

# AP4606

## N-P-Channel Power MOSFET

### 描述 / Descriptions

SOP-8 塑封封装互补增强模式 MOS 场效应管。

Complementary Enhancement MOSFET in a SOP-8 Plastic Package.

### 特征 / Features

N-channel	P-channel
$V_{DS}(V)=30V$	$V_{DS}(V)=-30V$
$I_D=6.9A$	$I_D=-6A$
$R_{DS(ON)}<28m\ \Omega$ ( $V_{GS}=10V$ )	$R_{DS(ON)}<35m\ \Omega$ ( $V_{GS}=10V$ )
$R_{DS(ON)}<42m\ \Omega$ ( $V_{GS}=4.5V$ )	$R_{DS(ON)}<58m\ \Omega$ ( $V_{GS}=4.5V$ )

### 用途 / Applications

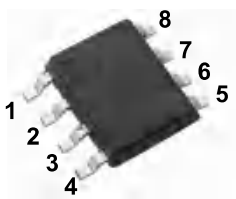
用于高功率 DC/DC 转换和功率开关。适用于作负载开关或脉宽调制应用。

These devices are well suited for high efficiency switching DC/DC converters and switch mode power supplies. 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

**AP4606**
**N-P-Channel Power MOSFET**
**极限参数 / Absolute Maximum Ratings(Ta=25°C)**

参数 Parameter	符号 Symbol	数值 Rating		单位 Unit
		N-channel	P-channel	
Drain-Source Voltage	$V_{DSS}$	±30		V
Gate-Source Voltage	$V_{GSS}$	±20		V
Continuous Drain Current <sup>A</sup>	$I_D (T_A=25^\circ\text{C})$	6.9	-6.0	A
	$I_D (T_A=70^\circ\text{C})$	5.8	-5.0	A
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	±30		A
Power Dissipation	$P_D (T_A=25^\circ\text{C})$	2		W
	$P_D (T_A=70^\circ\text{C})$	1.44		W
Maximum Junction-to-Ambient <sup>A</sup>	$R_{\theta JA}(t \leq 10\text{s})$	62.5		°C/W
	$R_{\theta JA}$	110		°C/W
Maximum Junction-to-Lead <sup>C</sup>	$R_{\theta JL}$	60		°C/W
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150		°C

**Notes:**

A: The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ . The value in any a given application depends on the user's specific board design. The current rating is based on the  $t \leq 10\text{s}$  thermal resistance rating.

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

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

D: The static characteristics in Figures 1 to 6, 12, 14 are obtained using 80  $\mu\text{s}$  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  $T_A = 25^\circ\text{C}$ . The SOA curve provides a single pulse rating.

