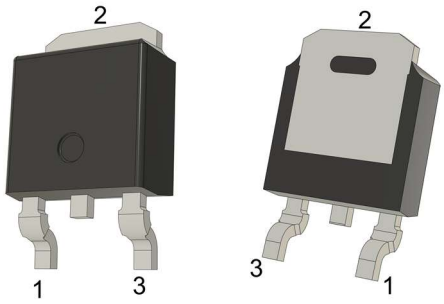
海明微半导体
HIMINGWAY

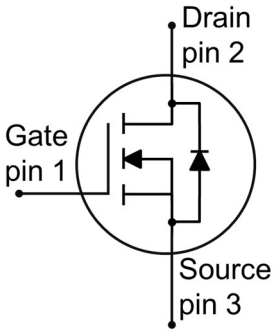
HC260N070A5E

700V N-Channel SiC MOSFET



产品特点/Product features

- Low Capacitances with High speed switching
  低电容高速开关
- Low specific on-resistance
  低导通电阻
- Low reverse recovery (Q_{rr})
  低反向恢复电荷Q_{rr}
- Reduction of heat sink requirements
  减少散热器需求
- Halogen Free and RoHS Compliant
  无卤素且符合 RoHS 标准



应用领域/Applications

- On-Board Charger
  车载充电器
- Direct Current to Direct Current Converters
  DC-DC 转换器
- Renewable Energy Applications
  可再生能源应用

关键性能参数/Key Performance Parameters

Parameter	Value	Unit
V_{DSS}	700	V
$R_{DS(on)}$,typ	260 (@5A)	mΩ
I_{DM}	18	A

Type/型号	Package/封装	Marking/标识	Packaging method/包装方式
HC260N070A5E	TO252-2L	HC260N070E	Tape and Reel/卷带包装

1. Maximum ratings at T_j= 25°C, unless otherwise specified.

最大额定值默认T_j= 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_j≥25°C	700	V
Drain current[1] 连续漏极电流	I_D	T_C=25°C,V_{GS}=18V	12	A
		T_C=100°C,V_{GS}=18V	7	
Peak drain current[2] 峰值漏极电流	I_{DM}	T_C=25°C	18	A
Continuous diode current[1] 连续二极管电流	I_S	T_C=25°C,V_{GS}=-4V	10	A
Peak diode current[2] 峰值二极管电流	I_{SM}	T_C=25°C,V_{GS}=-4V	18	A
Maximum gate source voltage 栅源最大电压	$V_{GS.MAX}$		-10~25	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}=10A,V_{DD}=50V,L=1mH	70	mJ
Power dissipation 总耗散功率	P_{tot}	T_C=25°C	59	W
		T_C=100°C	29	

1. Limited by T_j(max)/受限于最大结温
2. Pulse width t_p limited by $T_{j(max)}$ /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	$R_{th(j-c)}$			2.56		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_j= 25°C, unless otherwise specified.

电气特性默认T_j= 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		700			V
Gate threshold voltage 门极开启阀值电压	$V_{GS(th)}$	I_D=1.33mA,V_{DS}=V_{GS}		2.2	2.7	3.8	V
Drain-source on-state resistance 漏极-源极导通电阻	$R_{DS(on)}$	I_D=5A,V_{GS}=15V	T_j=25°C		320		mΩ
			T_j=175°C		400		
		I_D=5A,V_{GS}=18V	T_j=25°C		260	350	
			T_j=175°C		360		
Zero gate voltage drain current 集电极-发射极漏电	I_{DSS}	V_{DS}=700V,V_{GS}=0V			1.0	20	μA
Gate to source Leakage current 门极-源极漏电流	I_{GSS}	V_{DS}=0V,V_{GS}=18V				100	nA
Integrated gate resistor 内部门极电阻	R_G	f=1MHz			13		Ω

Table 4 Dynamic characteristics/动态特性

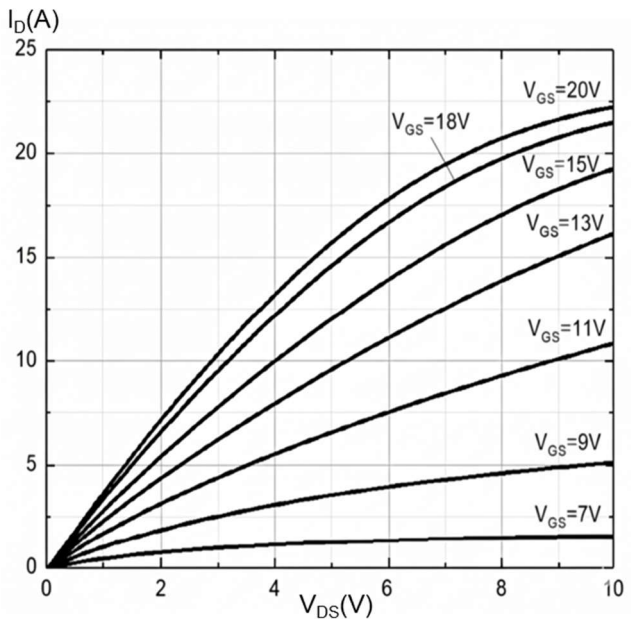
Parameter 参数	Symbol 符号	Test conditions 测试条件	Value/值			Unit 单位
			Min.	Typ.	Max.	
Total gate charge 总栅极电荷	$Q_{G(tot)}$	V_{DD}=400V, I_D=5A, V_{GS}=-4/18V		17.6		nC
Gate source charge 栅-源极电荷	Q_{GS}			3.7		
Gate-drain charge 栅-漏极电荷	Q_{GD}			7		
Input capacitance 输入电容	C_{iss}	V_{DS}=600V, V_{GS}=0V, f=1MHz		361		pF
Output capacitance 输出电容	C_{oss}			34		
Reverse transfer capacitance 反向传输电容	C_{rss}			3.5		
Turn-On Delay Time 开启延迟时间	$t_{d(on)}$	V_{DD}=400V, I_D=5A, V_{GS}=-4/18V, $R_{G(ext)}$=20Ω,		2		ns
Rise time 上升时间	t_r			19		
Turn-Off Delay Time 关闭延迟时间	$t_{d(off)}$			14		
Turn-Off Fall Time 下降时间	t_f			11		
Turn-on switch loss 单次开启损耗	E_{on}			31		μJ
Turn-off switch loss 单次关闭损耗	E_{off}			13		

