

HC090N065H6P

650V N-Channel SiC MOSFET

产品特点/Product features

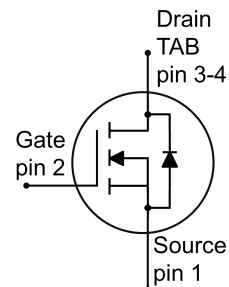
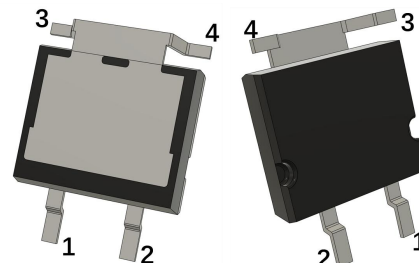
- Top side cooling technology
顶部散热技术
- High Blocking Voltage with Low On-Resistance
高击穿电压与低导通电阻
- High Speed Switching with Low Capacitance
高开关速度与低电容特性
- Easy to Parallel and Simple to Drive
易于并联且驱动电路简单
- 100% UIS Tested
100% UIS测试
- Resistant to Latch-Up
抗门锁效应
- Halogen free, RoHS compliant
无卤, 符合RoHS

应用领域/Applications

- Uninterruptible power supplies
不间断电源 (UPS)
- Switching mode power supply
开关模式电源 (SMPS)
- Solar inverters
太阳能逆变器
- High voltage DC/DC converters
高压DC/DC转换器

关键性能参数/Key Performance Parameters

Parameter	Value	Unit
V_{DSS}	650	V
$R_{DS(on),typ}$	90	mΩ
I_{DM}	61	A



Type/型号	Package/封装	Marking/标识	Packaging method/包装方式
HC090N065H6P	TSC263-4L	HC090N065P	Tape and Reel/卷带包装



1. Maximum ratings at $T_j = 25^\circ\text{C}$, unless otherwise specified.

最大额定值 默认 $T_j = 25^\circ\text{C}$ 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}	$T_j \geq 25^\circ\text{C}$	650	V
Drain current ¹ 连续漏极电流	I_{D}	$T_c = 25^\circ\text{C}, V_{\text{GS}} = 18\text{V}$	31	A
		$T_c = 100^\circ\text{C}, V_{\text{GS}} = 18\text{V}$	22	
Peak drain current ² 峰值漏极电流	I_{DM}	$T_c = 25^\circ\text{C}$	61	A
Continuous diode current ¹ 连续二极管电流	I_{S}	$T_c = 25^\circ\text{C}, V_{\text{GS}} = -5\text{V}$	16	A
Peak diode current ² 峰值二极管电流	I_{SM}	$T_c = 25^\circ\text{C}, V_{\text{GS}} = -5\text{V}$	61	A
Maximum gate source voltage 栅源最大电压	$V_{\text{GS,MAX}}$		-8~22	V
Recommend gate source voltage 推荐的栅源电压	$V_{\text{GS,op}}$		-5~18	V
Avalanche energy, single pulse 单脉冲雪崩能量	E_{AS}	$I_{\text{AS}} = 2.5\text{A}, V_{\text{DD}} = 50\text{V}, L = 1\text{mH}$	72	mJ
Power dissipation 总耗散功率	P_{tot}	$T_c = 25^\circ\text{C}$	273	W
		$T_c = 100^\circ\text{C}$	136	

1. Limited by $T_{\text{j(max)}}$ /受限于最大结温

2. Pulse width t_p limited by $T_{\text{j(max)}}$ /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_j		-55		175	°C
Thermal resistance, junction-case 结-壳热阻	$R_{th(j-c)}$				0.55	K/W
Thermal resistance, junction-ambient 结-环境热阻	$R_{th(j-a)}$				61	K/W
Soldering temperature, reflow solderin 焊接温度, 回流焊	T_{sold}	reflow MSL1			260	°C



