

### 描述 / Descriptions

SOP-8 塑封封装 N 沟道双芯片场效应管。

N- Channel Enhancement Double Mode Field Effect Transistor in a SOP-8 Plastic Package.

### 特征 / Features

$V_{DS} (V) = 60V$

$I_D = 4.5 A (V_{GS} = 10V)$

$R_{DS(ON)} < 50m\Omega (V_{GS} = 10V)$

$R_{DS(ON)} < 65m\Omega (V_{GS} = 4.5V)$

### 用途 / Applications

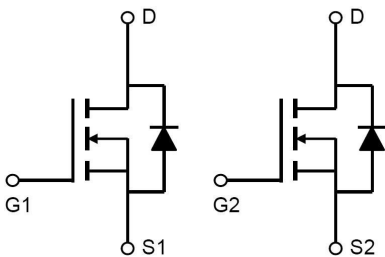
使用先进沟槽工艺制造而成，拥有良好的  $R_{DS(ON)}$  参数和极低的栅极电荷。

用于作负载开关或脉宽调制应用。

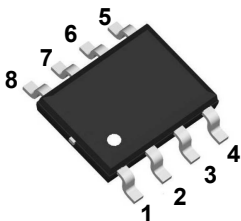
Uses advanced trench technology to provide excellent  $R_{DS(ON)}$  and low gate charge.

This device is suitable for use as a load switch or in PWM applications..

### 内部等效电路 / Equivalent Circuit



### 引脚排列 / Pinning



PIN 1 : S2    PIN 2 : G2    PIN 3 : S1    PIN 4 : G1

PIN 5 : D1    PIN 6 : D1    PIN 7 : D2    PIN 8 : D2

### 印章代码 / Marking

见印章说明 See Marking Instructions.

**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 <sub>DSS</sub>	60	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current <sup>AF</sup>	I <sub>D</sub> (T <sub>a</sub> =25°C)	4.5	A
Continuous Drain Current <sup>AF</sup>	I <sub>D</sub> (T <sub>a</sub> =70°C)	3.6	A
Pulsed Drain Current <sup>B</sup>	I <sub>DM</sub>	20	A
Power Dissipation for Single Operation <sup>A</sup>	P <sub>D</sub> (T <sub>a</sub> =25°C)	2	W
Power Dissipation for Single Operation <sup>A</sup>	P <sub>D</sub> (T <sub>a</sub> =70°C)	1.28	W
Avalanche Current <sup>B</sup>	I <sub>AR</sub> , I <sub>AS</sub>	19	A
Repetitive avalanche energy 0.1mH <sup>B</sup>	E <sub>AR</sub> , E <sub>AS</sub>	18	mJ
Junction and Storage Temperature Range	T <sub>j</sub> , T <sub>stg</sub>	-55 ~ +150	°C

**热特性 / Thermal Characteristics**

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
Maximum Junction-to-Ambient <sup>A</sup>	R <sub>θJA</sub>	t ≤ 10s		48	62.5	°C/W
Maximum Junction-to-Ambient <sup>AD</sup>		steady-State		74	110	
Maximum Junction-to-Case	R <sub>θJC</sub>	Steady-State		35	60	

Note:

A: A: The value of R<sub>qJA</sub> is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C. The R<sub>θJA</sub> is the sum of the thermal impedance from junction to lead R<sub>qJL</sub> and lead to ambient.

D. The static characteristics in Figures 1 to 6 are obtained using <300 ms pulses, duty cycle 0.5% max.

E. These tests are performed with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The SOA curve provides a single pulse rating.

