

描述 / Descriptions

SOP-8 塑封封装 P 沟道 MOS 场效应管。

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

特征 / Features

$V_{DS(V)} = -40V$

$I_D = -6 A (V_{GS} = -10V)$

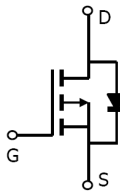
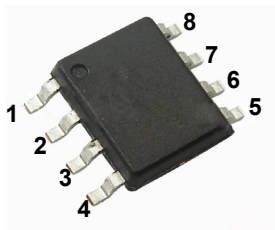
$R_{DS(ON)} < 42m\Omega (V_{GS} = -10V)$

$R_{DS(ON)} < 63m\Omega (V_{GS} = -4.5V)$

用途 / Applications

电池保护，负载开关。

Battery protection, Load Switch.

内部等效电路 / Equivalent Circuit**引脚排列 / Pinning**

PIN 1 : S PIN 2 : S PIN 3 : S PIN 4 : G

PIN 5 : D PIN 6 : D PIN 7 : D PIN 8 : D

放大及印章代码 / h_{FE} Classifications & 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_{DSS}	-40	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current	$I_D (T_a=25^\circ\text{C})$	-6	A
Continuous Drain Current	$I_D (T_a=70^\circ\text{C})$	-5	A
Pulsed Drain Current ^C	I_{DM}	-40	A
Avalanche Current ^C	I_{AS}, I_{AR}	20	A
Avalanche energy $L=0.1\text{mH}$ ^C	E_{AS}, E_{AR}	20	mJ
Power Dissipation ^B	$P_D (T_a=25^\circ\text{C})$	3.1	W
	$P_D (T_a=70^\circ\text{C})$	2	W
Junction and Storage Temperature Range	T_j, T_{stg}	-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 ^A	$R_{\theta JA}$	$t \leq 10\text{s}$		31	40	°C/W
Maximum Junction-to-Ambient ^{A D}				59	75	
Maximum Junction-to-Lead	$R_{\theta JL}$			16	24	°C/W

Note:

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on $T_{J(MAX)}=150^\circ\text{C}$, using $\leq 10\text{s}$ junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_j=25^\circ\text{C}$.

D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using $<300\text{ms}$ pulses, duty cycle 0.5%max.

F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)}=150^\circ\text{C}$. The SOA curve provides a single pulse 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
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D = -250\mu A$ $V_{GS} = 0V$	-40			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -40$ $V_{GS} = 0V$			-1.0	μA
		$V_{DS} = -40$ $V_{GS} = 0V$ $T_J = 55^\circ C$			-5.0	
Gate-Body leakage current	I_{GSS}	$V_{DS} = 0V$ $V_{GS} = \pm 20$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ $I_D = -250\mu A$	-1.5	-2.0	-2.6	V
On state drain current	$I_{D(ON)}$	$V_{GS} = -10V$ $V_{DS} = -5V$	40			A
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS} = -10V$ $I_D = -6A$		35	42	m Ω
		$V_{GS} = -10V$ $I_D = -6A$ $T_J = 125^\circ C$		53	65	
		$V_{GS} = -4.5V$ $I_D = -5.0A$		46.5	63	
Forward Transconductance	g_{FS}	$V_{DS} = -5V$ $I_D = -6A$		17		S
Diode Forward Voltage	V_{SD}	$I_S = -1A$ $V_{GS} = 0V$		-0.76	-1.0	V
Maximum Body-Diode Continuous Current	I_S				-3.5	A
Total Gate Charge	$Q_{g(10V)}$	$V_{GS} = -10V$ $V_{DS} = -20V$ $I_D = -6A$		17.3	22	nC
Total Gate Charge	$Q_{g(4.5V)}$			8.4	11	
Gate-Source Charge	Q_{gs}			3.2		
Gate-Drain Charge	Q_{gd}			4.3		
Gate Resistance	R_g	$V_{GS} = 0V$ $V_{DS} = 0V$ $f = 1MHz$	7.0	14	21	Ω
Input Capacitance	C_{iss}	$V_{GS} = 0V$ $V_{DS} = -20V$ $f = 1MHz$	750	940	1175	pF
Output Capacitance	C_{oss}			97		
Reverse Transfer Capacitance	C_{rss}			72		
Turn-on Delay Time	$t_{d(ON)}$	$V_{GS} = -10V$ $V_{DS} = -20V$ $R_L = 3.35\Omega$ $R_{GEN} = 3\Omega$		10.3		ns
Turn-on Rise Time	t_r			4.3		
Turn-off Delay Time	$t_{d(OFF)}$			39		
Turn-off Fall Time	t_f			46.5		
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -6A$ $dI/dt = 100A/\mu s$		17	24	ns
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F = -6A$ $dI/dt = 100A/\mu s$		11.5		nC