3. Electrical characteristics at $T_j = 25^\circ\text{C}$, unless otherwise specified.

电气特性 默认 $T_j = 25^\circ\text{C}$ 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	$V_{(BR)DSS}$	$I_D = 0.1\text{mA}, V_{GS} = 0\text{V}$		650			V
Gate threshold voltage 门极开启阈值电压	$V_{GS(th)}$	$I_D = 2.5\text{mA}, V_{DS} = V_{GS}$	$T_j = 25^\circ\text{C}$	2.2	2.5	4.2	V
			$T_j = 175^\circ\text{C}$		1.7		
Drain-source on-state resistance 漏极-源极导通电阻	$R_{DS(on)}$	$I_D = 10\text{A}, V_{GS(on)} = 18\text{V}$	$T_j = 25^\circ\text{C}$		90	100	m Ω
			$T_j = 175^\circ\text{C}$		105		
Zero gate voltage drain current 集电极-发射极漏电	I_{DSS}	$V_{DS} = 650\text{V}, V_{GS} = 0\text{V}$				50	μA
Gate to source Leakage current 门极-源极漏电流	I_{GSS}	$V_{DS} = 0\text{V}, V_{GS} = 18\text{V}$				200	nA
		$V_{DS} = 0\text{V}, V_{GS} = -5\text{V}$				200	
Integrated gate resistor 内部门极电阻	$R_{G,int}$	$f = 1\text{MHz}, V_{AC} = 25\text{mV}$			15.8		Ω

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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}	$V_{DS}=400V$, $V_{GS}=0V$, $f=1MHz$		655		pF
Output capacitance 输出电容	C_{oss}			60		
Reverse transfer capacitance 反向传输电容	C_{rss}			6		
Coss stored energy 输出电容存储能量	E_{oss}	Calculated based on C_{oss}		6		μJ
Total gate charge 总栅极电荷	$Q_{G(tot)}$	$V_{DD}=400V$, $I_D=10A$, $V_{GS}=-5/18V$		26		nC
Gate source charge 栅-源极电荷	Q_{GS}			7.4		
Gate-drain charge 栅-漏极电荷	Q_{GD}			11.3		

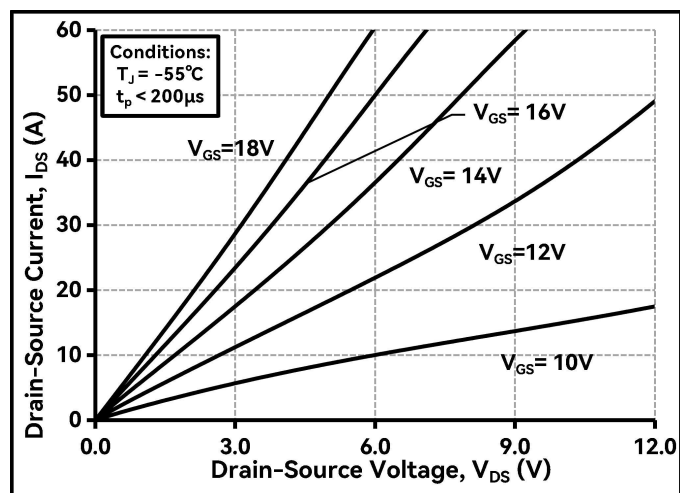
Table 5 Reverse diode characteristics/体二极管反向特性

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}	$I_S=5A, V_{GS}=0V, T_j=25^{\circ}C$		2.7		V
		$I_S=5A, V_{GS}=0V, T_j=175^{\circ}C$		2.4		
MOSFET forward recovery time MOSFET正向恢复时间	t_{fr}	$V_{DS}=400V$, $I_S=10A$, $-di_S/dt=1400A/\mu s$		13.1		ns
MOSFET forward recovery charge MOSFET正向恢复电荷	Q_{fr}			100.3		nC
MOSFET peak forward recovery current MOSFET正向恢复峰值电流	I_{frm}			12.7		A