F. The current rating is based on the t ≤ 10s junction to ambient thermal resistance rating.

**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
<b>静态参数 STATIC PARAMETERS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\mu A$ $V_{GS}=0V$	60			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=60V$ $V_{GS}=0V$			1	$\mu A$
		$V_{DS}=60V$ $V_{GS}=0V$ $T_J=55^\circ C$			5	
Gate-Body leakage current	$I_{GSS}$	$V_{DS}=0V$ $V_{GS}=\pm 20V$			100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ $I_D=250\mu A$	1.0	1.6	3.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V$ $I_D=4.5A$		45	50	m $\Omega$
		$V_{GS}=10V$ $I_D=4.5A$ $T_J=125^\circ C$		79	100	
		$V_{GS}=4.5V$ $I_D=3A$		55	65	
Forward Transconductance	$g_{FS}$	$V_{DS}=5V$ $I_D=4.5A$		8.0		S
Diode Forward Voltage	$V_{SD}$	$I_S=1A$ $V_{GS}=0V$		0.74	1	V
Maximum Body-Diode Continuous Current	$I_S$				3	A
Pulsed Body Diode Current <sup>B</sup>	$I_{SM}$				20	A
<b>动态参数 DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{iss}$	$V_{GS}=0V$ $f=1MHz$		665		pF
Output Capacitance	$C_{oss}$			76		
Reverse Transfer Capacitance	$C_{rss}$			20		
Gate resistance	$R_g$	$V_{GS}=0V,$ $f=1MHz$ $V_{DS}=0V,$		2.2		$\Omega$
<b>开关参数 SWITCHING PARAMETERS</b>						
Total Gate Charge	$Q_g(10V)$	$V_{GS}=10V$ $V_{DS}=30V$ $I_D=4.5A$		8.5	10.5	nC
Total Gate Charge	$Q_g(4.5V)$			4.3	5.5	nC
Gate-Source Charge	$Q_{gs}$			1.6		nC
Gate-Drain Charge	$Q_{gd}$			2.2		nC
Turn-on Delay Time	$t_{d(ON)}$	$V_{GS}=10V$ $V_{DS}=30V$ $R_L=6.7\Omega,$ $R_{GEN}=3\Omega$		4.7		ns
Turn-on Rise Time	$t_r$			2.3		
Turn-off Delay Time	$t_{d(OFF)}$			15.7		
Turn-off Fall Time	$t_f$			1.9		
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F=4.5A,$ $dI/dt=100A/ms$		27.5	35	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$	$I_F=4.5A,$ $dI/dt=100A/ms$		32		nC