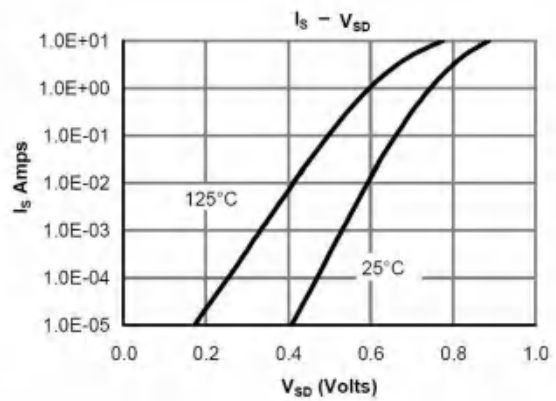
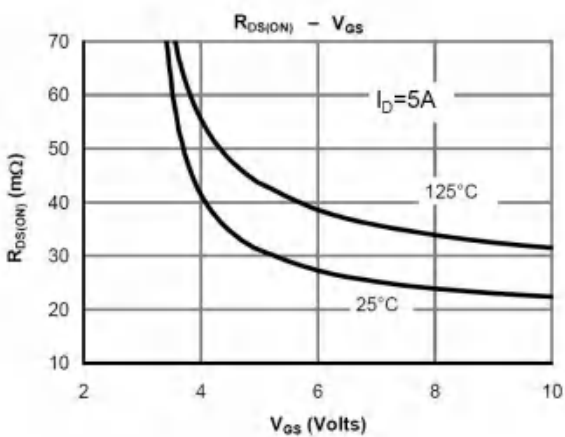
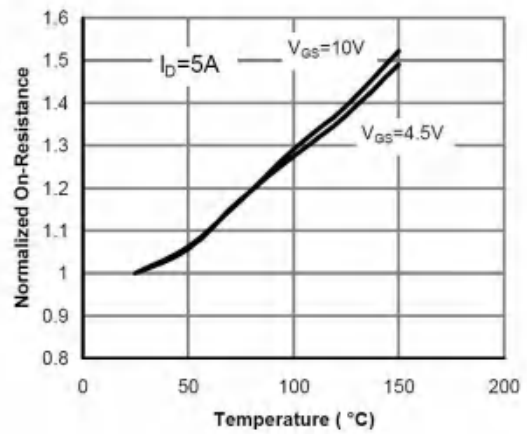
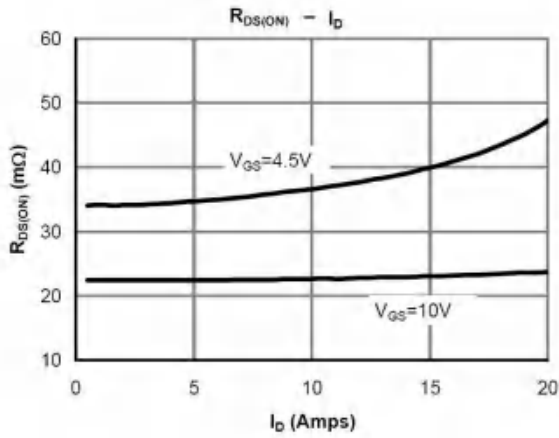
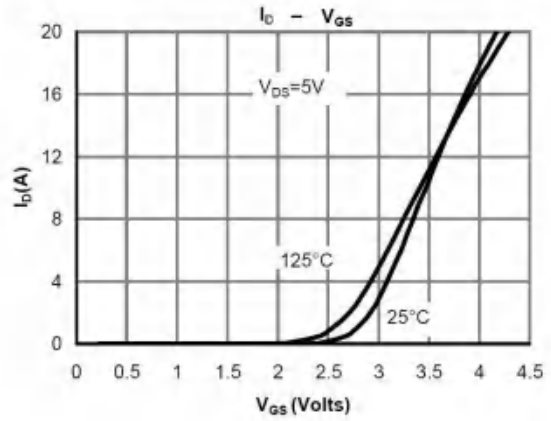
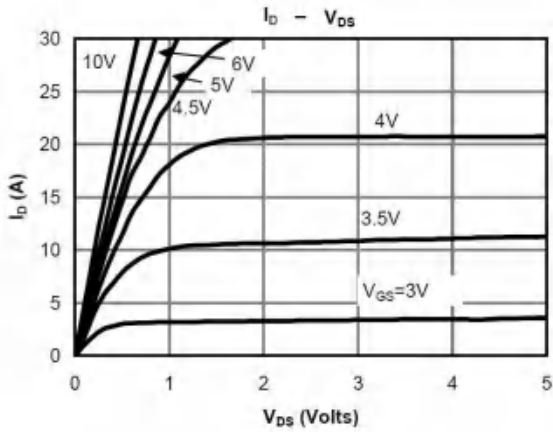
**AP4606**
**N-P-Channel Power MOSFET**
**N-沟道电性能参数/N-CHANNEL Electrical Characteristics(Ta=25°C)**