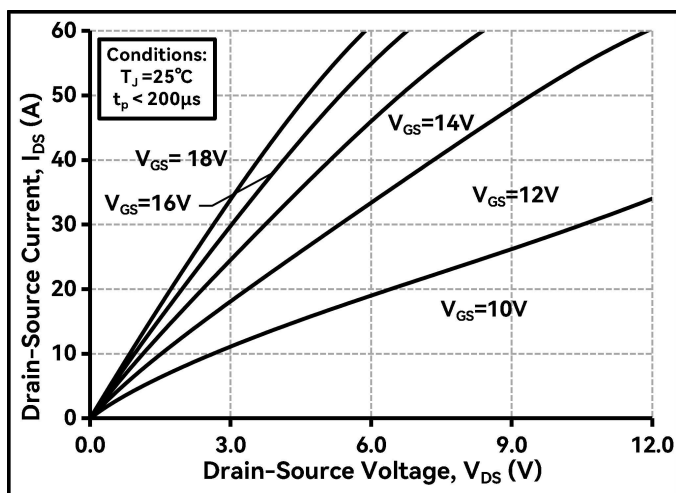
4. Electrical characteristics diagrams

电气特性图表

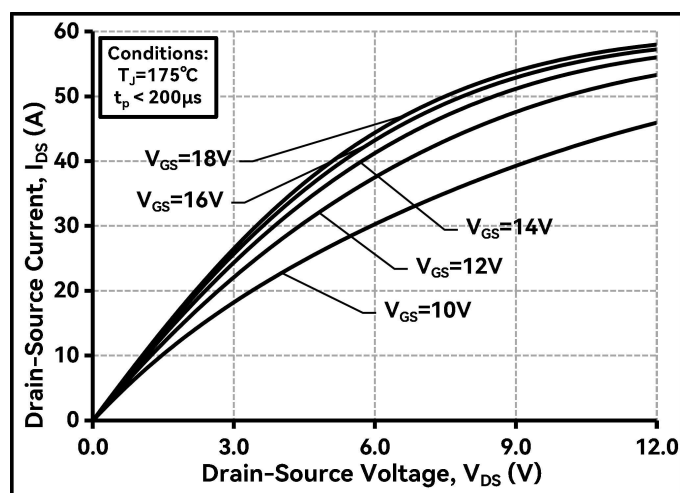
Typ. Output characteristic/典型输出特性



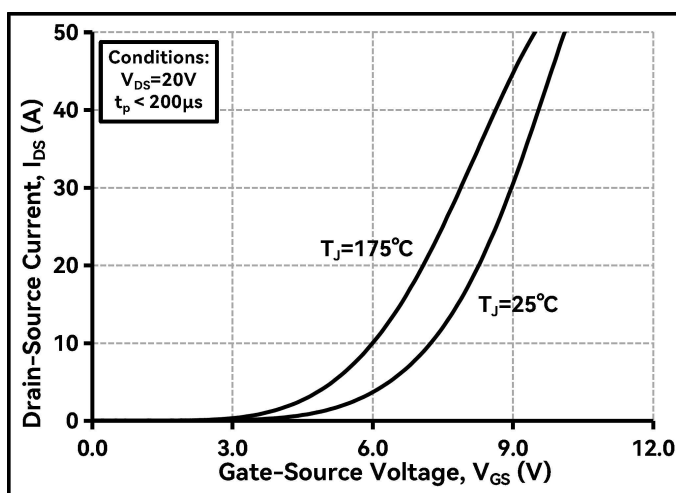
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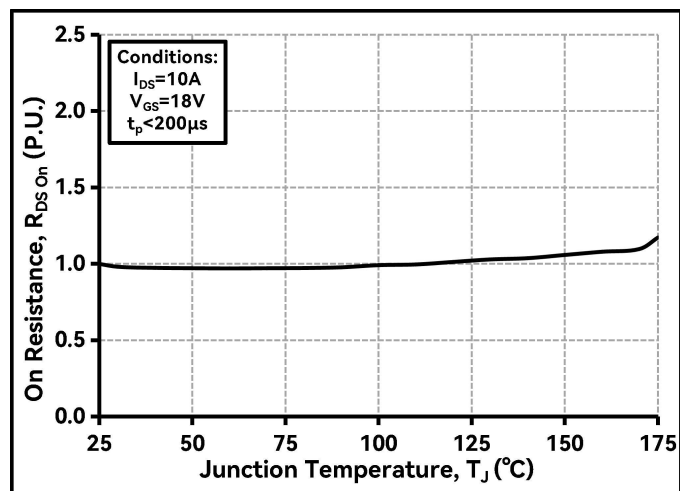
Typ. Output characteristic/典型输出特性



