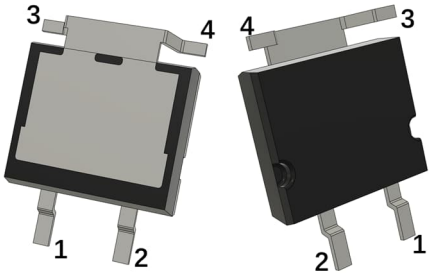
海明微半导体
HIMINGWAY

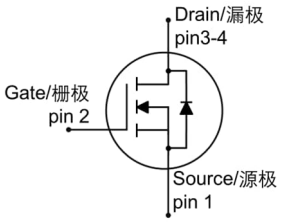
HC120N120H6Z

1200V N-Channel SiC MOSFET



Product features/产品特点

- Top side cooling technology
  顶部散热技术
- Low specific on-resistance
  低导通电阻
- High Speed Switching with Low Capacitance
  低电容高速切换
- Avalanche Ruggedness
  雪崩鲁棒性
- Easy to Parallel and Simple to Drive
  易于并联且操作简单
- Halogen free, RoHS compliant
  无卤，符合RoHS



Applications/应用领域

- High Voltage DC/DC Converters
  高压DC/DC转换器
- Switching Mode Power Supply
  开关模式电源（SMPS）
- Industrial Power Supplies
  工业电源
- Lighting Power Supplies
  照明电源

Key performance parameters/关键性能参数

Parameter	Value	Unit
V_{DSS}	1200	V
$R_{DS(on)}$,typ	120	mΩ
I_{DM}	45	A

Package parameters/封装信息

Type/型号	Package/封装	Marking/标识	Packaging method/包装方式
HC120N120H6Z	TSC263-4L	HC120N120Z	Tape and Reel/卷带包装

1. Maximum ratings at T_{vj}= 25°C, unless otherwise specified.

最大额定值默认T_{vj}= 25°C除非另有说明

Table 1 Maximum ratings/最大额定值

Parameter 参数	Symbol 符号	Test conditions 测试条件	Value 值	Unit 单位
Drain-source voltage 漏极-源极电压	V_{DSS}	T_{vj}≥25°C	1200	V
Drain current[1] 连续漏极电流	I_D	T_C=25°C,V_{GS}=18V	24	A
		T_C=100°C,V_{GS}=18V	17	
Peak drain current[2] 峰值漏极电流	I_{DM}	T_C=25°C	45	A
Continuous diode current[1] 连续二极管电流	I_S	T_C=25°C,V_{GS}=-4V	24	A
		T_C=100°C,V_{GS}=-4V	14	
Peak diode current[2] 峰值二极管电流	I_{SM}	T_C=25°C,V_{GS}=-5V	45	A
Maximum gate source voltage 栅源最大电压	$V_{GS.MAX}$		-8~22	V
Recommend gate source voltage 推荐的栅源电压	$V_{GS.op}$		-4~18	V
Avalanche energy, single pulse 单脉冲雪崩能量	E_{AS}	I_{AS}=5A,V_{DD}=100V	13	mJ
Power dissipation 总耗散功率	P_{tot}	T_C=25°C	144	W
		T_C=100°C	72	

1. Limited by T_{vj}(max)/受限于最大结温
2. Pulse width t_p limited by $T_{vj(max)}$ /脉宽受限于最大结温

2. Thermal characteristics
热特性

Table 2 Thermal characteristics/热特性

Parameter 参数	Symbol 符号	Test conditions 测试条件	Value/值			Unit 单位
			Min.	Typ.	Max.	
Storage Temperature 存储温度	T_{stg}		-55		175	°C
Operating junction Temperature 工作结温	T_{vj}		-55		175	°C
Thermal resistance, junction-case 结-壳热阻	$R_{th(j-c)}$			0.81	1.04	K/W
Thermal resistance, junction-ambient 结-环境热阻	$R_{th(j-a)}$			40		K/W
Soldering temperature, reflow solderin 焊接温度，回流焊	T_{sold}	reflow MSL1			260	°C

3. Electrical characteristics at T_{vj}= 25°C, unless otherwise specified.

电气特性默认T_{vj}= 25°C除非另有说明

Table 3 Static characteristics/静态特性

Parameter 参数	Symbol 符号	Test conditions 测试条件		Value/值			Unit 单位
				Min.	Typ.	Max.	
Drain-source breakdown voltage 漏源击穿电压	$V_{(BR)DSS}$	I_D=100μA,V_{GS}=0V		1200			V
Gate threshold voltage 门极开启阀值电压	$V_{GS(th)}$	I_D=2.5mA,V_{DS}=V_{GS}	T_{vj}=25°C	2.0	2.8	4.0	V
			T_{vj}=175°C		2.0		
Drain-source on-state resistance 漏极-源极导通电阻	$R_{DS(on)}$	I_D=10A,$V_{GS(on)}$=15V			150		mΩ
		I_D=10A,$V_{GS(on)}$=18V	T_{vj}=25°C		120	160	
			T_{vj}=175°C		206		
Zero gate voltage drain current 集电极-发射极漏电	I_{DSS}	V_{DS}=1200V,V_{GS}=0V				5	μA
Gate to source Leakage current 门极-源极漏电流	I_{GSS}	V_{DS}=0V,V_{GS}=22V,T_{vj}=25°C				250	nA
		V_{DS}=0V,V_{GS}=-8V,T_{vj}=25°C				250	
Forward transconductance 正向跨导	g_{fs}	I_D=10A,V_{DS}=20V			6.3		S
Integrated gate resistor 内部门极电阻	R_G	f=1MHz			1.9		Ω