电参数曲线图 / Electrical Characteristic Curve

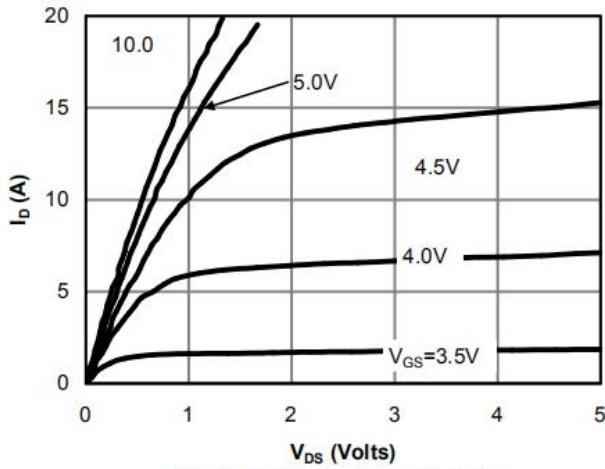


Fig 1: On-Region Characteristics

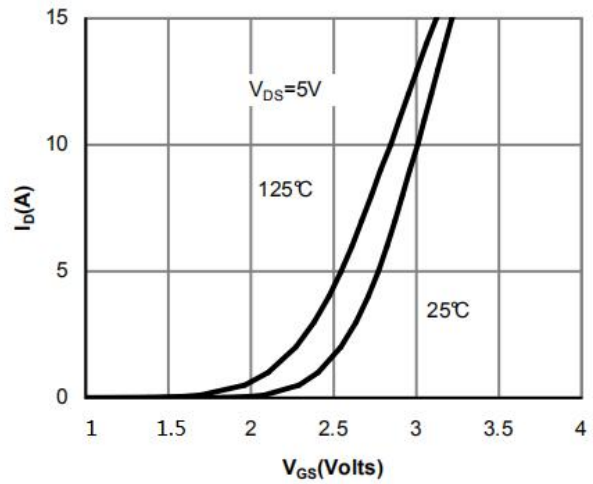


Figure 2: Transfer Characteristics

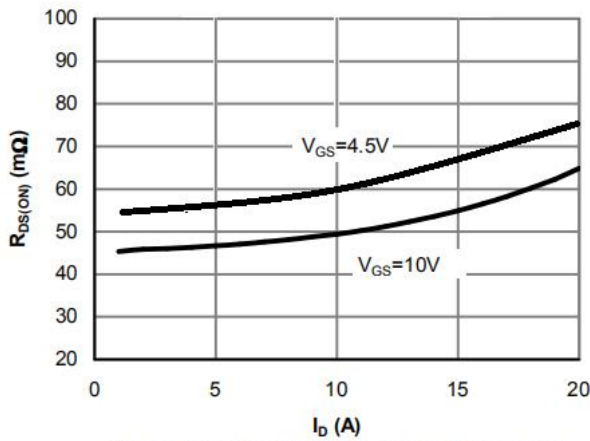


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

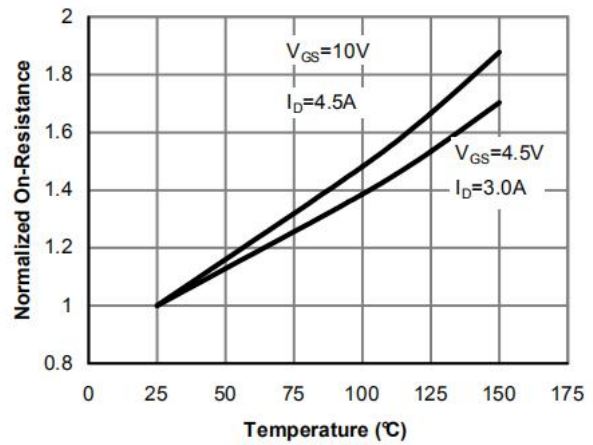


Figure 4: On-Resistance vs. Junction Temperature