电参数曲线图 / Electrical Characteristic Curve

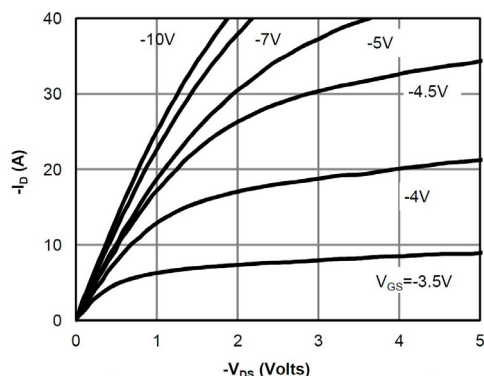


Fig 1: On-Region Characteristics (Note E)

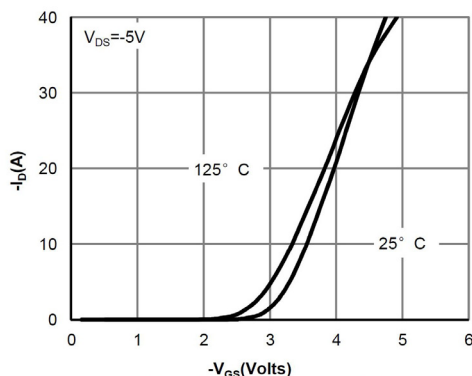


Figure 2: Transfer Characteristics (Note E)

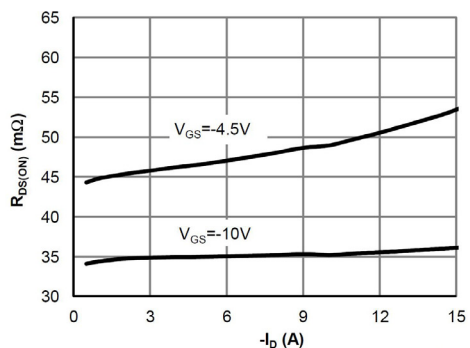


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

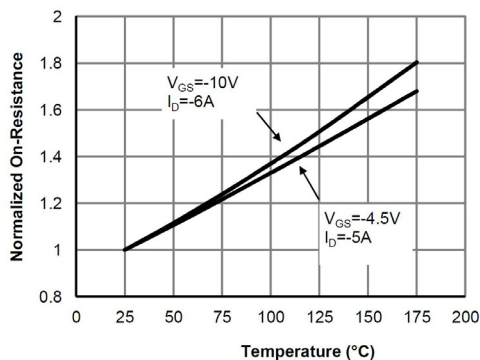


Figure 4: On-Resistance vs. Junction Temperature (Note E)