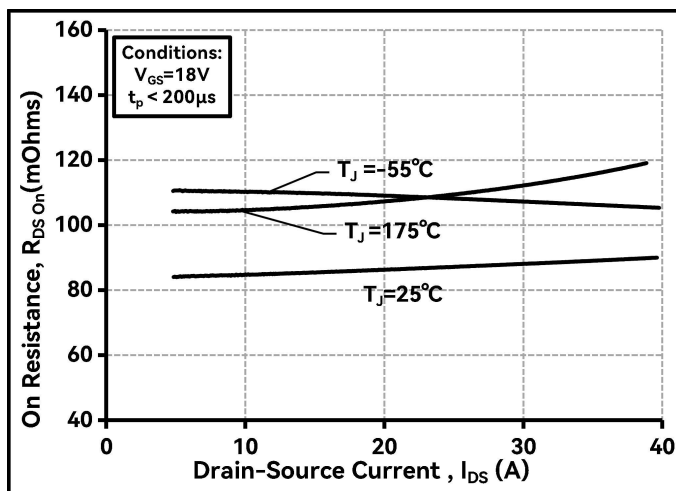
Typ. Transfer characteristics/传输特性



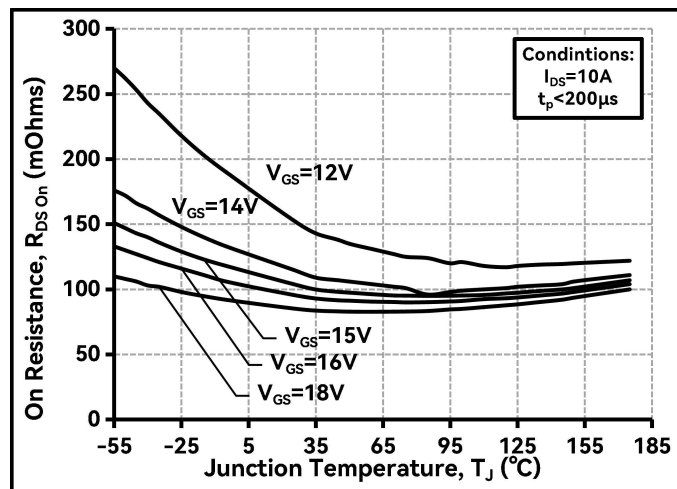
Typ. Drain-source on-state resistance/导通电阻特性



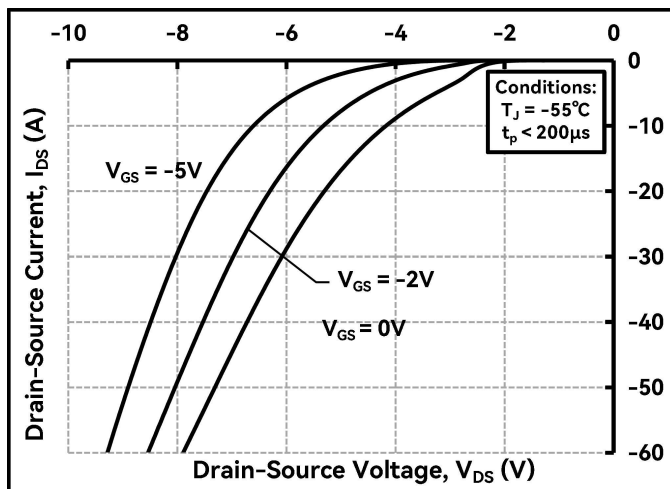
Typ. Drain-source on-state resistance/导通电阻特性



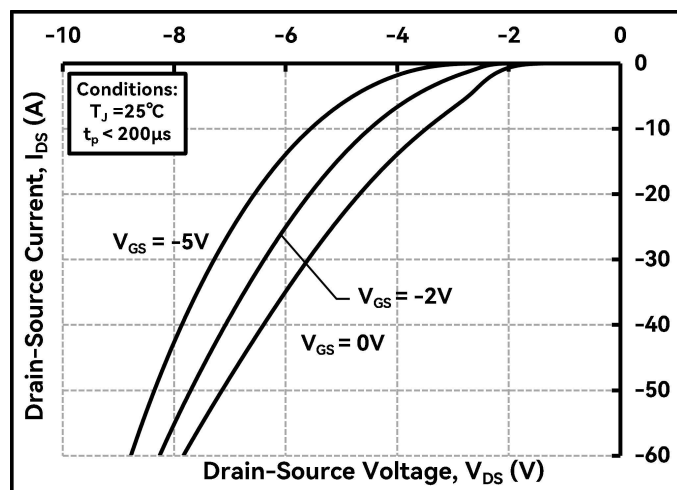
Typ.Drain-source on-state resistance/导通电阻特性



