TM120PES33A1

SiC MOSFET 芯片 SiC MOSFET Chip

初版 Preliminary

关键参数 Key Parameters

V_{DSmax}		1200	V
$R_{DS(on)}$	Typ.	80	mΩ
I_D	Max.	44	A
Die Size		3.43×3.43	mm^2

特点 Features

- 高开关频率 High Switching Frequency
- 低开关损耗 Low Switching Loss
- 软、快速开关 Soft, fast Switching
- 易并联使用 Easy Paralleling

电路结构 Circuit Configuration

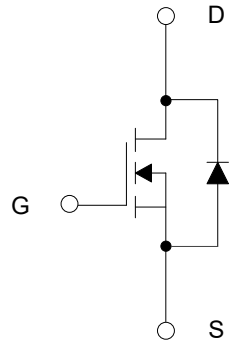


图 1. 电路结构

Fig. 1 Circuit configuration

最大额定值 Maximum Ratings

符号 Symbol	参数名称 Parameter	测试条件 Test Conditions	数值 Value	单位 Unit
V_{DSmax}	漏源极电压 Drain-source voltage		1200	V
V_{GSS}	栅源峰值电压 Gate-source voltage		-6/+18	V
I_D	持续正向电流，由 $T_{vj\,max}$ 限制 Continuous forward current, limited by $T_{vj\,max}$		44	A
I_{DM}	最大重复正向电流，由 $T_{vj\,max}$ 限制 Maximum repetitive forward current, limited by $T_{vj\,max}$		88	A
$T_{vj\,max}$	最大允许结温 Max. Junction temperature		175	°C
$T_{vj(op)}$	工作结温 Operation junction temperature		-55...+175	°C
T_{Proc} (*1)	最大加工温度 Maximum processing temperature		325	°C

电特性值 Electrical Characteristics

除非特别声明，否则 T_{vj}= 25 °C　　T_{vj}= 25 °C unless otherwise stated

符号 Symbol	参数名称 Parameter	测试条件 Test Conditions	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit
I_{DSS}	零栅压漏极电流 Zero gate voltage drain current	V_{GS} = 0V, V_{DS} = V_{DSS}			50	μA
I_{GSS}	栅极漏电流 Gate leakage current	V_{GS} = V_{GSS}, V_{DS} = 0V			250	nA
$V_{GS(th)}$ (*2)	栅极-源极阈值电压 Gate threshold voltage	I_D = 10 mA, V_{GS} = V_{DS}	2.0	3.0	4.0	V
$R_{DS(on)}$	漏极-源极通态电阻 Drain-source on-state resistance	V_{GS} =15V, I_D = 20A		80	98	mΩ
		V_{GS} =15V, I_D = 20A, T_{vj} = 175 °C		107		mΩ
g_{fs}	跨导 Forward transconductance	V_{DS} =20V, I_D = 20A		11		S
C_{iss}	输入电容 Input capacitance	V_{DS} = 1000V, V_{GS} = 0V, f = 100kHz, V_{AC} = 30mV		1390		pF
C_{oss}	输出电容 Output capacitance			85		pF
C_{rss}	反向传输电容 Reverse transfer capacitance			6		pF
E_{oss}	电容存储能量 C_{oss} Stored Energy			92		μJ
R_{Gint}	内部栅极电阻 Internal gate resistor	V_{GS} =0V		4		Ω
Q_{gs}	栅源电荷 Gate to source charge	I_D =20A, V_{DS} = 600V, V_{GS} = -3/+15V		10		nC
Q_{gd}	栅漏电荷 Gate to drain charge			37		nC
Q_g	总栅极电荷 Total gate charge			50		nC
V_{SD}	二极管正向电压 Diode forward voltage	I_{SD} =20A, V_{GS} = -3V		5.8		V
		I_{SD} =20A, V_{GS} = -3V, T_{vj} = 175 °C		5.4		V

注意： 1.(*1)表示最长持续时间 10min((*1)) indicates 10min, maximum);

Note: 2.(*2)表示做过预处理后的测试值((*2) indicates $V_{GS(th)}$ is preprocessed).