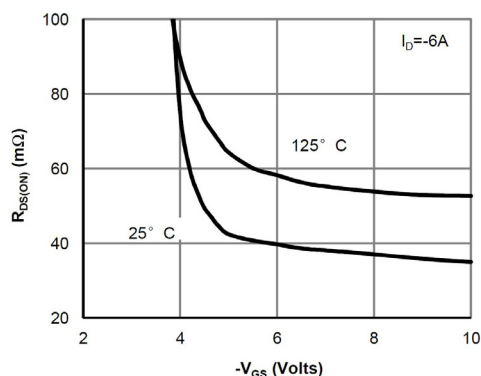


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

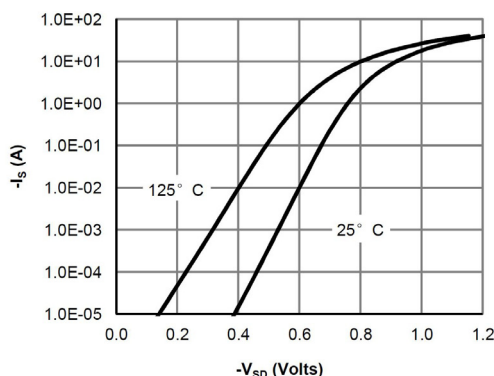


Figure 6: Body-Diode Characteristics (Note E)

电参数曲线图 / Electrical Characteristic Curve

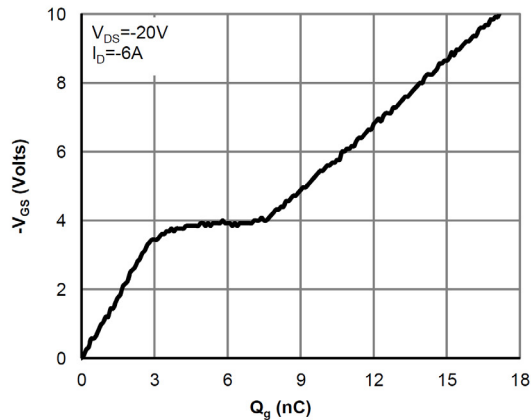


Figure 7: Gate-Charge Characteristics

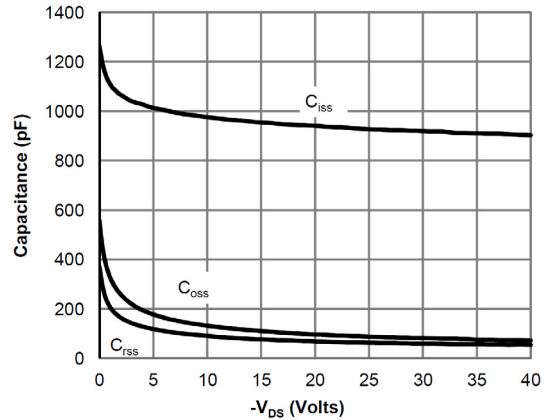


Figure 8: Capacitance Characteristics

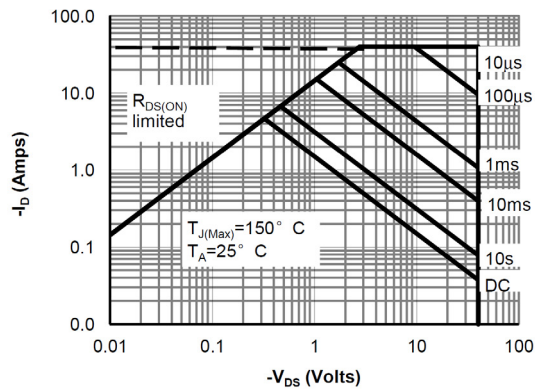


Figure 10: Maximum Forward Biased Safe Operating Area (Note F)

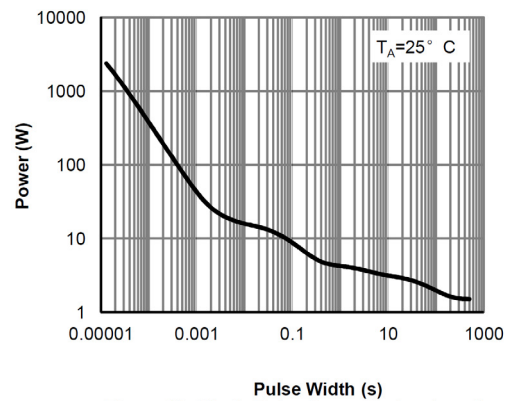


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note F)

