

 D. G. M. E.	KP500-16~20	版本号: V1.0
	普通晶闸管 Phase Control Thyristor	

产品概述 General Description

本产品采用先进的全扩散及真空闭管镓扩散制造工艺，广泛应用于变流设备、电机励磁、调速、调压、调功等无触点开关及自动控制等方面。

This product adopts advanced full diffusion and vacuum closed tube gallium diffusion manufacturing process, which are widely used in variable flow equipment, electrical field, Speed control, regulating voltage, adjustable power non-contact switch and automatic control, etc.

产品特点

- 全扩散工艺
- 平板压装，双面冷却
- 大功率容量
- 低损耗
- 高dv/dt
- 高浪涌电流

FEATURES

- All diffusion process
- Double-side cooling
- High power capability
- Low loss
- High dv/dt
- High surge current

应用领域

- 大功率传动
- 高压大电流电源
- 电机控制
- 工业加热控制
- 电机软启动

APPLICATIONS

- High power drive
- High voltage large current power supply
- Motor Control
- Industrial heating control
- Motor slow start

特征参数

CHARACTERISTIC PARAMETRS

符 号 Symbol	参 数 Parameter	单 位 Unit
V_{DRM}/V_{RRM}	1600~2000	V
$I_{T(AV)}$	500	A
I_{TSM}	7.8	KA
V_{TO}	0.94	V
r_T	1.036	mΩ
Φ	40	mm

管芯及封装 CHIP & THE PACKAGE



电压额定值 VOLTAGE RATINGS

器件型号 Device Model	测试条件 Tests Conditions	断态和反向峰值电压 V_{DRM}/V_{RRM} (V) Repetitive Peak Off-state & Reverse Voltage
KP500-16	$T_c=25, 125^\circ\text{C}$, $I_{DRM}=I_{RRM}=75\text{mA}$, 门极断路, $V_{DM}=V_{DRM}$, $V_{RM}=V_{RRM}$, $t_p=10\text{ms}$, $V_{DSM}=V_{DRM}+200$ $V_{RSM}=V_{RRM}+200$	1600
KP500-18		1800
KP500-20		2000

热和机械参数 THERMAL & MECHANICAL DATA

参数名称 Parameter	符号 Symbol	最小 Min	典型 Type	最大 Max	单位 Unit
结壳热阻 Case junction thermal resistance	R_{jc}			0.041	K/W
接触热阻 Contact thermal resistance	R_{cs}			0.001	K/W
贮存温度 Storage temperature range	T_{stg}	-40		140	$^\circ\text{C}$
等效结温 Virtual junction temperature range	T_{vj}			125	$^\circ\text{C}$
管壳温度 Case temperature range	T_c	-40		65	$^\circ\text{C}$
紧固力 Tighten pressure torque	F			5	kN

电流额定值 (T_a=25°C) CURRENT RATINGS

参数名称 Parameter	符号 Symbol	测试条件 Tests Conditions	最小 Min	典型 Type	最大 Max	单位 Unit
通态平均电流 Mean on-state current	I _{T(AV)}	正弦半波, T _c =70°C			500	A
通态方均根电流 R.M.S on-state current	I _{T(RMS)}	T _c =70°C			801	A
通态不重复浪涌电流 Surge on-state current	I _{TSM}	T _{vj} =125°C, 正弦半波, t _w =10ms, V _R =0			7.8	kA
电流平方时间积 I ² t value	I ² t	正弦波, 10ms			30.4	10 ⁴ A ² s

特性值 CHARACTERISTICS

参数名称 Parameter	符号 Symbol	测试条件 Tests Conditions	最小 Min	典型 Type	最大 Max	单位 Unit
通态峰值电压 Peak on-state voltage	V _{TM}	T _{vj} =25°C, I _{TM} =1500A			1.8	V
断态重复峰值电流 Repetitive peak off-state current	I _{DRM}	T _{vj} =25°C, 125°C, V _{DRM} /V _{RRM} , 门极断路			20	mA
反向重复峰值电流 Repetitive peak reverse current	I _{RRM}	T _{vj} =25°C, 125°C, V _{DRM} /V _{RRM} , 门极断路			20	mA
门槛电压 Threshold voltage	V _{TO}	T _{vj} =125°C			0.94	V
斜率电阻 Slope resistance	r _t	T _{vj} =125°C			1.036	mΩ
维持电流 Holding current	I _H	T _{vj} =25°C, I _c =400mA, I _{TM} =50A, V _D =12V	50		200	mA
擎住电流 Latching current	I _L	T _{vj} =25°C, I _G =400mA, V _D =12V			1000	mA