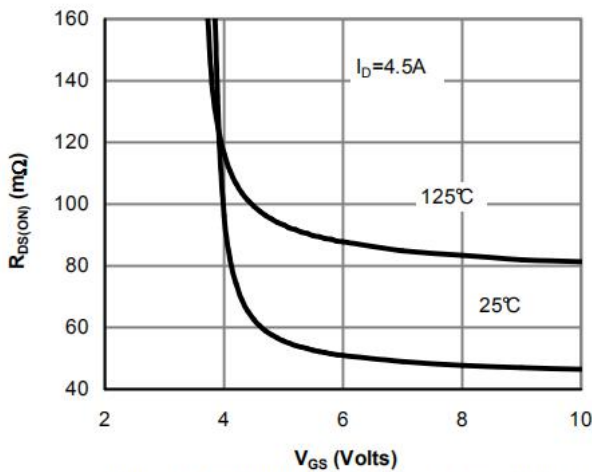


Figure 5: On-Resistance vs. Gate-Source Voltage

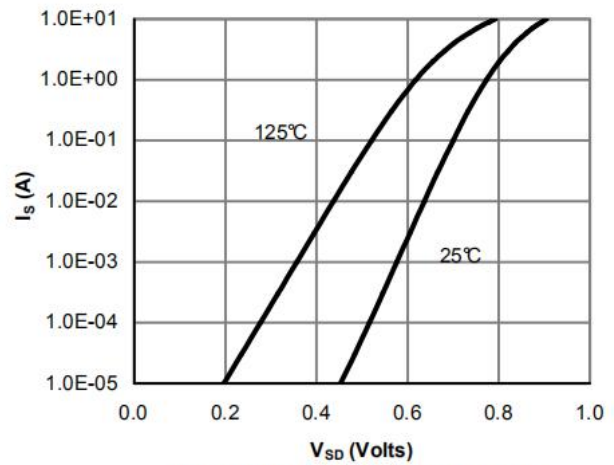
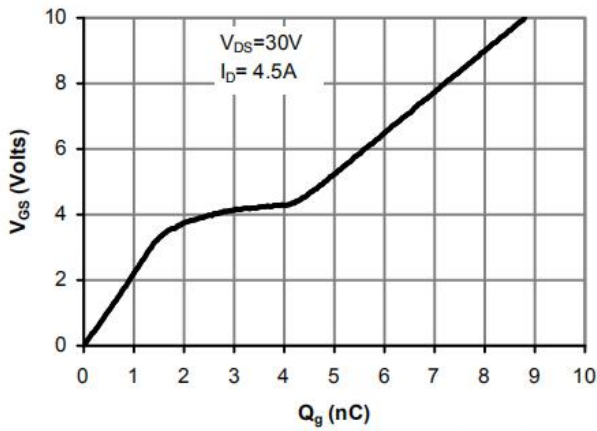
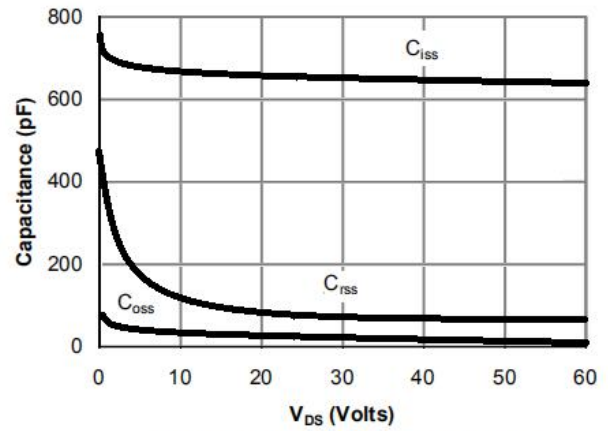


Figure 6: Body-Diode Characteristics

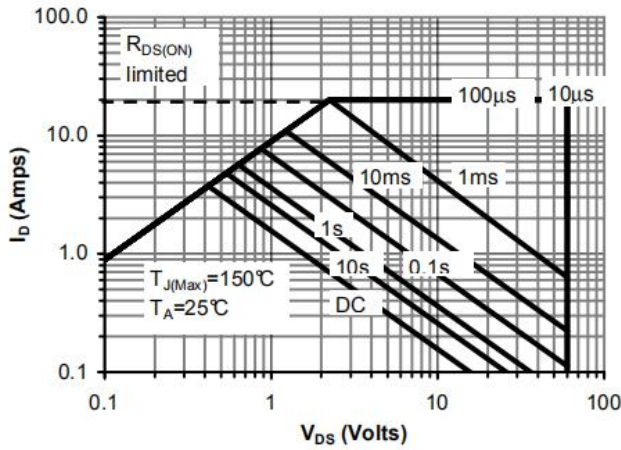
**电参数曲线图 / Electrical Characteristic Curve**



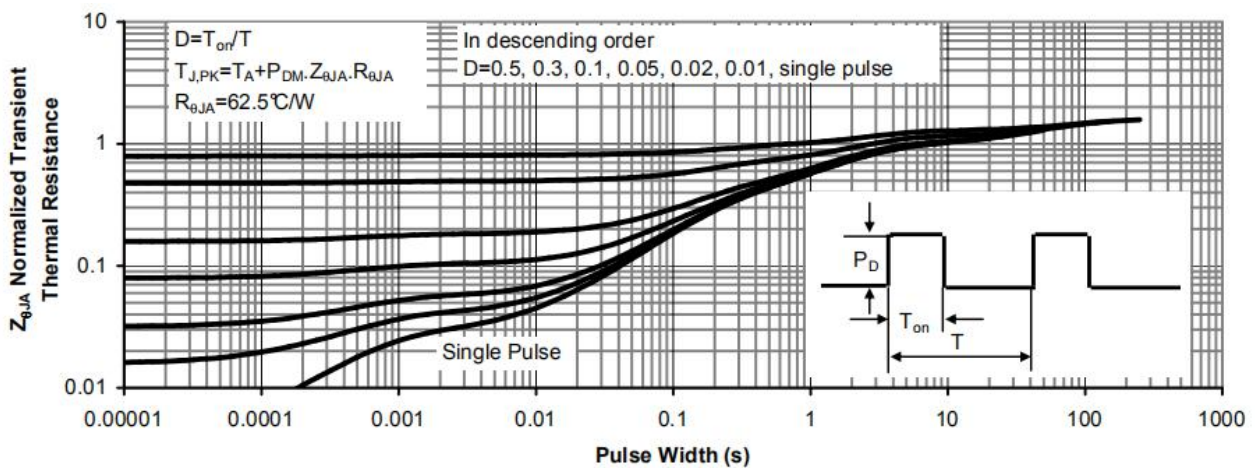
**Figure 7: Gate-Charge Characteristics**