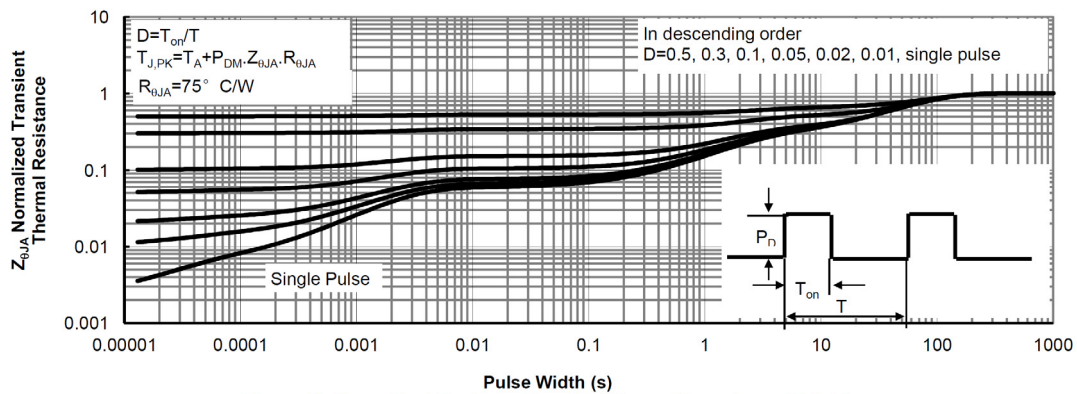
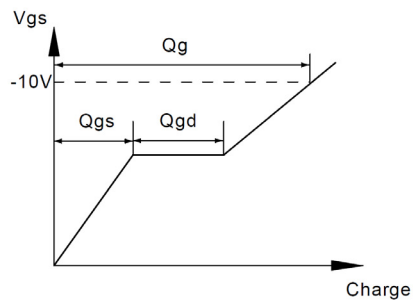
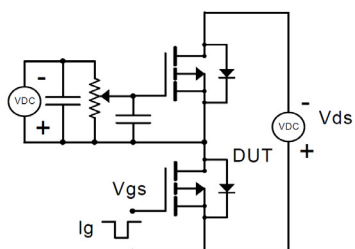


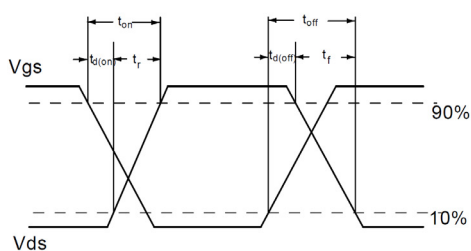
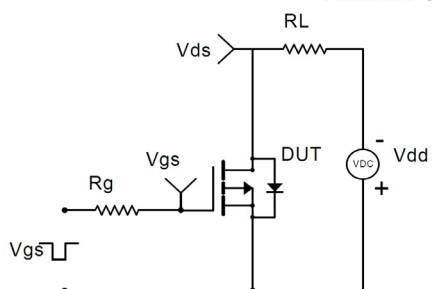
Figure 12: Normalized Maximum Transient Thermal Impedance (Note F)

测试电路和波形 / Test Circuit & Waveform

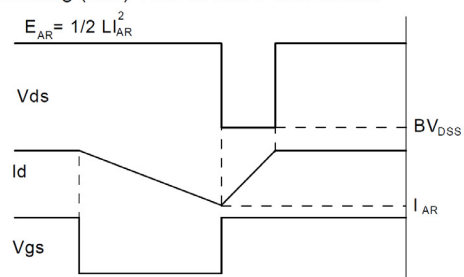
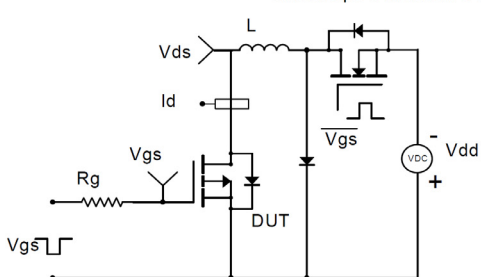
Gate Charge Test Circuit & Waveform