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	$BV_{DSS}$	$V_{GS}=0V$	$I_D=250\mu A$	30			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=24V$	$V_{GS}=0V$			1.0	$\mu A$
		$V_{DS}=24V$ $T_J=55^\circ C$	$V_{GS}=0V$			5.0	$\mu A$
Gate-Body leakage current	$I_{GSS}$	$V_{GS}=\pm 20V$	$V_{DS}=0V$			100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$	$I_D=250\mu A$	1.0	1.9	3.0	V
On state drain current	$I_{D(on)}$	$V_{DS}=4.5V$	$V_{GS}=5.0V$	20			A
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V$	$I_D=6.9A$		22.5	28	m $\Omega$
		$V_{GS}=10V$ $T_J=125^\circ C$	$I_D=6.9A$		31.3	38	m $\Omega$
		$V_{GS}=4.5V$	$I_D=5.0A$		34.5	42	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=5.0V$	$I_D=6.9A$	10	15.4		S
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V$	$I_S=1.0A$		0.76	1.0	V
Maximum Body-Diode Continuous Current	$I_S$					3.0	A
Input Capacitance	$C_{iss}$				680		pF
Output Capacitance	$C_{oss}$	$V_{DS}=15V$ $f=1.0MHz$	$V_{GS}=0V$		102		pF