Table 4 Dynamic characteristics/动态特性

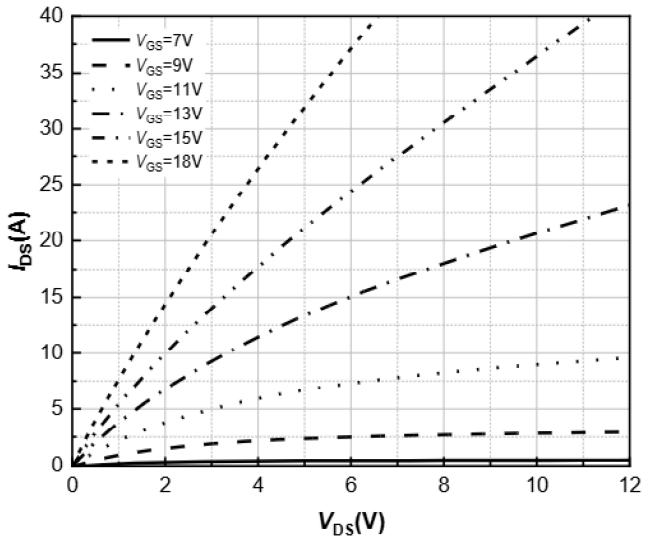
Parameter 参数	Symbol 符号	Test conditions 测试条件	Value/值			Unit 单位
			Min.	Typ.	Max.	
Input capacitance 输入电容	C_{iss}	V_{DS}=1000V, V_{GS}=0V, f=1MHz		692		pF
Output capacitance 输出电容	C_{oss}			39		
Reverse transfer capacitance 反向传输电容	C_{rss}			4		
Coss stored energy 输出电容存储能量	E_{oss}	Calculated based on C_{oss}		22		μJ
Total gate charge 总栅极电荷	$Q_{G(tot)}$	V_{DD}=800V, I_D=10A, V_{GS}=-4/18V		37		nC
Gate source charge 栅-源极电荷	Q_{GS}			9		
Gate-drain charge 栅-漏极电荷	Q_{GD}			13		
Turn-on delay time 开启延迟时间	$t_{d(on)}$	V_{DD}=800V, I_D=10A, V_{GS}=-4/18V, $R_{G(ext)}$=2.5Ω, L=200μH		10		ns
Rise time 上升时间	t_r			11		
Turn-off delay time 关闭延迟时间	$t_{d(off)}$			12		
Fall time 下降时间	t_f			14		
Turn-on switching loss 单次开启损耗	E_{on}			84		μJ
Turn-off switching loss 单次关闭损耗	E_{off}			64		

Table 5 Reverse diode characteristics/体二极管反向特性

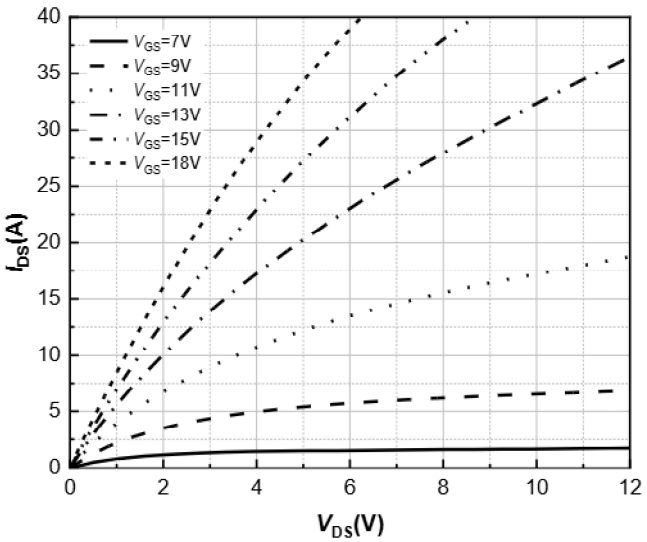
Parameter 参数	Symbol 符号	Test conditions 测试条件		Value/值			Unit 单位
				Min.	Typ.	Max.	
Drain-source reverse voltage 体二极管正向压降	V_{SD}	I_S=5A,V_{GS}=-4V	T_{vj}=25°C		4.0	5.5	V
			T_{vj}=175°C		3.6		
		I_S=10A,V_{GS}=-4V	T_{vj}=25°C		4.6		
			T_{vj}=175°C		4.0		
MOSFET forward recovery time MOSFET正向恢复时间	t_{fr}	V_{DS}=800V, I_S=10A, di_S/dt=-1120A/μs			41		ns
MOSFET forward recovery charge MOSFET正向恢复电荷	Q_{fr}				115		nC
MOSFET peak forward recovery current MOSFET正向恢复峰值电流	I_{frm}				6.4		A

4. Electrical characteristics diagrams
电气特性图表

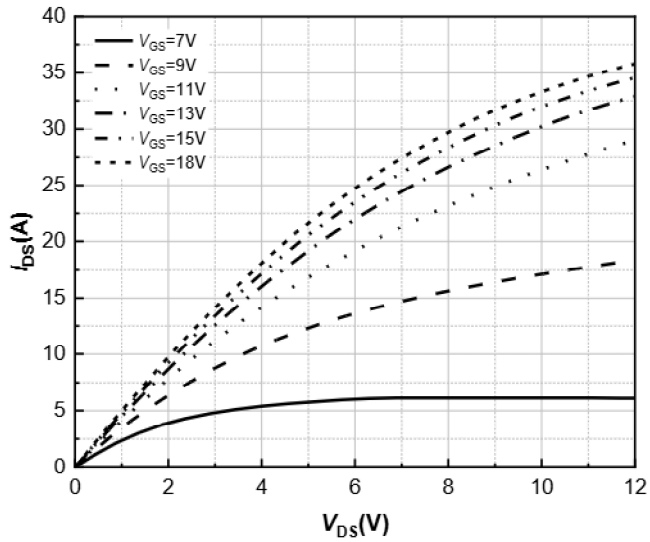
Typ.Output characteristic/输出特性
$I_{DS}=f(V_{DS})$; T_{vj}=-40℃