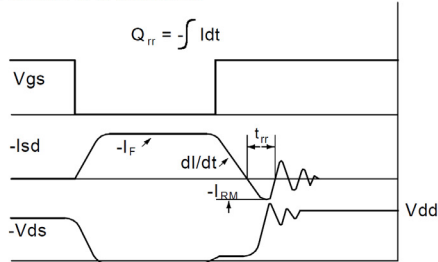
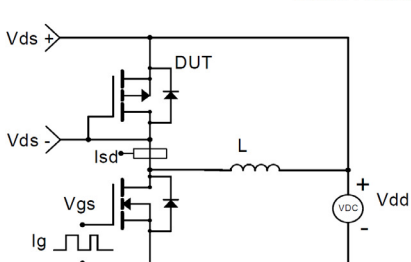
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



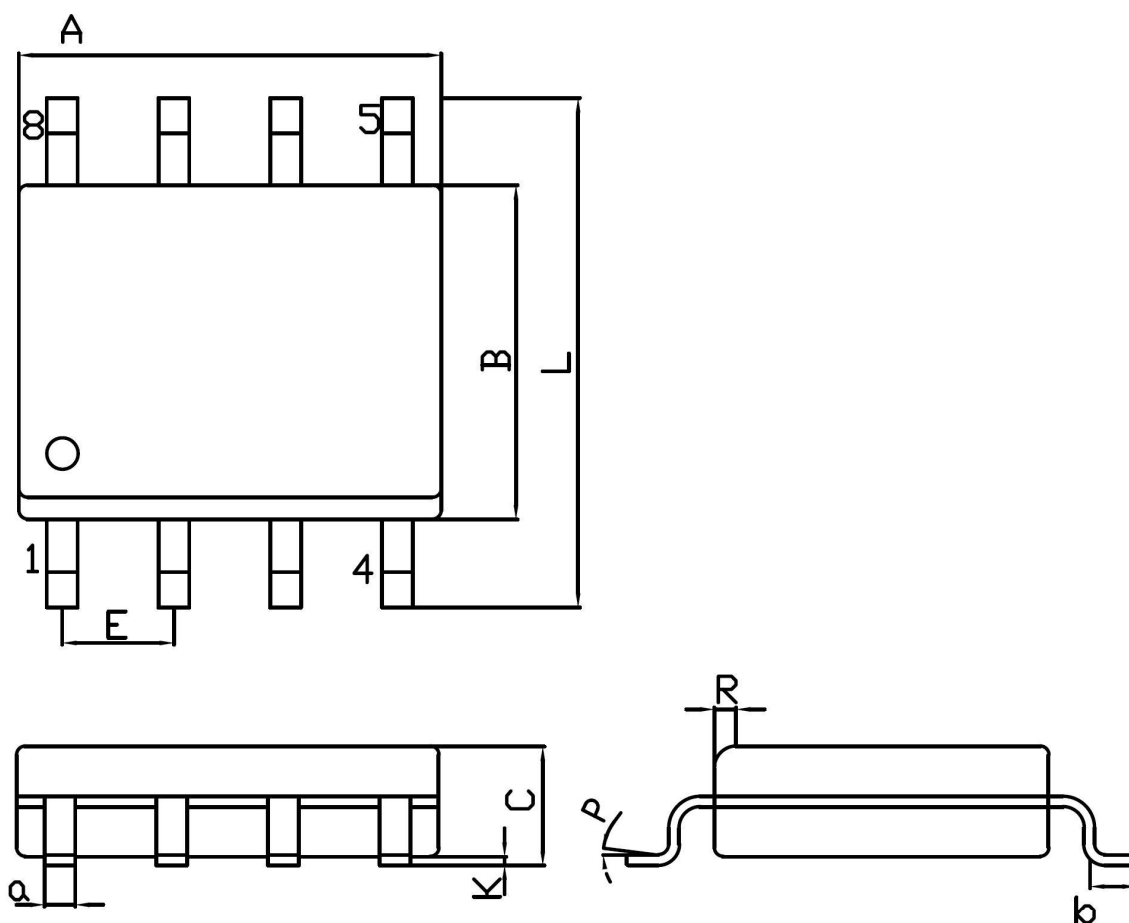
Diode Recovery Test Circuit & Waveforms



外形尺寸图 / Package Dimensions

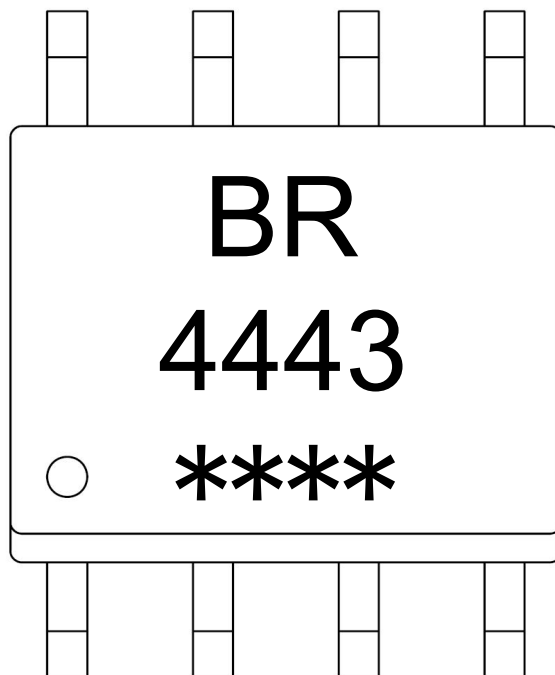
SOP-8

Unit:mm



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	4.70	5.10	C	1.35	1.75
B	3.70	4.10	a	0.35	0.49