**Figure 8: Capacitance Characteristics**



**Figure 9: Maximum Forward Biased Safe Operating Area**

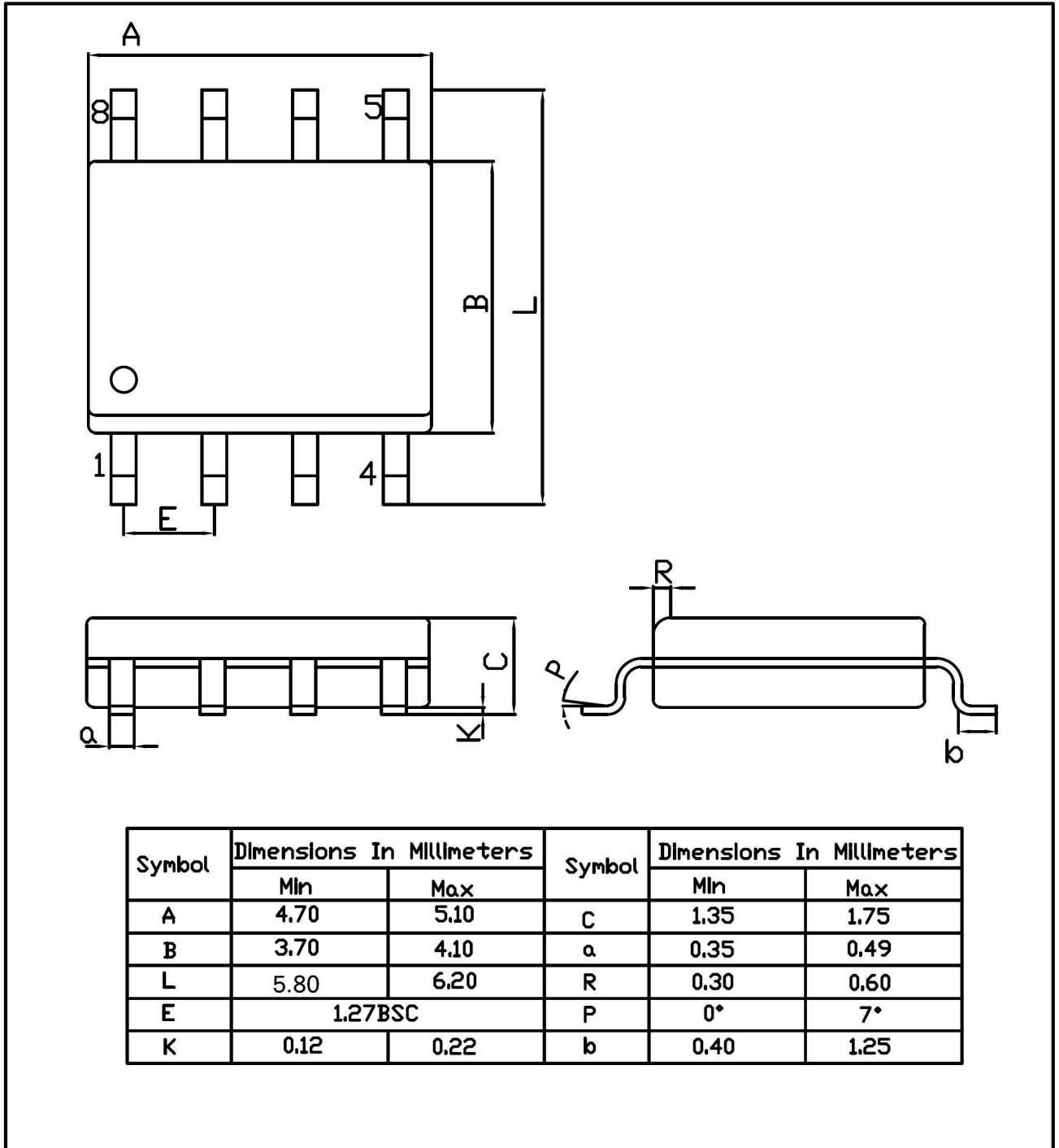


**Figure 10: Normalized Maximum Transient Thermal Impedance**

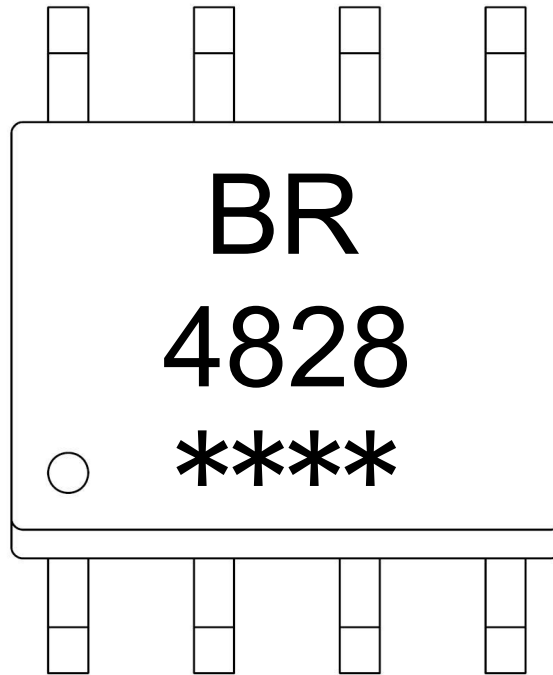
外形尺寸图 / Package Dimensions

SOP-8

Unit:mm



印章说明 / Marking Instructions



说明：

BR： 为公司代码

4828： 为型号代码

\*\*\*\*\*： 为生产批号代码，随生产批号变化。