Reverse Transfer Capacitance	$C_{rss}$				77		pF
Gate resistance	$R_g$	$V_{DS}=0V$ $f=1.0MHz$	$V_{GS}=0V$		3.0		$\Omega$
Total Gate Charge(10V)	$Q_g$	$V_{GS}=10V$ $I_D=6.9A$	$V_{DS}=15V$		13.84		nC
Total Gate Charge(4.5V)					6.74		nC
Gate-Source Charge	$Q_{gs}$				1.82		nC
Gate-Drain Charge	$Q_{gd}$				3.2		nC
Turn-On Delay Time	$t_{d(on)}$						4.6
Turn-On Rise Time	$t_r$	$V_{DS}=15V$ $R_L=2.1\Omega$	$V_{GS}=10V$ $R_{GEN}=3\Omega$		4.1		ns
Turn-Off Delay Time	$t_{d(off)}$				20.6		ns
Turn-Off Fall Time	$t_f$				5.2		ns
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F=6.9A$ $dI/dt=100A/\mu s$			16.5		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$	$I_F=6.9A$ $dI/dt=100A/\mu s$			7.8		nC

**AP4606**

**N-P-Channel Power MOSFET**

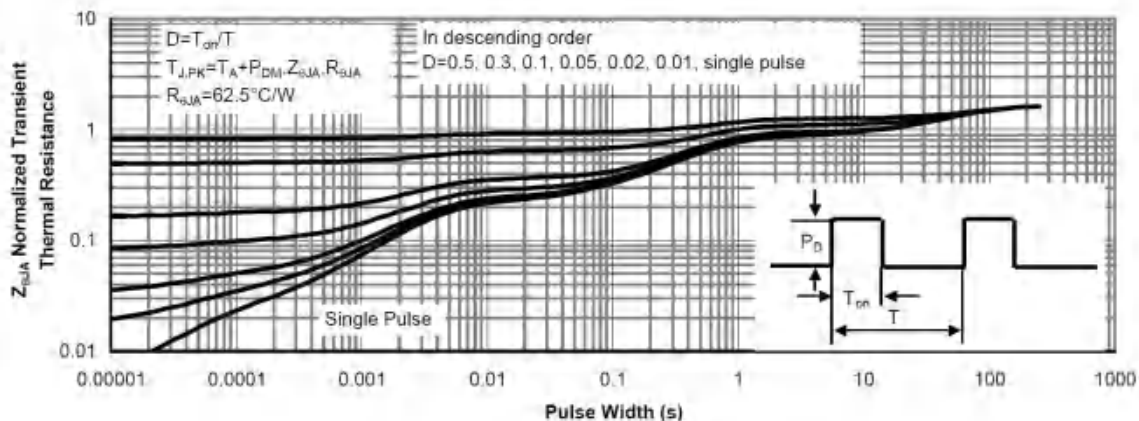
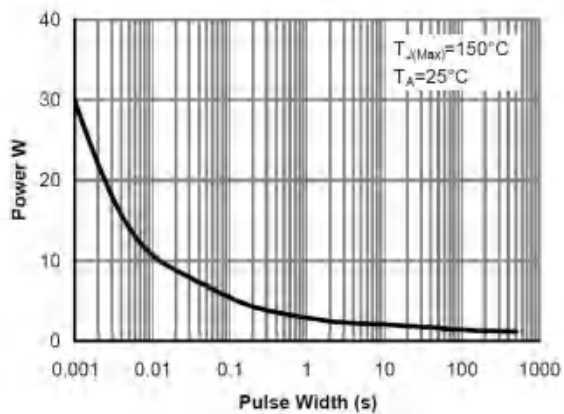
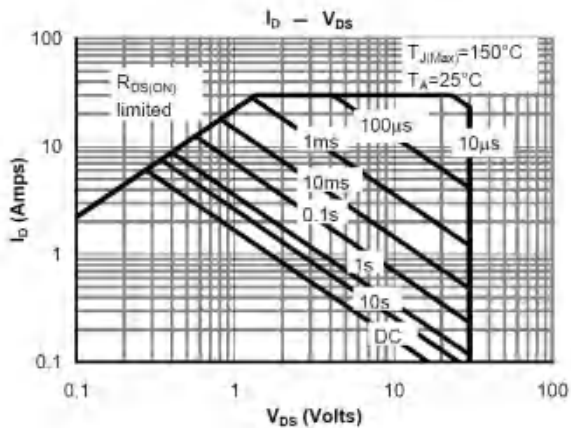
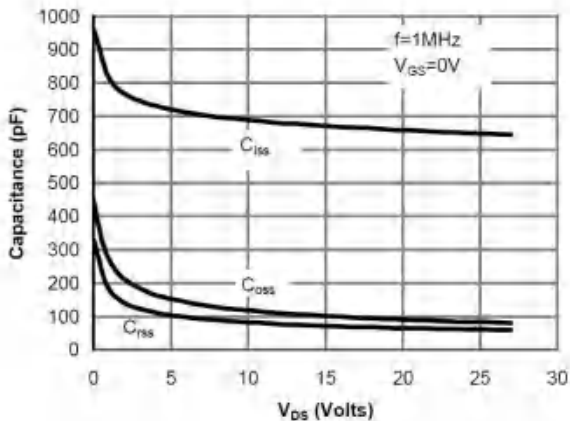
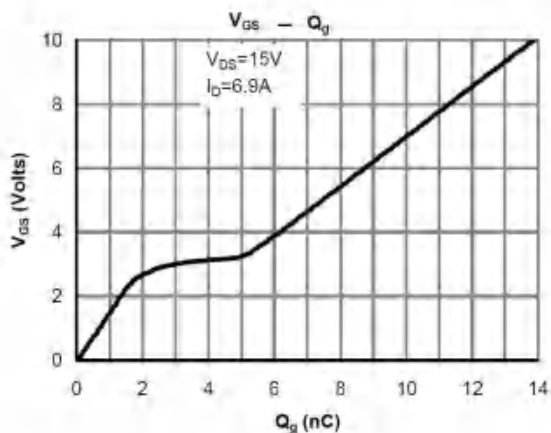
N-沟道电参数曲线图 / N-CHANNEL Electrical Characteristic Curve