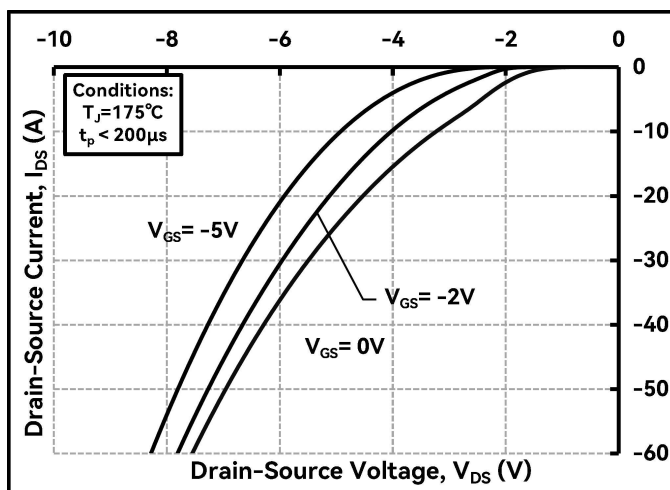
Typ.Reverse drain current characteristics/典型二极管特性



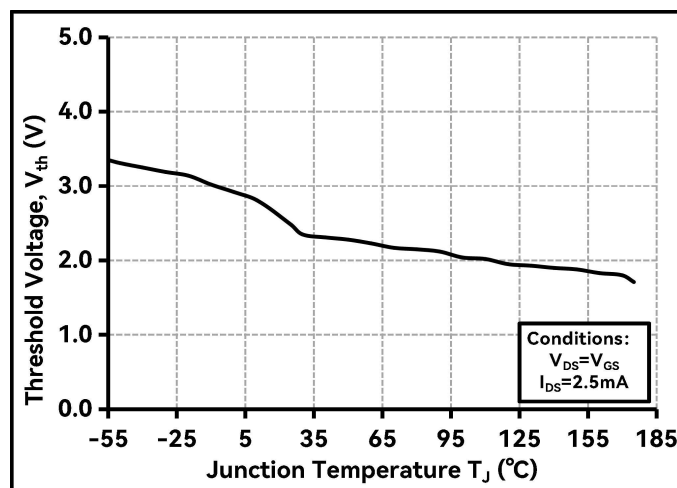
Typ.Reverse drain current characteristics/典型二极管特性



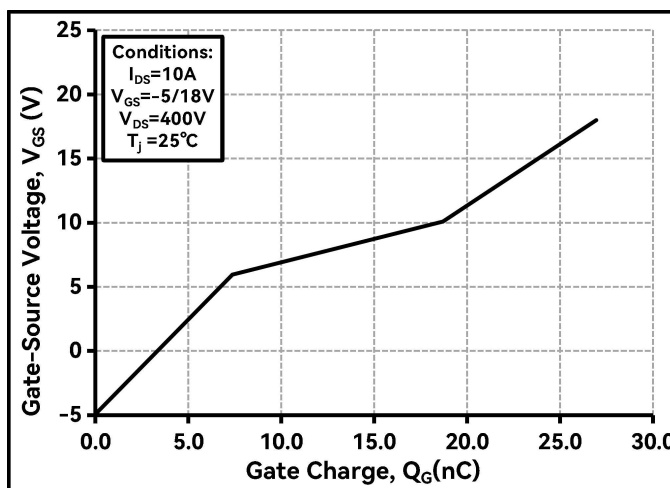
Typ.Reverse drain current characteristics/典型二极管特性