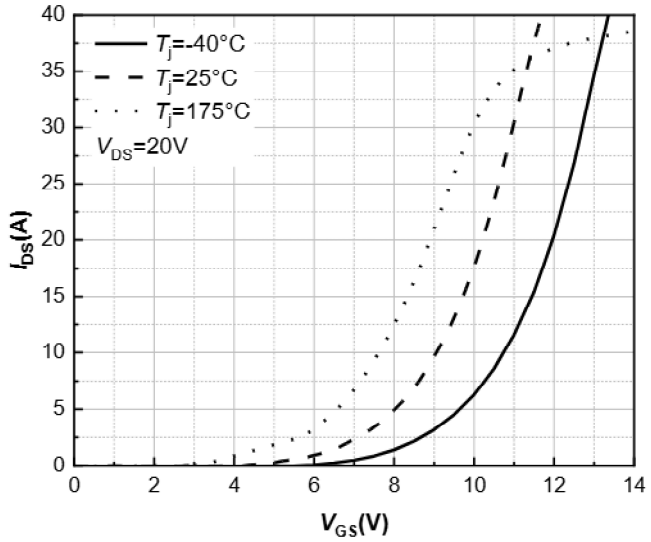
Typ.Output characteristic/输出特性
$I_{DS}=f(V_{DS})$; T_{vj}=25℃



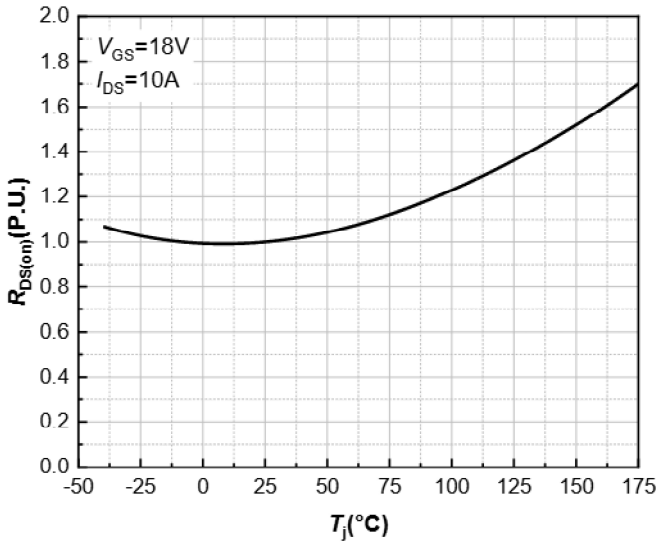
Typ.Output characteristic/输出特性
$I_{DS}=f(V_{DS})$; T_{vj}=175℃



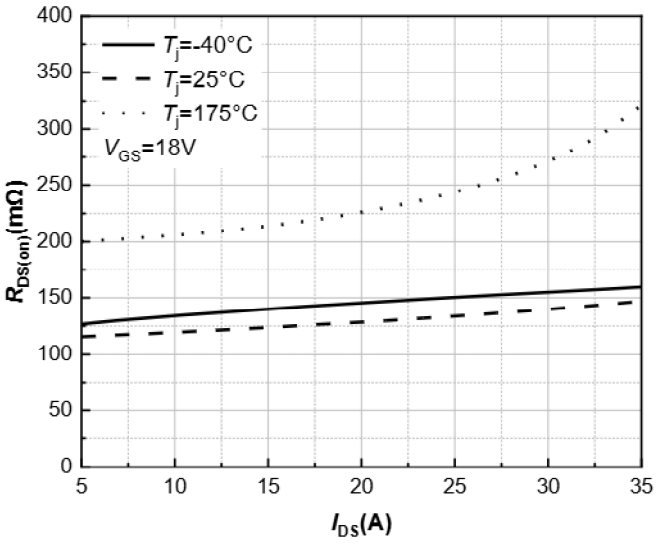
Typ.Transfer characteristic/典型传输特性
$I_{DS}=f(V_{GS})$;



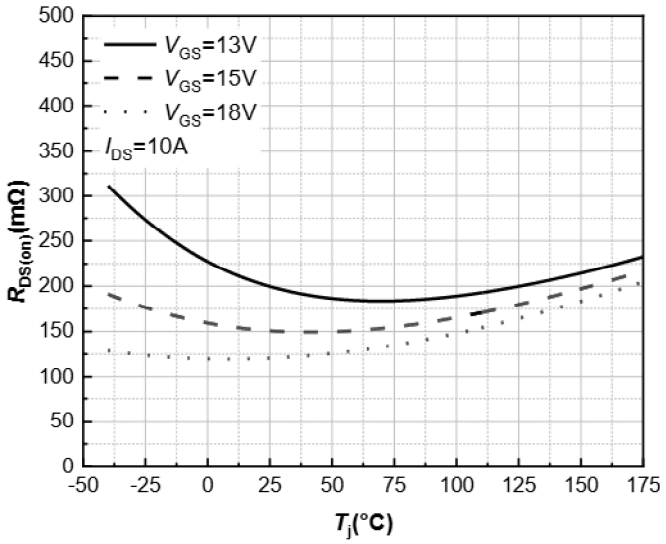
Typ.Drain-source on-state resistance/典型漏源导通电阻
$R_{DS(on)}=f(T_{vj})$;



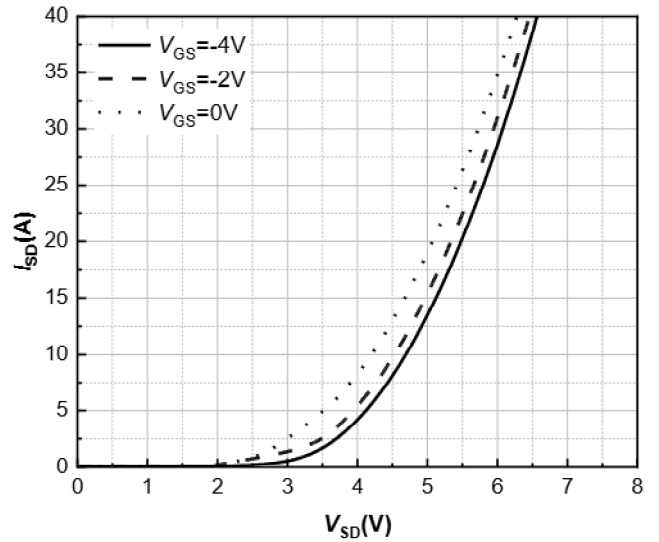
Typ.Drain-source on-state resistance/典型漏源导通电阻
$R_{DS(on)}=f(I_{DS})$;