**AP4606**

**N-P-Channel Power MOSFET**

**N-沟道电参数曲线图 / N-CHANNEL Electrical Characteristic Curve**



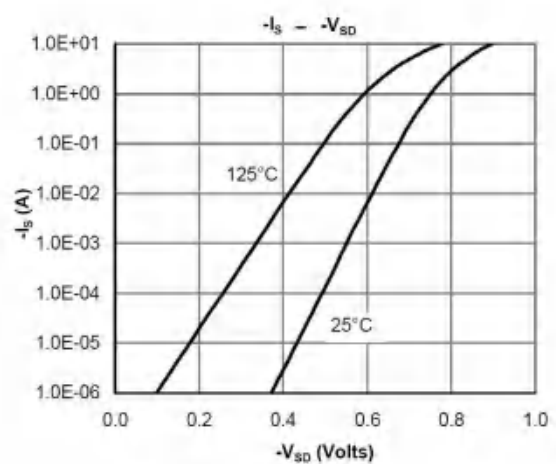
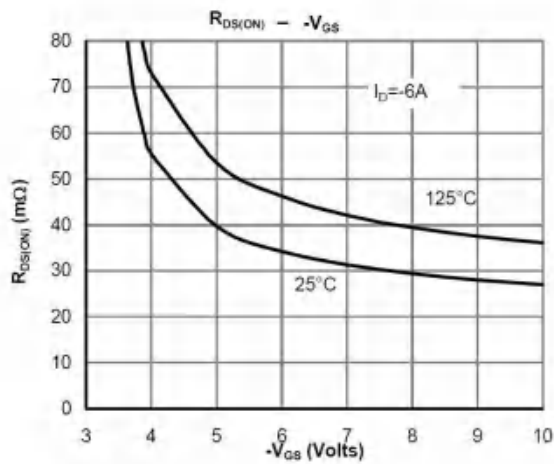
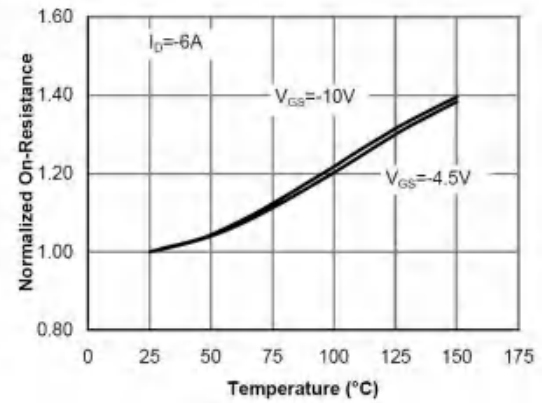
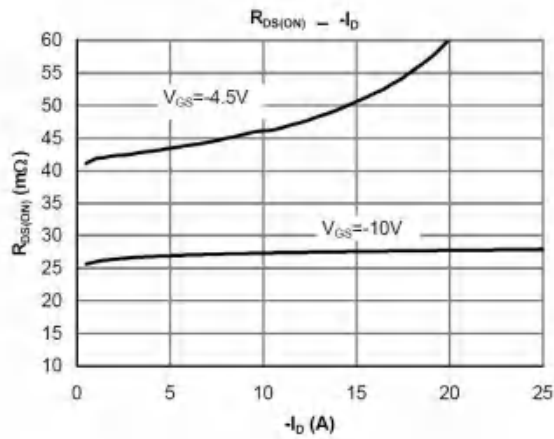
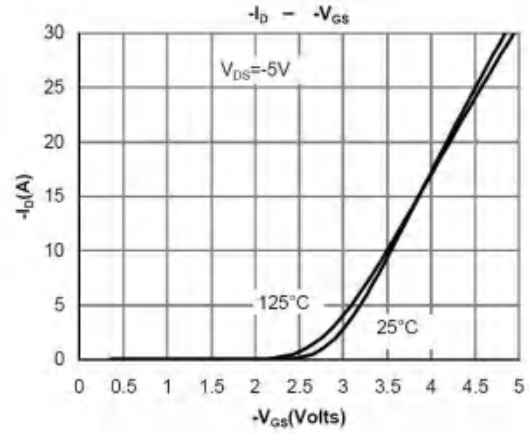
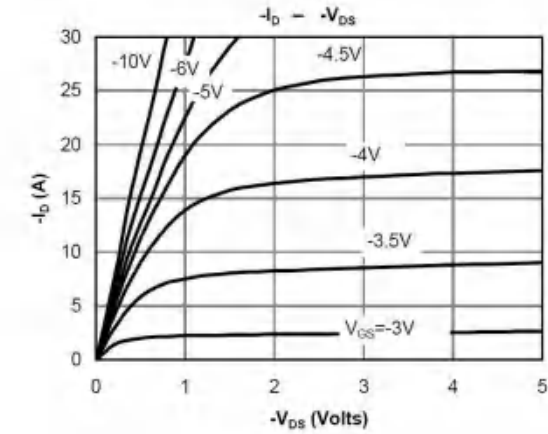
**AP4606**
**N-P-Channel Power MOSFET**
**P-沟道电性能参数/P-CHANNEL Electrical Characteristics(Ta=25°C)**