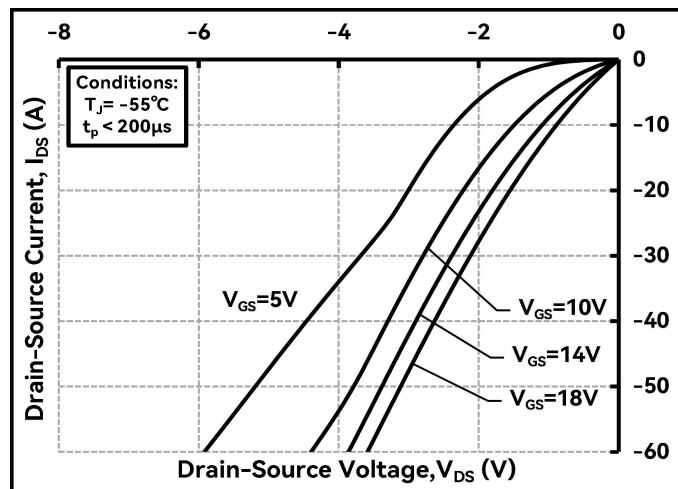
Typ.Gate threshold voltage/门级阈值电压结温特性



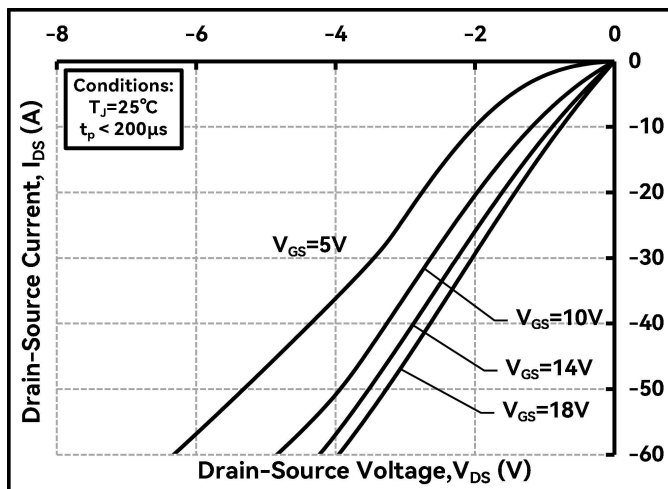
Typ.Gate charge/典型门级电荷



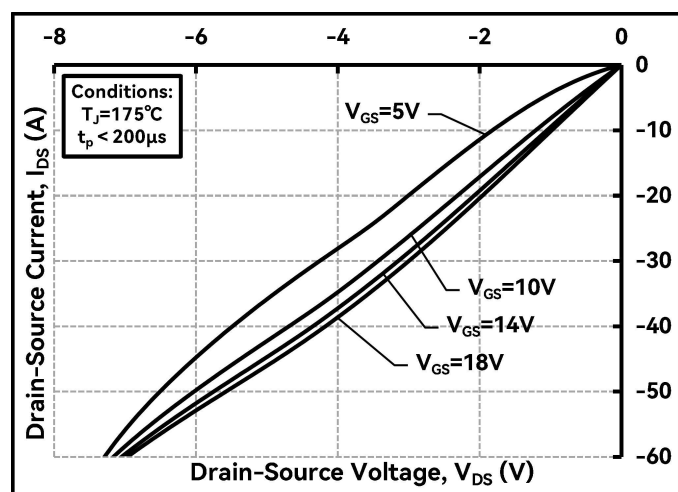
Typ.3rd Quadrant Characteristics/典型第三象限特性



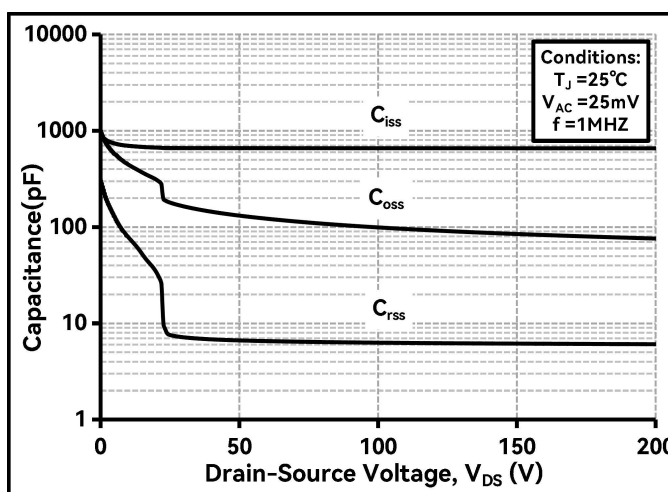
Typ.3rd Quadrant Characteristics/典型第三象限特性