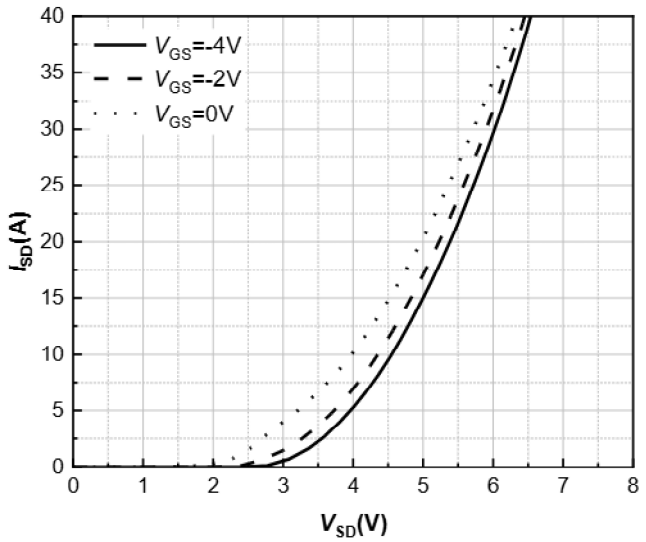
Typ.Drain-source on-state resistance/典型漏源导通电阻
$R_{DS(on)}=f(T_{vj})$;



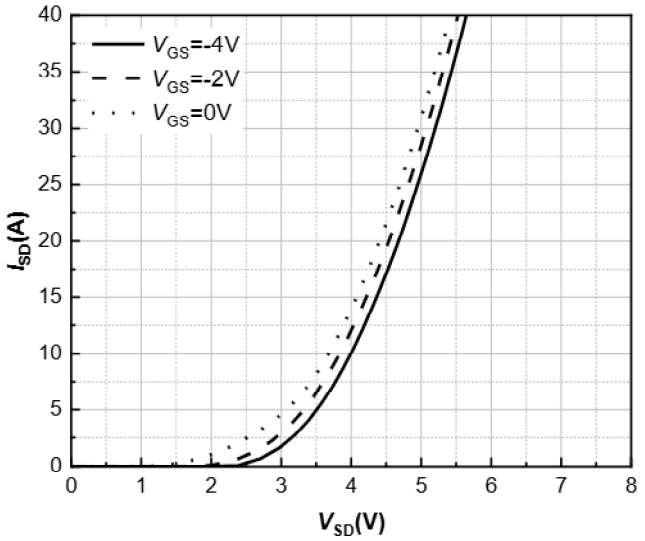
Typ.Reverse drain current characteristics/典型二极管特性
$I_{SD}=f(V_{SD})$; T_{vj}=-40℃



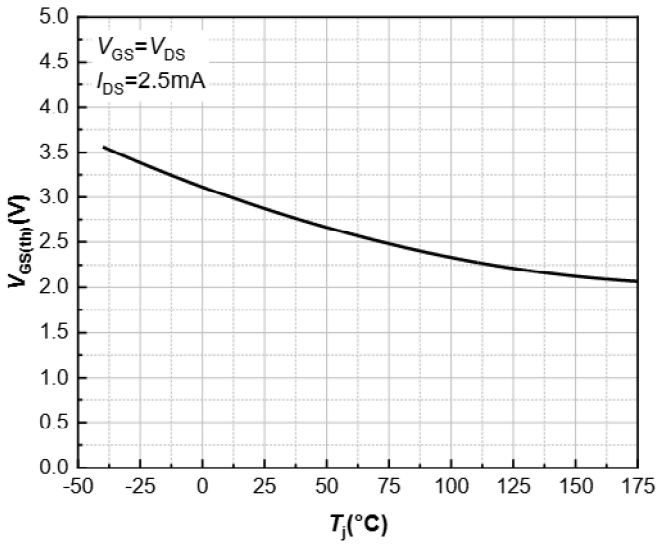
Typ.Reverse drain current characteristics/典型二极管特性
I_{SD}=f(V_{SD}); T_{vj}=25℃



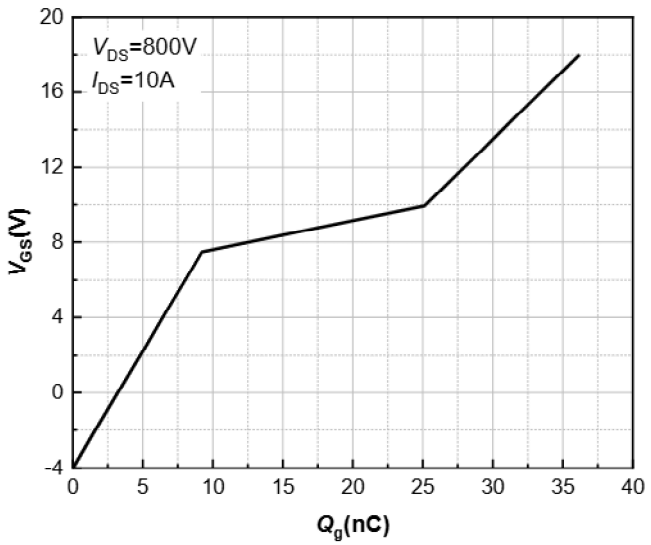
Typ.Reverse drain current characteristics/典型二极管特性
I_{SD}=f(V_{SD}); T_{vj}=175℃



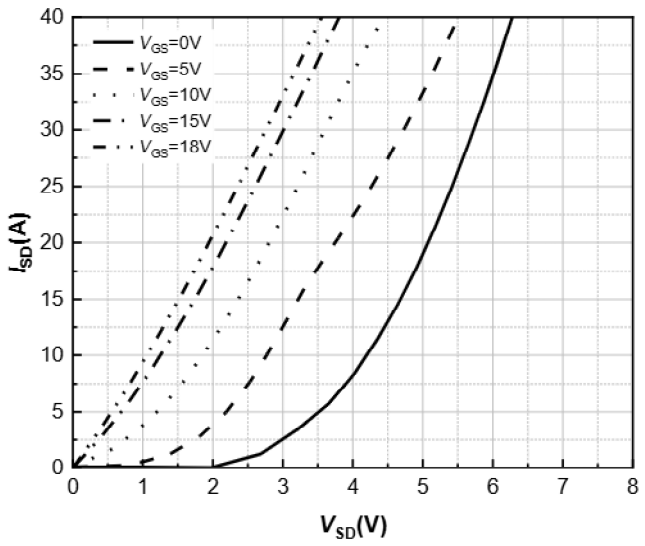
Typ.Gate threshold voltage/门级阈值电压结温特性
V_{GSth}=f(T_{vj});