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	$BV_{DSS}$	$V_{GS}=0V$ $I_D=-250\mu A$	-30			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-24V$ $V_{GS}=0V$			-1.0	$\mu A$
		$V_{DS}=-24V$ $V_{GS}=0V$ $T_J=55^\circ C$			-5.0	$\mu A$
Gate-Body leakage current	$I_{GSS}$	$V_{GS}=\pm 20V$ $V_{DS}=0V$			$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ $I_D=-250\mu A$	-1.2	-2.0	-2.4	V
On state drain current	$I_{D(on)}$	$V_{DS}=-4.5V$ $V_{GS}=-5.0V$	30			A
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-10V$ $I_D=-6.0A$		28	35	m $\Omega$
		$V_{GS}=-10V$ $I_D=-6.0A$ $T_J=125^\circ C$		37	45	m $\Omega$
		$V_{GS}=-4.5V$ $I_D=-5.0A$		44	58	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=-5.0V$ $I_D=-6.0A$		13		S
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V$ $I_S=-1.0A$		-0.76	-1.0	V
Maximum Body-Diode Continuous Current	$I_S$				-4.2	A
Input Capacitance	$C_{iss}$	$V_{DS}=-15V$ $V_{GS}=0V$ $f=1.0MHz$		920		pF
Output Capacitance	$C_{oss}$			190		pF
Reverse Transfer Capacitance	$C_{rss}$			122		pF
Gate resistance	$R_g$	$V_{DS}=0V$ $V_{GS}=0V$ $f=1.0MHz$		3.6		$\Omega$
Total Gate Charge(10V)	$Q_g$	$V_{GS}=-10V$ $V_{DS}=-15V$ $I_D=-6.0A$		18.5		nC
Total Gate Charge(4.5V)				9.6		nC
Gate-Source Charge	$Q_{gs}$			2.7		nC
Gate-Drain Charge	$Q_{gd}$			4.5		nC
Turn-On Delay Time	$t_{d(on)}$				7.7	
Turn-On Rise Time	$t_r$	$V_{DS}=-15V$ $V_{GS}=-10V$ $R_L=2.7\Omega$ $R_{GEN}=3\Omega$		5.7		ns
Turn-Off Delay Time	$t_{d(off)}$			20.2		ns
Turn-Off Fall Time	$t_f$			9.5		ns
Body Diode Reverse Recovery Time	$t_{rr}$		$I_F=-6.0A$ $di/dt=100A/\mu s$		20	
Body Diode Reverse Recovery Charge	$Q_{rr}$	$I_F=-6.0A$ $di/dt=100A/\mu s$		8.8		nC