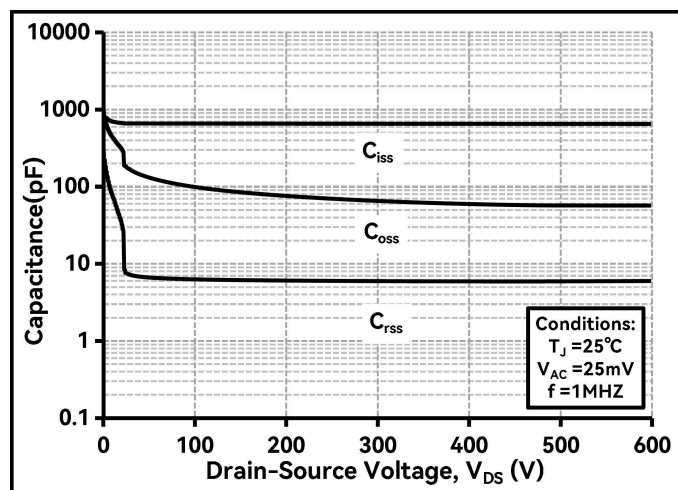
Typ.3rd Quadrant Characteristics/典型第三象限特性



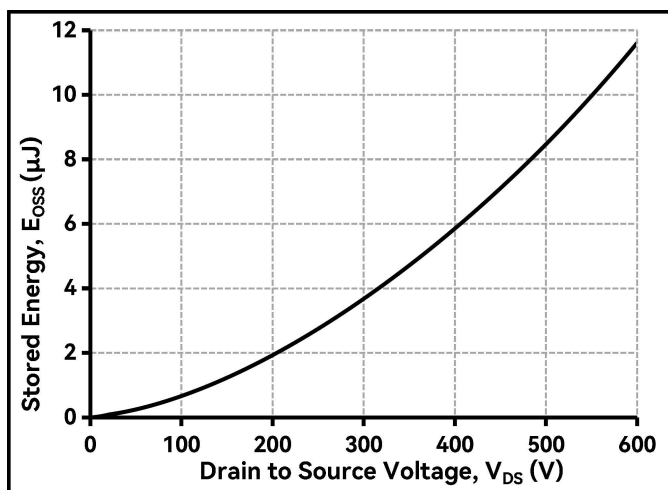
Typ.Capacitances/典型电容特性



Typ.Capacitances/典型电容特性

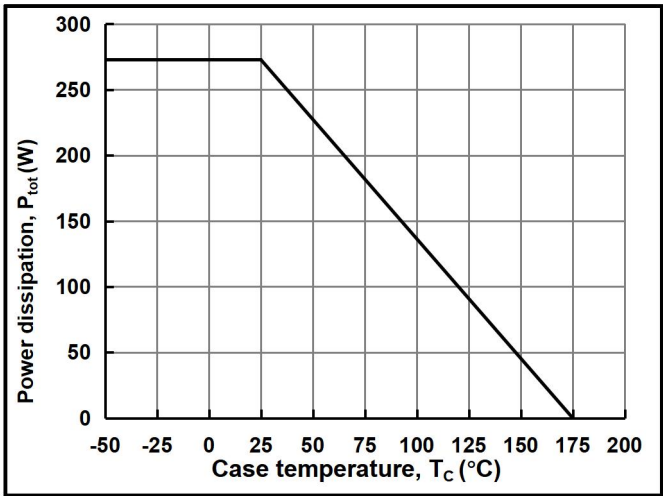


Typ.Coss stored energy/典型Coss存储能量

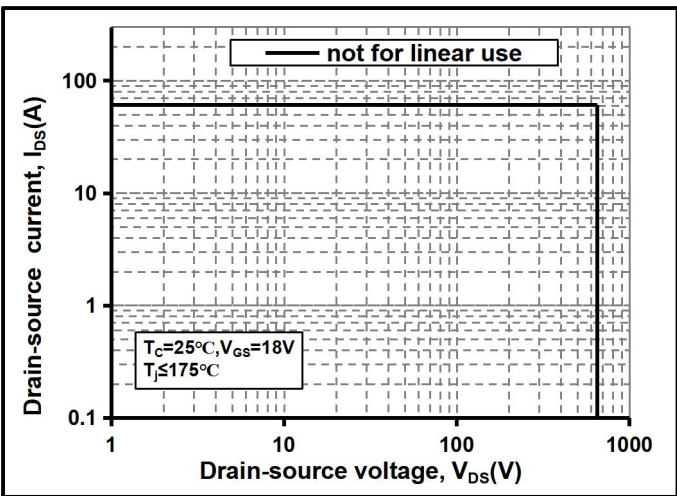




Power dissipation/耗散功率



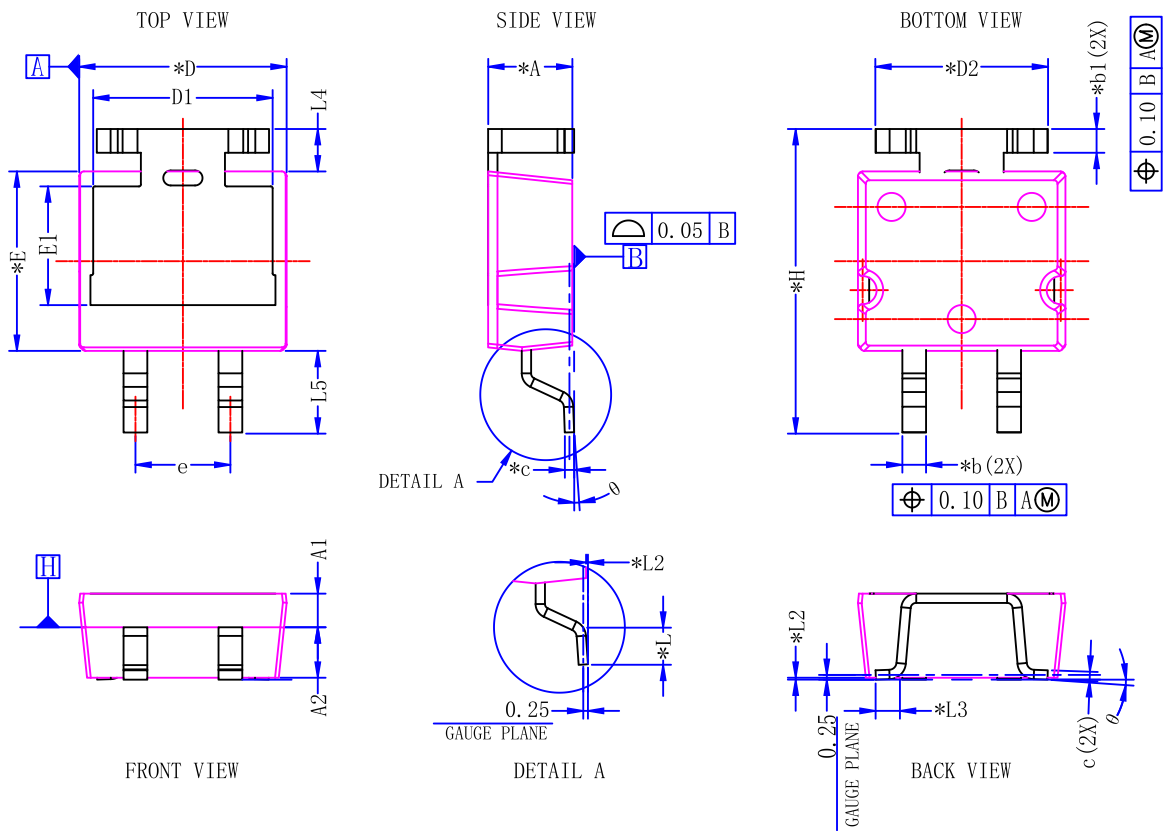
Reverse bias safe operating area/反偏安全工作区





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. Revision history

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

Date日期	Revision版本	Changes更改内容
2025-12-22	Rev.G1.0	Target Datasheet (目标规格书)

7. Matters needing attention

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]

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