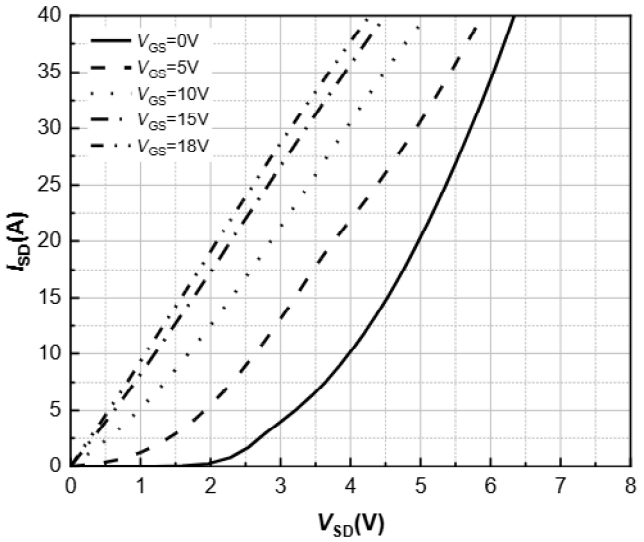
Typ.Gate charge/典型门级电荷
V_{GS}=f(Q_G);



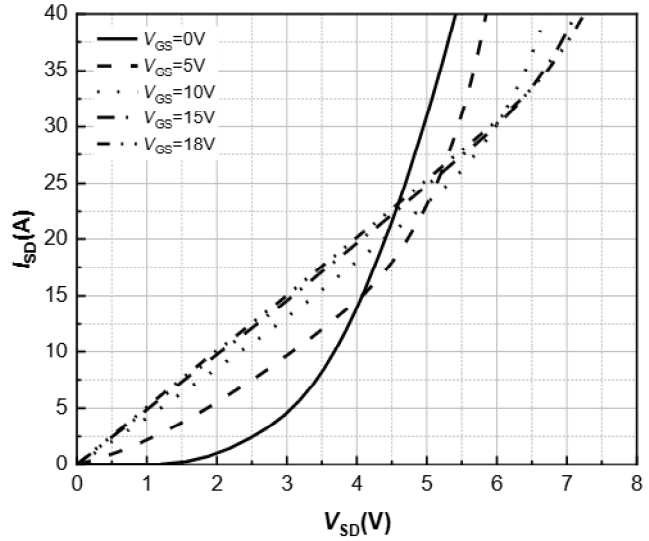
Typ.3rd Quadrant Characteristics/典型第三象限特性
$I_{SD}=f(V_{SD})$; T_{vj}=-40℃



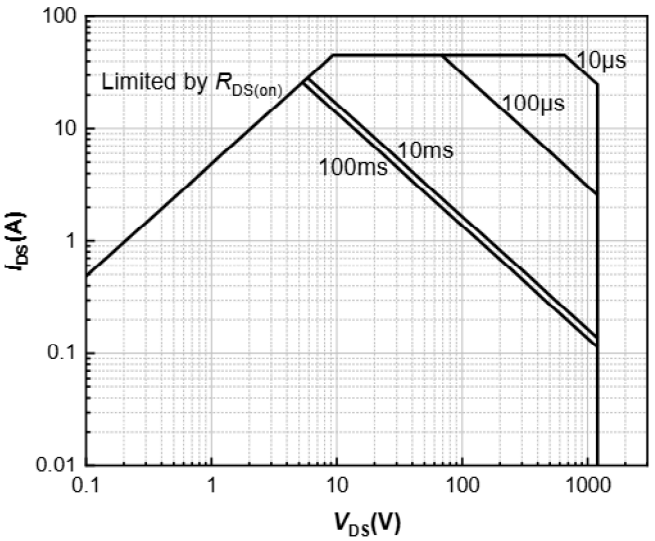
Typ.3rd Quadrant Characteristics/典型第三象限特性
$I_{SD}=f(V_{SD})$; T_{vj}=25℃



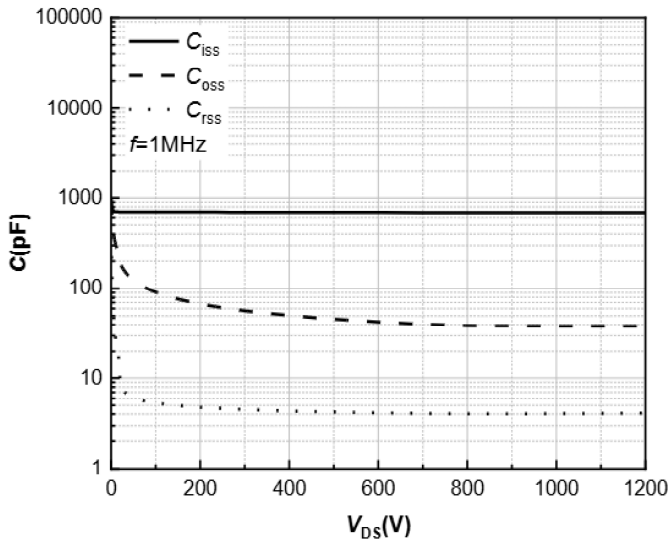
Typ.3rd Quadrant Characteristics/典型第三象限特性
$I_{SD}=f(V_{SD})$; T_{vj}=175℃



