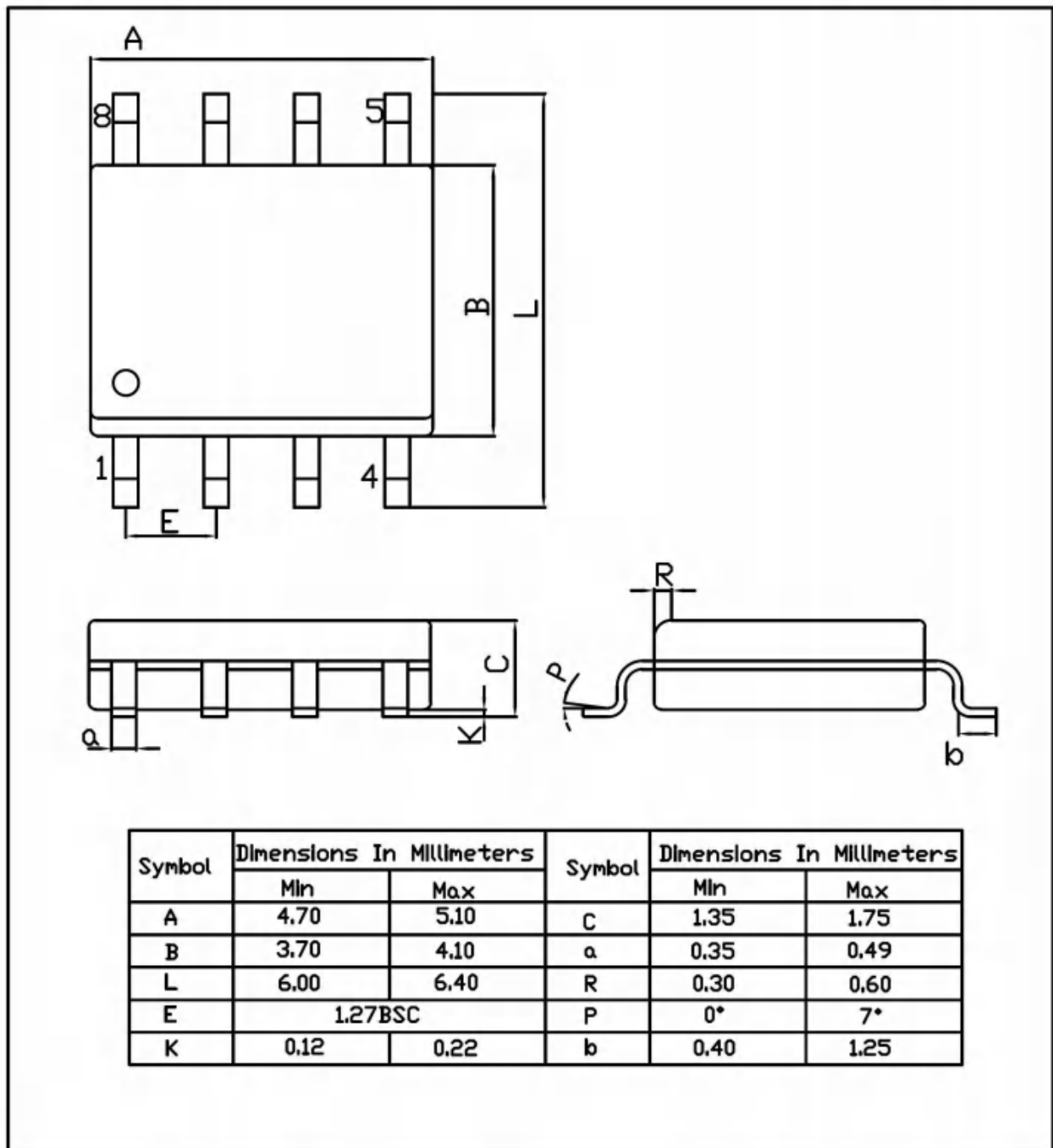
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外形尺寸图 / Package Dimensions

SOP-8

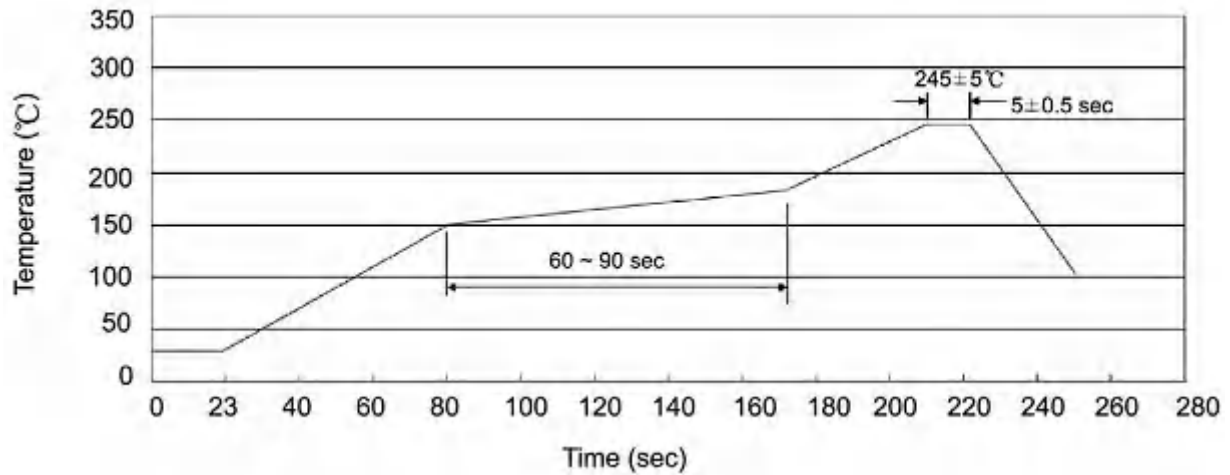
Unit:mm



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**回流焊温度曲线图(无铅) / Temperature Profile for IR Reflow Soldering(Pb-Free)**



说明：

- 1、预热温度 25~150°C，时间 60~90sec;
- 2、峰值温度 245±5°C，时间持续为 5±0.5sec;
- 3、焊接制程冷却速度为 2~10°C/sec.

Note:

- 1.Preheating:25~150°C, Time:60~90sec.
- 2.Peak Temp.:245±5°C, Duration:5±0.5sec.
3. Cooling Speed: 2~10°C/sec.

**耐焊接热试验条件 / Resistance to Soldering Heat Test Conditions**

温度：260±5°C      时间：10±1 sec.

Temp.:260±5°C      Time:10±1 sec

**包装规格 / Packaging SPEC.**

卷盘包装 / REEL

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm <sup>3</sup> )		
	Units/Reel 只/卷盘	Reels/Inner Box 卷盘/盒	Units/Inner Box 只/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/箱	Reel	Inner Box 盒	Outer Box 箱
SOP/ESOP-8	4,000	2	8,000	5	40,000	13" ×16	360×360×50	385×257×392

**使用说明 / Notices**