动态参数 DYNAMIC PARAMETERS

参数名称 Parameter	符号 Symbol	测试条件 Tests Conditions	最小 Min	典型 Type	最大 Max	单位 Unit
断态电压临界上升率 Critical rate of rise of off-state voltage	dv/dt	T _{vj} =125°C, V _{DM} =0.67V _{DRM}	1000			V/μs
通态电流临界上升率 Critical rate of rise on-state current	di/dt	T _{vj} =125°C, V _{DM} =0.67V _{DRM} , f=50Hz, I _{TM} =2000A, I _{FG} =2A, t _r =0.5μs			200	A/μs
关断时间 Circuit commutated turn-off time	t _q	T _{vj} =125°C, V _{DM} =0.67V _{DRM} , I _T =1000A, dv/dt=20V/μs, V _R =200V, -di/dt=10A/μs		250		μs
恢复电荷 Recovered charge	Q _r	T _{vj} =125°C, -di/dt=10A/μs, I _T =1000A, V _R =200V		1500		μC

门极特性 GATE PARAMETERS

参数名称 Parameter	符号 Symbol	测试条件 Tests Conditions	最小 Min	典型 Type	最大 Max	单位 Unit
门极触发电流 Gate tigger current	I_{GT}	$T_{Vj}=25^{\circ}C$	40		120	mA
门极触发电压 Gate tigger voltage	V_{GT}	$T_{Vj}=25^{\circ}C$			2	V
门极不触发电压 Gate non-tigger voltage	V_{GD}	$T_{Vj}=125^{\circ}C, V_b=0.4V_{DRM}$	0.3			V
门极正向峰值电压 Gate peak forward voltage	V_{FGM}	$T_{Vj}=125^{\circ}C$, 方波, $t=3s$, 阳、阴极断路			12	V
门极反向峰值电压 Gate peak reverse voltage	V_{RGM}	$T_{Vj}=125^{\circ}C$, 工频正弦, $t=3s$, 阳、阴极断路			5	V
门极正向峰值电流 Gate peak forward current	I_{FGM}	$T_{Vj}=125^{\circ}C$, 方波, $t=3s$, 阳、阴极断路			4	A
门极峰值功率 Gate peak power	P_{GM}	$T_{Vj}=125^{\circ}C$, 方波, $t=3s$, 阳、阴极断路			16	W
门极平均功率 Gate average power	$P_{G(AV)}$	$T_{Vj}=125^{\circ}C$, 方波, $t=3s$, 阳、阴极断路			4	W

典型特性曲线 ELECTRICAL CHARACTERISTICS

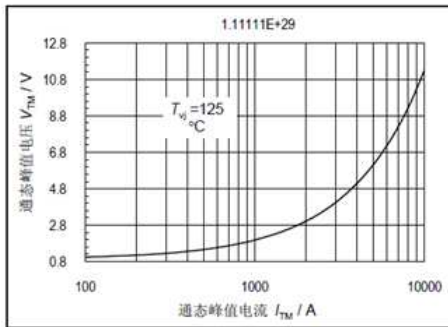


图1. 通态伏安特性曲线
Fig1. On-state volt-ampere characteristic curve

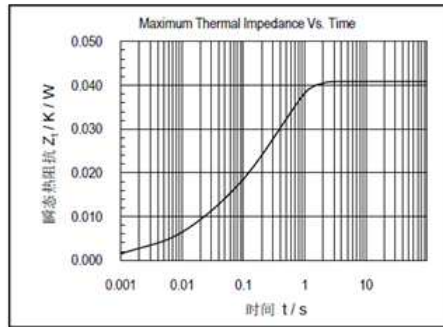


图2. 瞬态热阻抗曲线
Fig2. transient thermal resistance curve

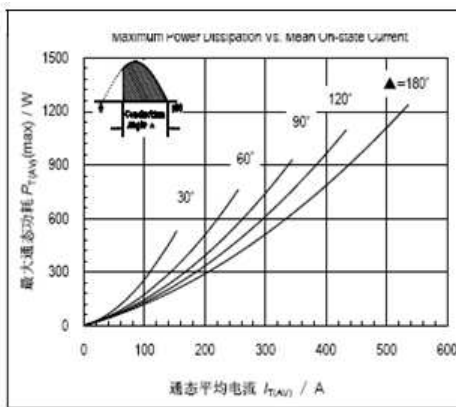


图3. 最大功耗与通态平均电流的关系曲线
Fig3. Maximum power consumption and Mean on-state current curve