**AP4606**

**N-P-Channel Power MOSFET**

P-沟道电参数曲线图 / P-CHANNEL Electrical Characteristic Curve

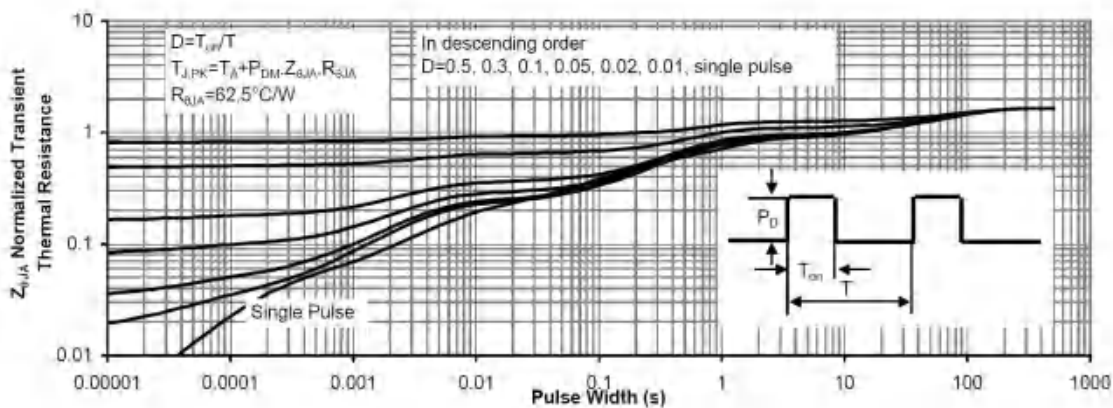
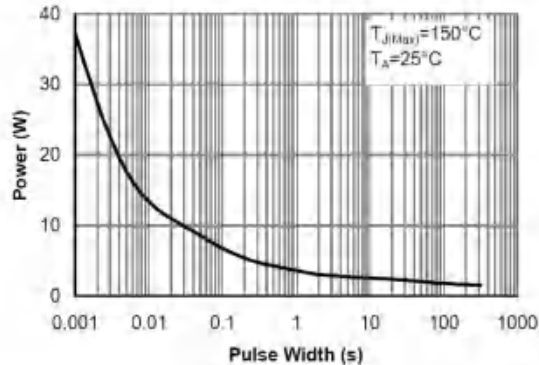
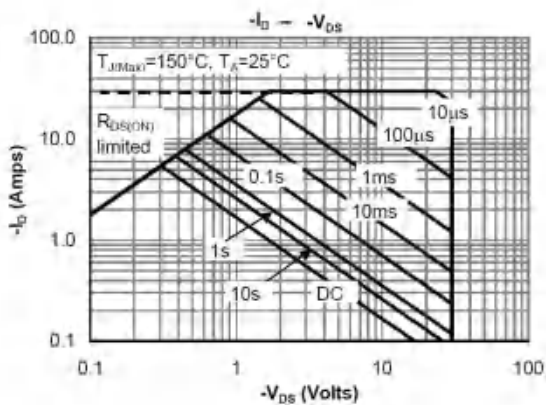
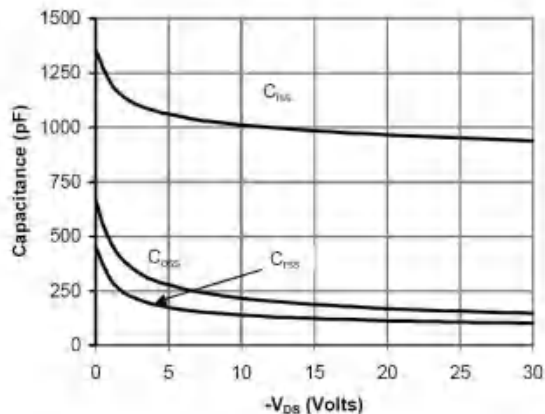
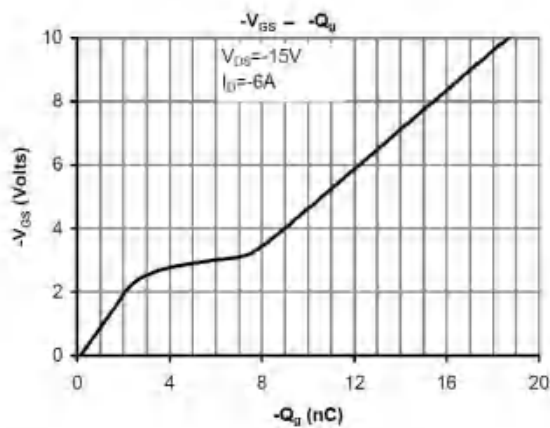