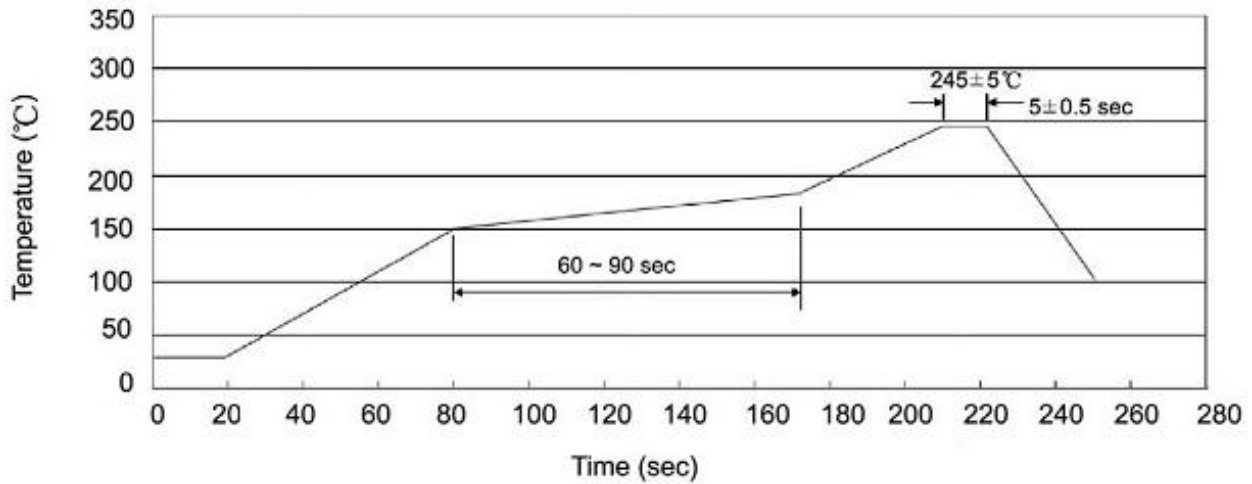
Note:

BR: Company Code.

4828: Product Type

\*\*\*\*\*: Lot No. Code, code change with Lot No.

**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 150 ~ 180°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:150~180°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	6	48,000	13" ×12	360×360×50	380×335×366

**使用说明 / Notices**