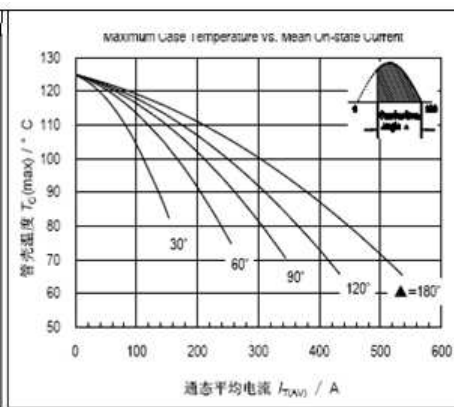


图4. 管壳温度与通态平均电流的关系曲线
Fig4 Case temperature range and Mean on-state current curve

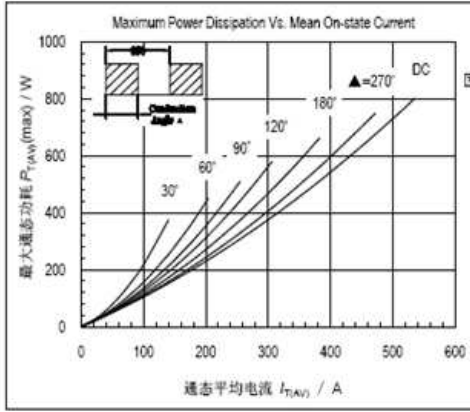


图5. 最大通态功耗与通态平均电流的关系曲线

Fig5 Maximum power consumption and Mean on-state current curve

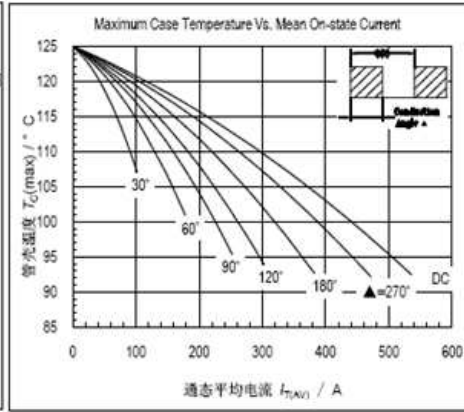


图6. 管壳温度与通态平均电流的关系曲线

Fig6 Case temperature range and Mean on-state current curve

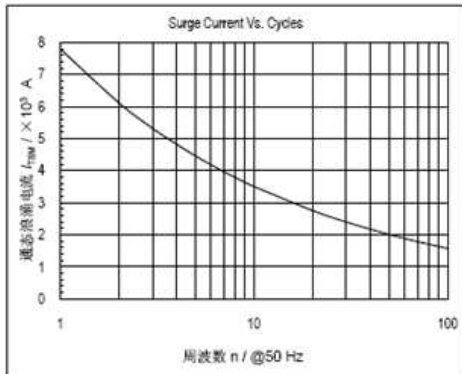


图7. 通态浪涌电流与周波数的关系曲线

Fig7. Surge on-state current ang Cycle number

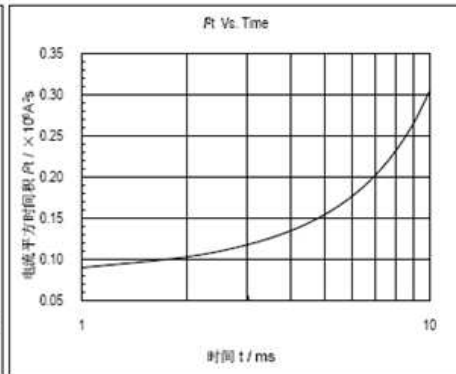


图8. I²t 特性曲线

Fig8. I²t characteristic curve

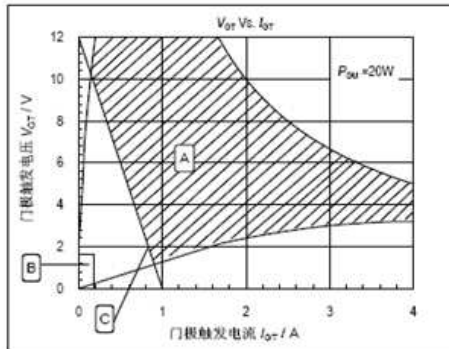


图9. 门极触发特性曲线

Fig9. Gate parameter curve

A为可靠触发区,
B为不可靠触发区。
C为建议采用的门极负载线。

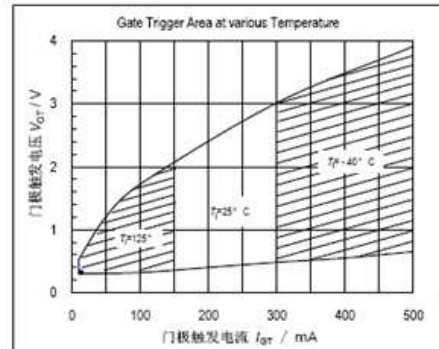


图10. 不同结温下的门极触发区

Fig10. Different junction temperature of the gate trigger area

A is Recommended Triggering Area.
B is Unreliable Triggering Area.
C is Recommended Gate Load Line.