工艺参数值 **Mechanical Parameters**

芯片尺寸 Chip size	3.43×3.43	mm^2
源极键合区尺寸(不包含开尔文源级) Source pad size (excl. Kelvin Source pad)	2×(1.24×1.68)	mm^2
栅极键合区尺寸 Gate pad size	0.8×0.8	mm^2
总面积 Area total	11.76	mm^2
厚度 Thickness	360±25	μm
晶圆尺寸 Wafer size	150	mm
每片晶圆上最大芯片数 Max. possible chips per wafer	1300	
正面金属 Frontside (Source and Gate) metal	Al(4μm)	
背面金属 Backside (Drain) metal	Ti:Ni:Ag (0.05:0.5:1μm)	
正面钝化 Passivation frontside	Polyimide	
建议存储环境 Recommended storage environment	存储在原始容器中，23°C 干燥氮气柜小于 6 个月 Store in original container, in dry nitrogen, <6 months at an ambient temperature of 23°C	

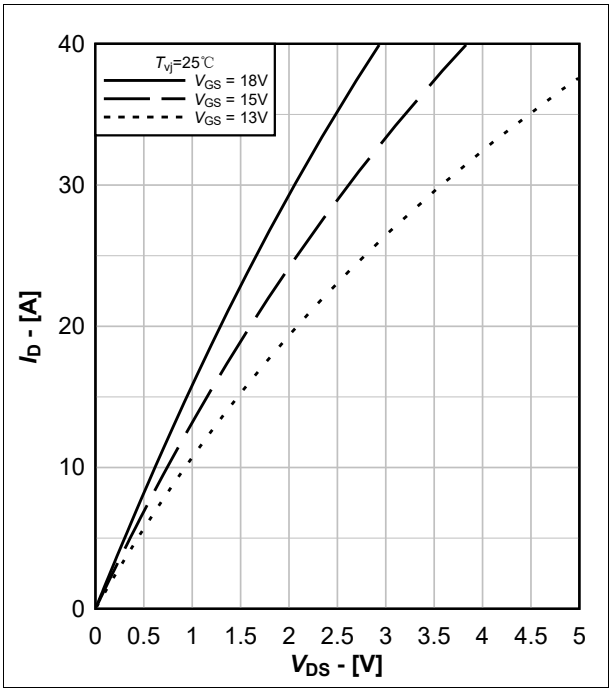


图 2. 输出特性典型曲线, I_D= f (V_{DS}), T_{vj} = 25 °C

Fig.2 Typical output characteristics, I_D= f (V_{DS}), T_{vj} = 25 °C

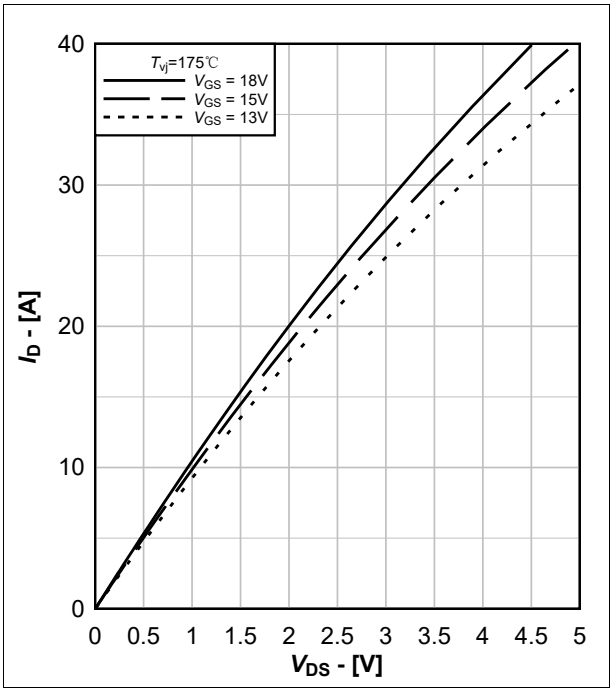


图 3. 输出特性典型曲线, I_D= f (V_{DS}), T_{vj} = 175 °C

Fig.3 Typical output characteristics, I_D= f (V_{DS}), T_{vj} = 175 °C

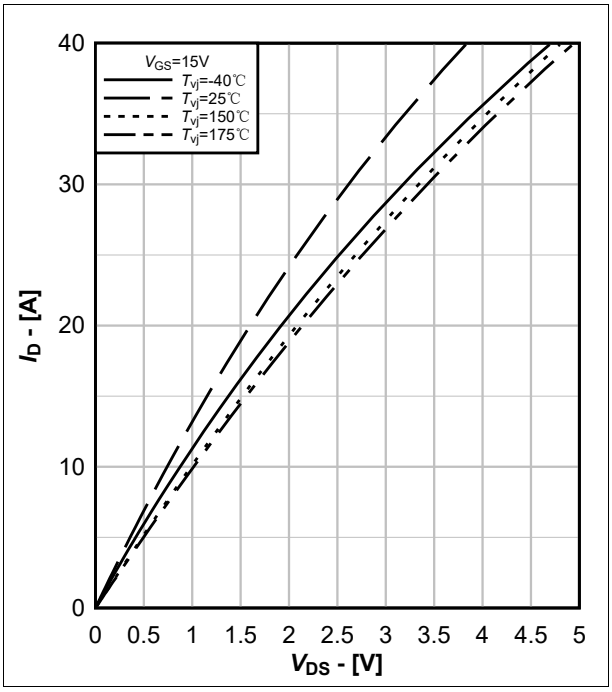


图 4. 输出特性典型曲线, I_D= f (V_{DS})

Fig.4 Typical output characteristics, I_D= f (V_{DS})

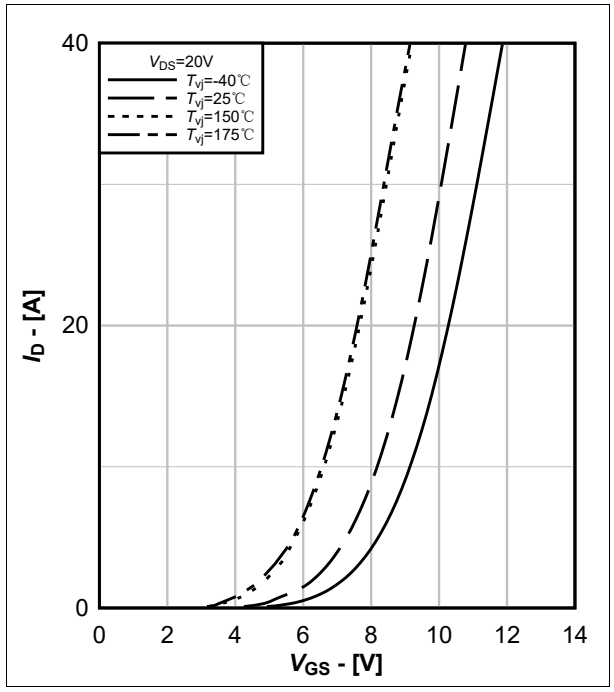


图 5.传输特性典型曲线,I_D= f (V_{GS})

Fig.5 Typical transfer characteristics, I_D= f (V_{GS})