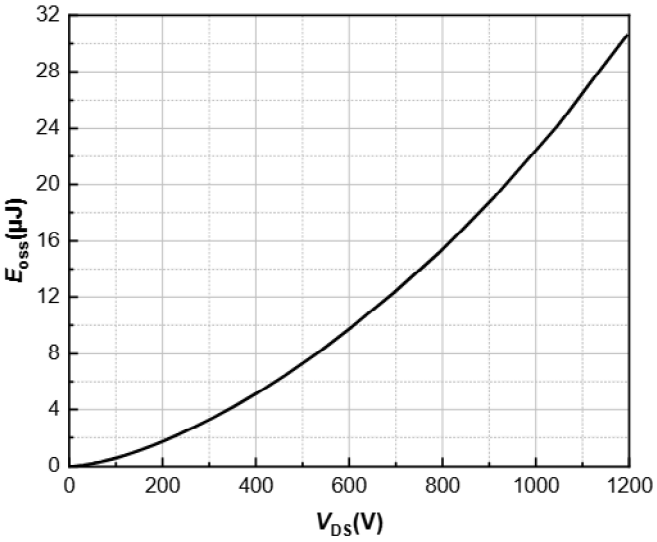
Forward bias safe operating area/安全工作区
$I_{DS}=f(V_{DS})$;



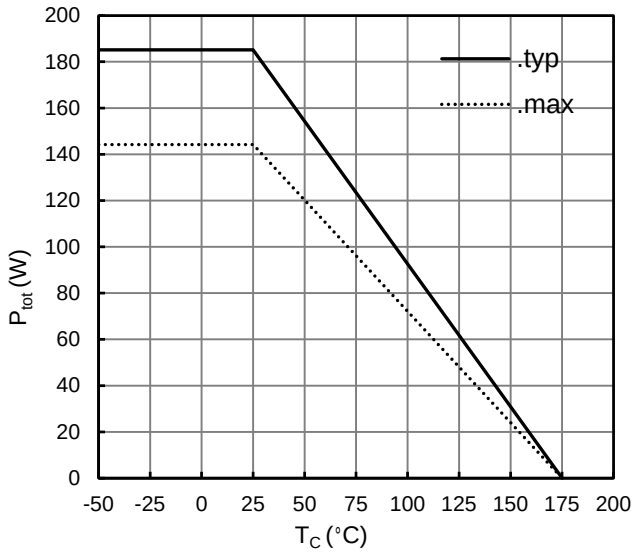
Typ.Capacitances/典型电容特性
C=f(V_{DS});



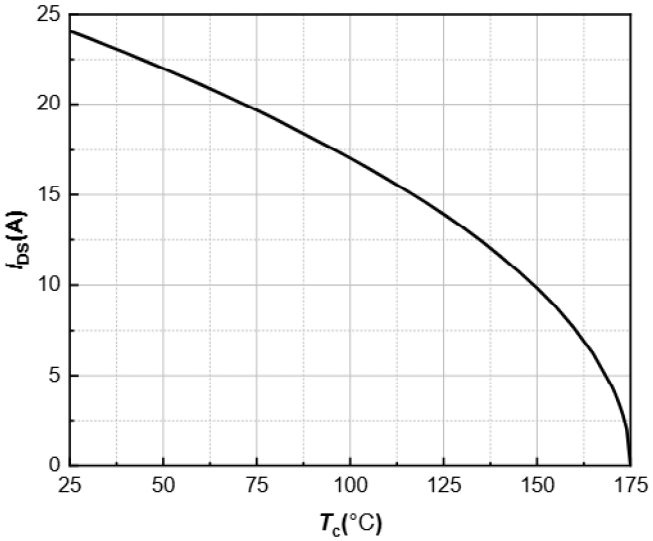
Typ.Coss stored energy/典型C_{OSS}存储能量
E_{OSS}=f(V_{DS});



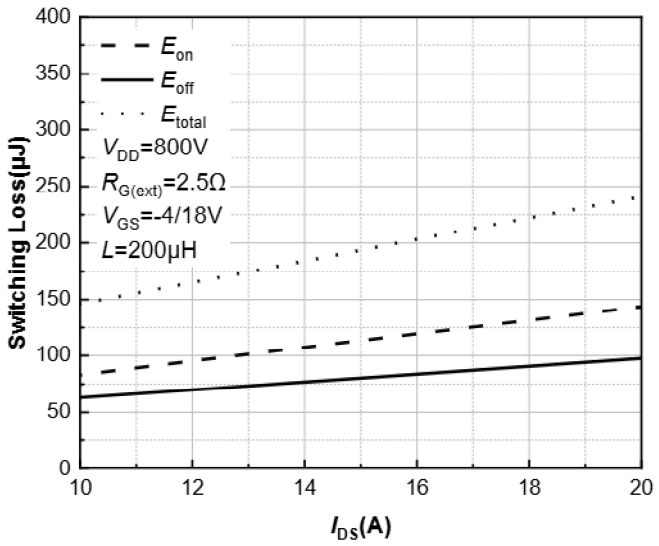
Power dissipation/耗散功率
P_{tot}=f(T_C); @$R_{th(j-c)}$



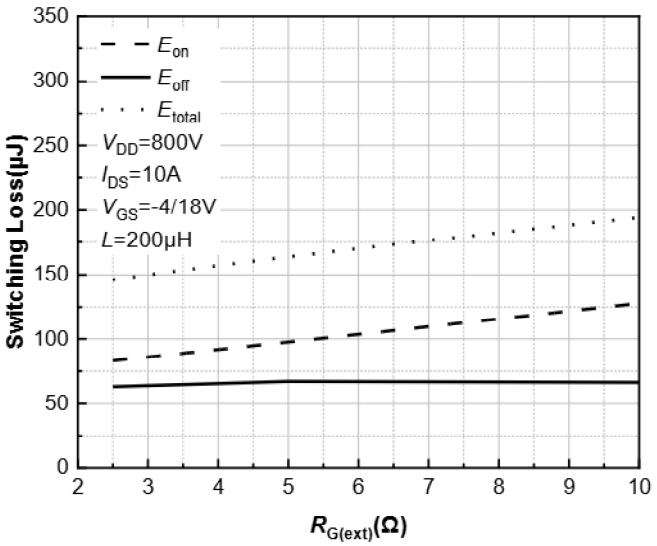
Continuous Drain Current/连续漏电与壳温
I_{DS}=f(T_C);