L	5.80	6.20	R	0.30	0.60
E	1.27BSC		P	0°	7°
K	0.12	0.22	b	0.40	1.25

印章说明 / Marking Instructions



说明：

BR： 为公司代码

4443： 为型号代码

****： 为生产批号代码，随生产批号变化。

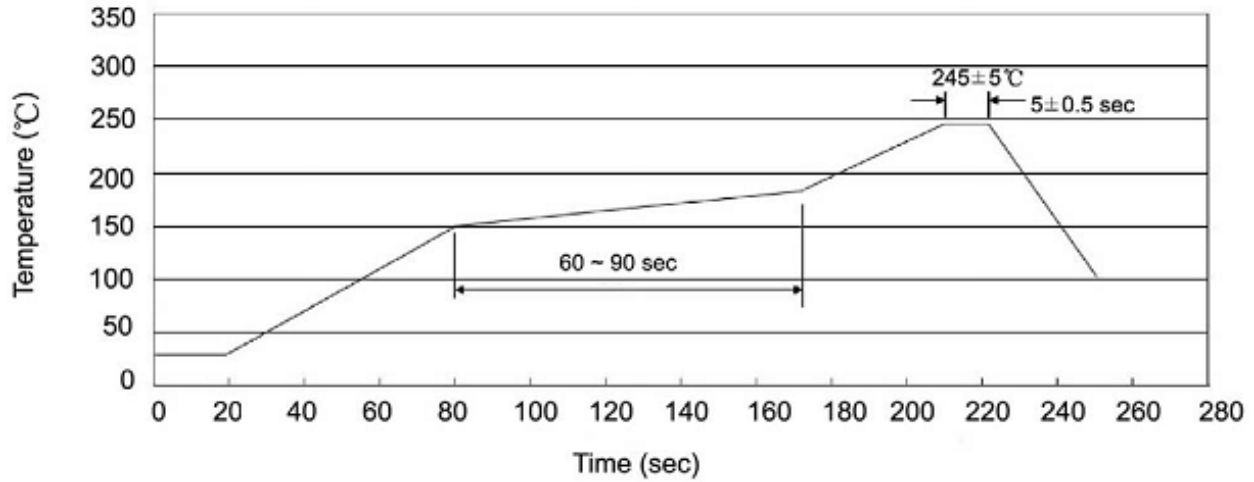
Note:

BR: Company Code.

4443: 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 ³)		
	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/盒	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