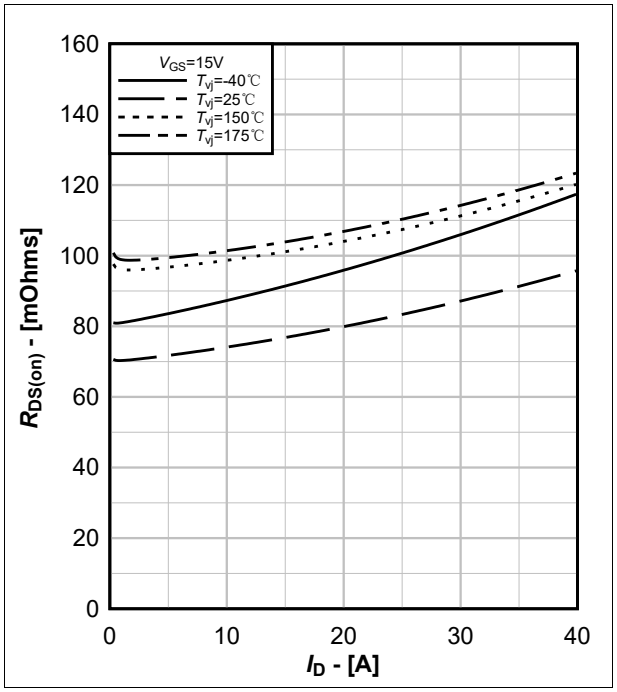


图 6. 导通电阻典型曲线, $R_{DS(on)}$ = f (I_D)

Fig.6 Typical On-Resistance characteristics, $R_{DS(on)}$ = f (I_D)

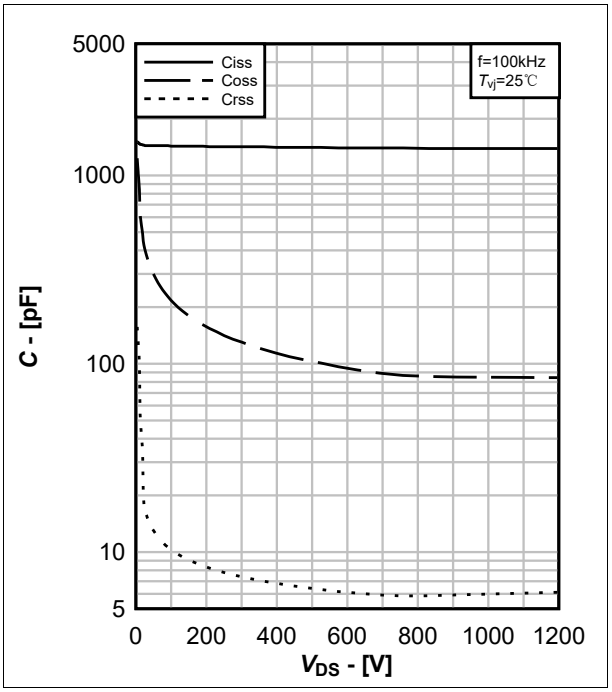


图 7. 电容特性典型曲线, C= f (V_{DS})

Fig.7 Typical capacity characteristic, C= f (V_{DS})

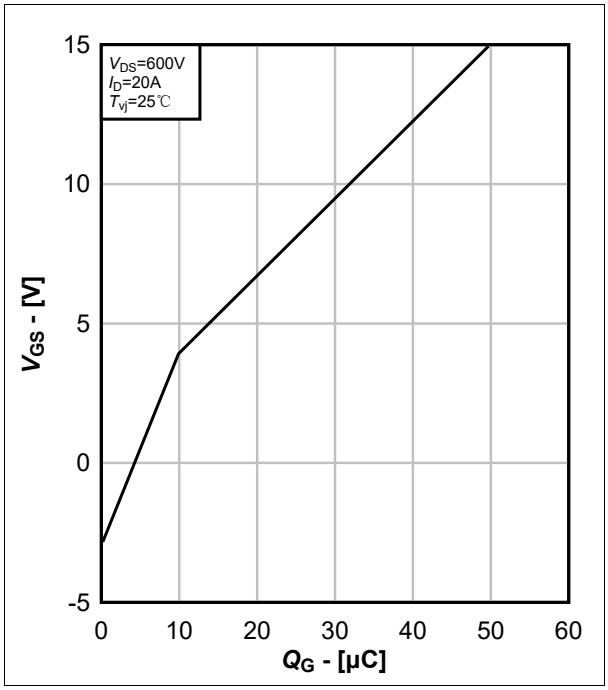


图 8. 栅极电荷特性典型曲线, V_{GS} = f (Q_G)

Fig.8 Typical gate charge characteristic, V_{GS}= f (Q_G)