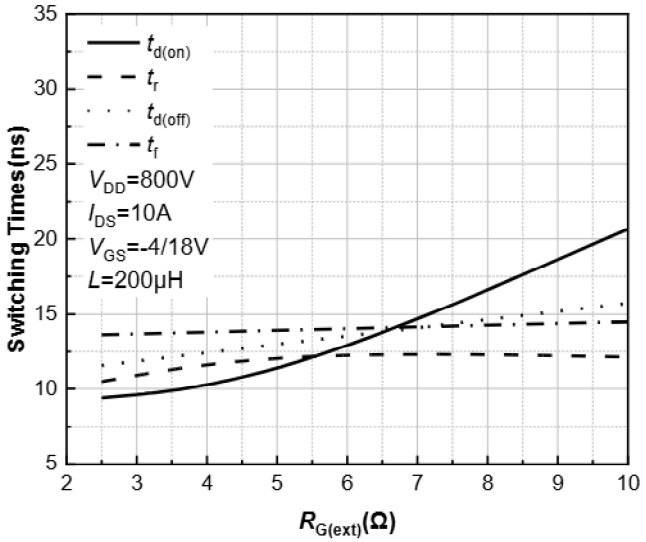
Typ. Switching Losses vs current /动态损耗-电流特性
E=f(I_D); T_{vj}=25℃