**AP4606**

**N-P-Channel Power MOSFET**

P-沟道电参数曲线图 / P-CHANNEL Electrical Characteristic Curve





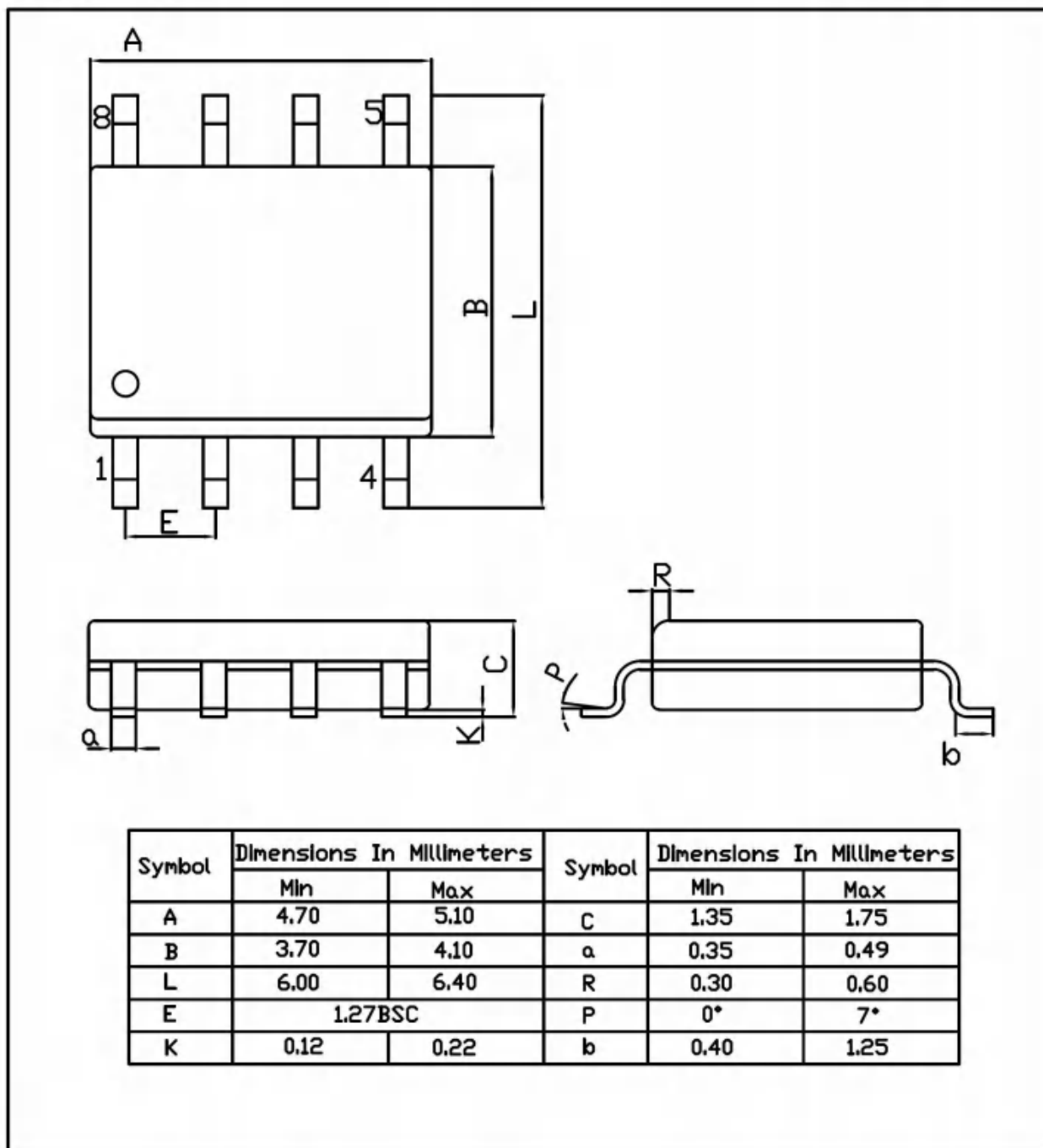
**AP4606**

**N-P-Channel Power MOSFET**

外形尺寸图 / Package Dimensions

SOP-8

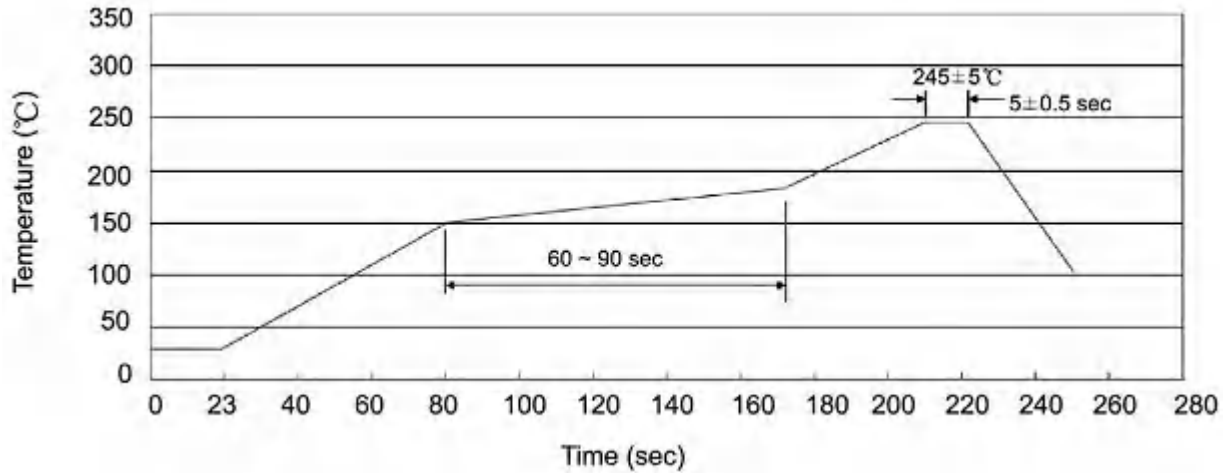
Unit:mm



**AP4606**

**N-P-Channel Power MOSFET**

**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**