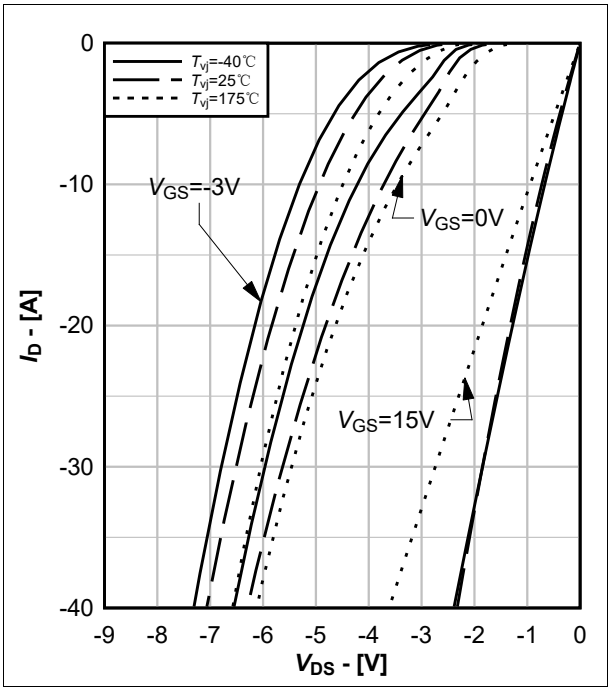
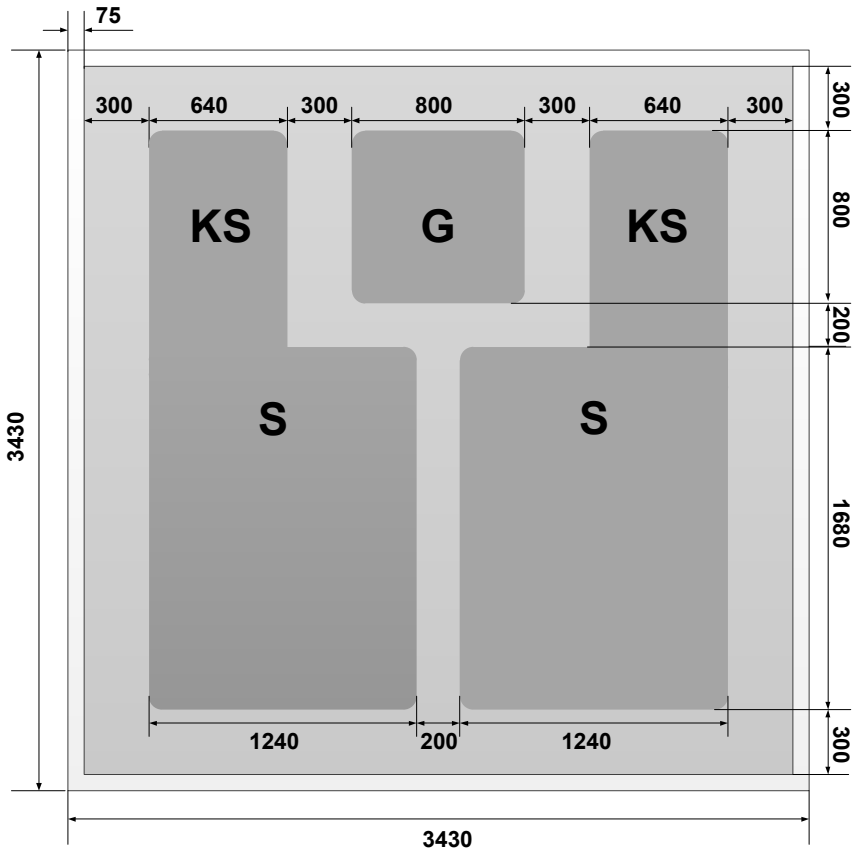


图 9. 体二极管及第三象限输出特性典型曲线, I_D = f (V_{DS})

Fig.9 Typical body diode output and 3rd quadrant characteristic, I_D = f (V_{DS})



S=源极 G=栅极 KS=开尔文源极 单位：微米 S=Source G=Gate KS=Kelvin Source Unit: μm

图 10. 芯片外观尺寸

Fig. 10 Chip drawing

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