Typ.Switching losses vs resistance/动态损耗-门级电阻特性
E=f(R_G); T_{vj}=25℃

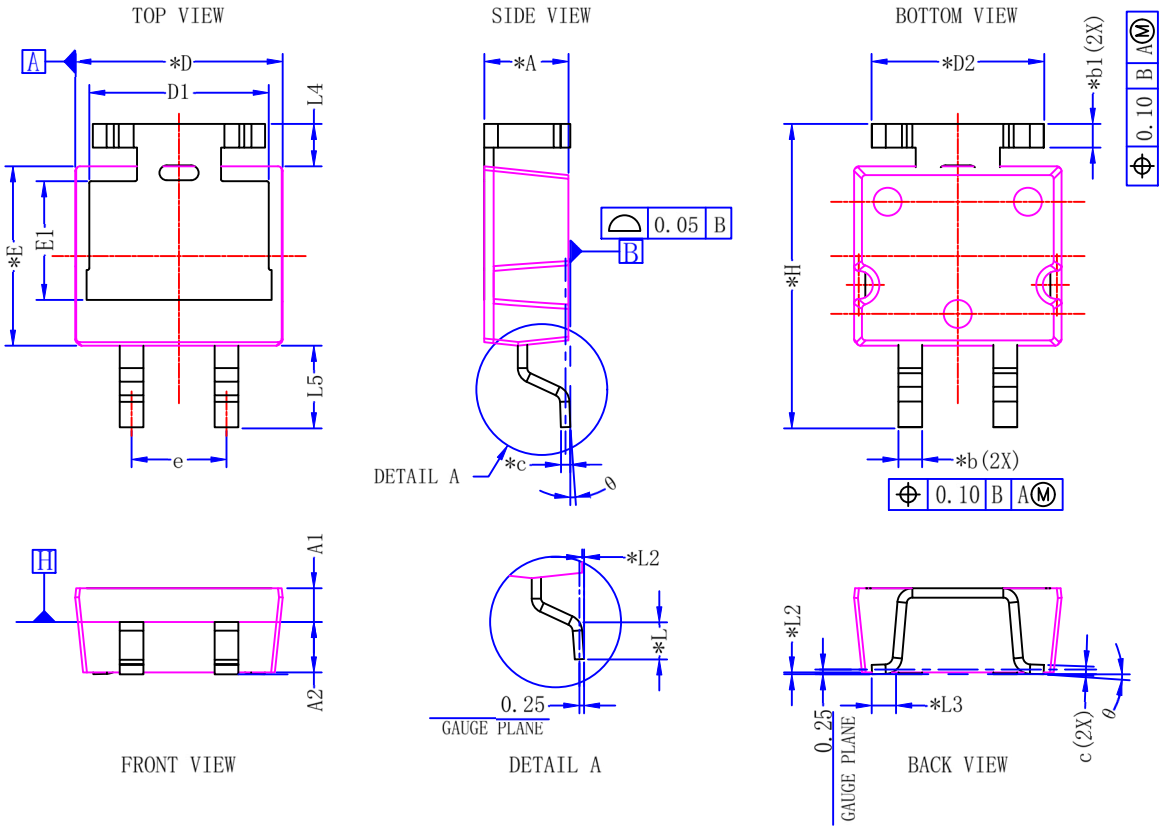


Typ.Switching times vs resistance/开关时间-门级电阻特性
t=f(R_G); T_{vj}=25℃



5. Package outline
封装外形

Figure 1. Outline TSC263-4L, dimensions in mm/TSC263-4L外形尺寸（毫米）



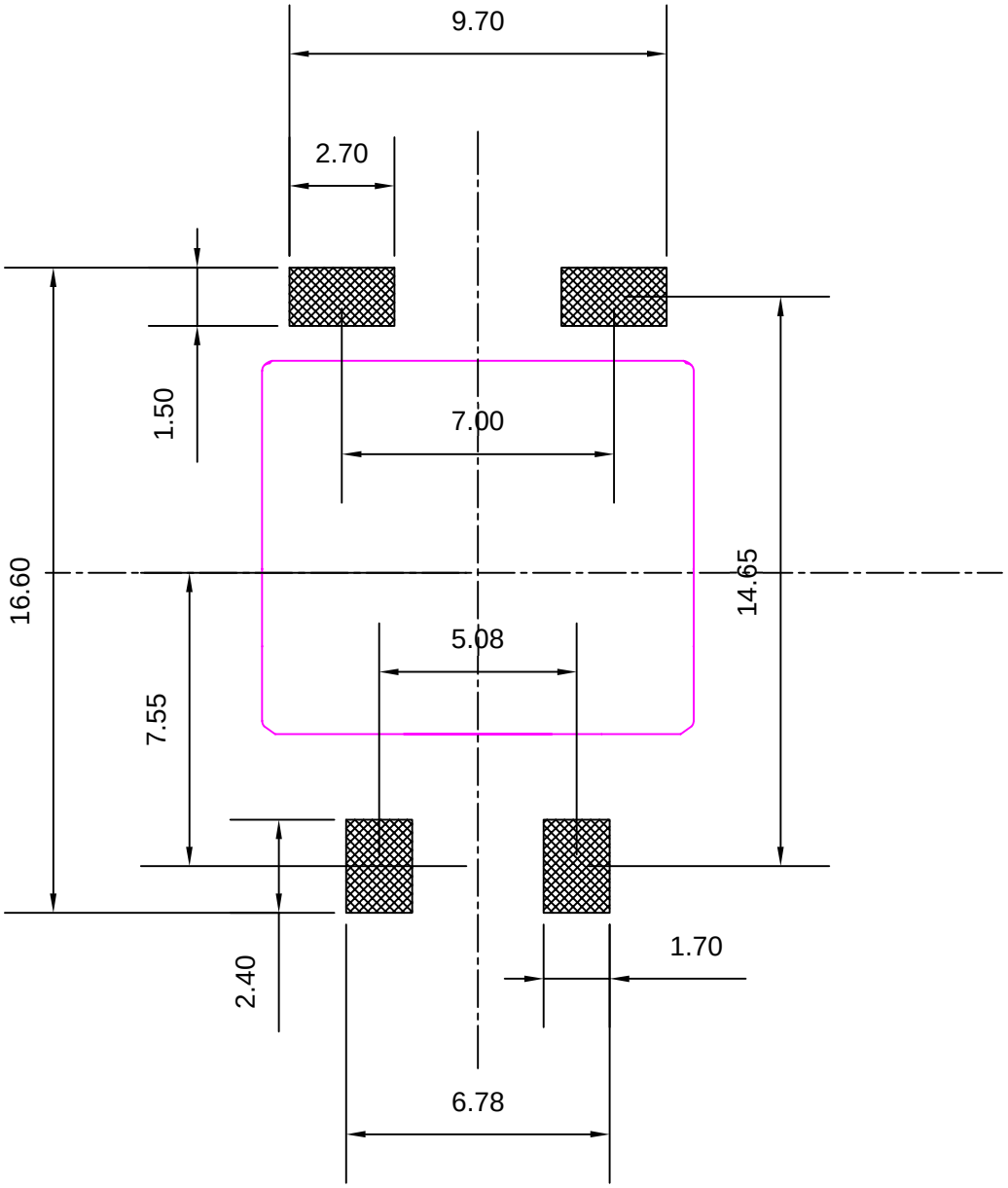
DIM SYMBOL	MIN.	TYP.	MAX.	DIM SYMBOL	MIN.	TYP.	MAX.
*A	4.40	4.50	4.60	*E	9.45	9.60	9.75
A1	1.75	1.80	1.85	E1	6.15	6.35	6.55
A2	2.65	2.70	2.75	e	5.08 BSC		
*b	1.22	1.27	1.32	*H	16.02	16.22	16.42
*b1	1.22	1.27	1.32	*L	1.70	1.90	2.10
*c	0.45	0.50	0.55	*L2	0.05	0.10	0.15
*D	10.95	11.10	11.25	*L3	1.10	1.30	1.50
D1	9.50	9.60	9.70	L4	2.27 REF		
*D2	9.00	9.20	9.40	L5	4.15	4.35	4.55
				Θ	0°	-	8°

NOTES:
- ALL DIMENSIONS ARE IN MILLIMETER. ANGLES ARE IN DEGREE.
- DIMENSION "D" DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSIONS. INTERLEAD FLASH SHALL NOT EXCEED 0.150 MM PER SIDE. DIMENSION "E" DOES NOT INCLUDE MOLD FLASH, GATE BURRS, THE GATE BURRS SHALL NOT EXCEED 0.15MM.
- DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, TIE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.

注:
- 所有尺寸均以毫米为单位。角度以度为单位。
- 尺寸 D 不包括引脚间飞边或突出物。引脚间飞边在每侧不得超过0.15mm。尺寸 E 不包括模具飞边、浇口残余物，浇口残余物不得超过0.15mm。
- 尺寸 D、E 是在塑胶本体的最外极限确定的，不包括模具飞边、连接条残余、浇口残余和引脚间飞边，但包括塑胶本体顶部和底部之间可能存在的任何不匹配或错位。

6. Recommended Land Pattern
推荐焊盘尺寸

Figure 2. TSC263-4L Effective Solderable Area for Reflow Soldering/ TSC263-4L 回流焊接有效可焊面积



solder land/焊盘区域

Package Reference Centerline/封装参考中心线

dimensions in mm/单位为毫米

注:
所示焊盘尺寸仅供参考。为确保最佳散热性能及焊接质量，建议根据实际应用中的 PCB 板材、层数及散热设计对焊盘进行优化调整
The land pattern dimensions provided are for reference only. To achieve optimal thermal performance, actual design adjustments should be considered based on the specific PCB materials, layer stack-up, and thermal dissipation requirements.

7. Revision history
修订历史

Table 6 Date and version number/日期与版本号

Date日期	Revision版本	Changes更改内容
2026-04-02	Rev.G1.0	Target Datasheet（目标规格书）

8. Matters needing attention
注意事项

Appendix 1. Important Technical Guidance, Application Policy, and Copyright Notice/重要技术指南、应用规范与版权声明

[Data and Design Guidance]

The information provided herein, including typical values and application examples, serves as technical guidance only and should not be construed as a formal guarantee of product characteristics. This documentation is intended for qualified engineering personnel, who bear the ultimate responsibility for evaluating the product's suitability for their specific application and compliance with all industry standards.

【数据与设计指引】

本文件中提供的所有信息，包括任何典型值和应用示例，仅作为技术指引，不应被视为对产品特性的正式保证。本资料专供具备资质的工程技术人员使用，客户的技术部门应对产品在特定应用中的适用性和对所有行业标准的符合性负最终评估责任。

[Copyright and Revision Management]

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[Application Safety and Intellectual Property]

Our product supply does not confer any license or right under any third-party intellectual property. Customers are fully responsible for the patent clearance and functional safety of their end application. Furthermore, this product is not intended for use in life-critical or high-risk systems (such as Class III medical devices or aerospace control) unless explicitly approved by us through a dedicated high-reliability agreement.

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