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

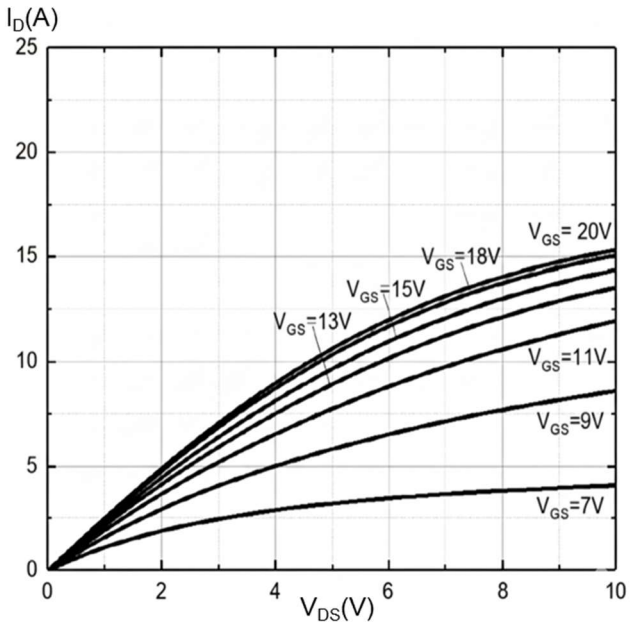
Parameter 参数	Symbol 符号	Test conditions 测试条件	Value/值			Unit 单位
			Min.	Typ.	Max.	
Drain-source reverse voltage 体二极管正向压降	V_{SD}	I_S=2.5A,V_{GS}=-4V		4.8		V
MOSFET forward recovery time MOSFET正向恢复时间	t_{fr}	V_{DS}=400V, I_S=5A, -di$_S$/dt=1000A/μs		28		ns
MOSFET forward recovery charge MOSFET正向恢复电荷	Q_{fr}			38		nC
MOSFET peak forward recovery current MOSFET正向恢复峰值电流	I_{frm}			3.5		A

4. Electrical characteristics diagrams
电气特性图表

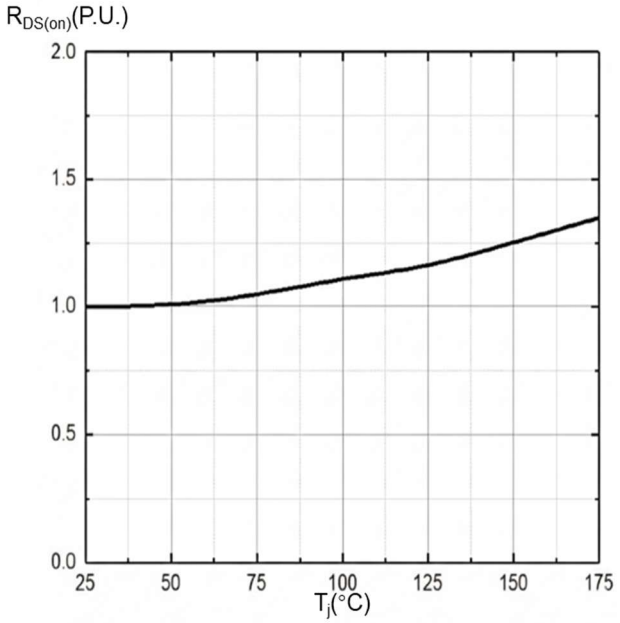
Typ.Output characteristic/典型输出特性
$I_D=f(V_{DS})$; T_j=25℃



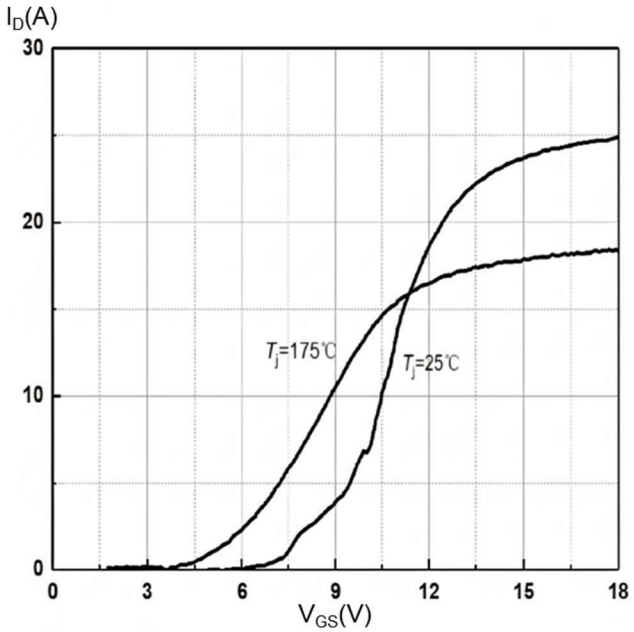
Typ.Output characteristic/典型输出特性
$I_D=f(V_{DS})$; T_j=175℃



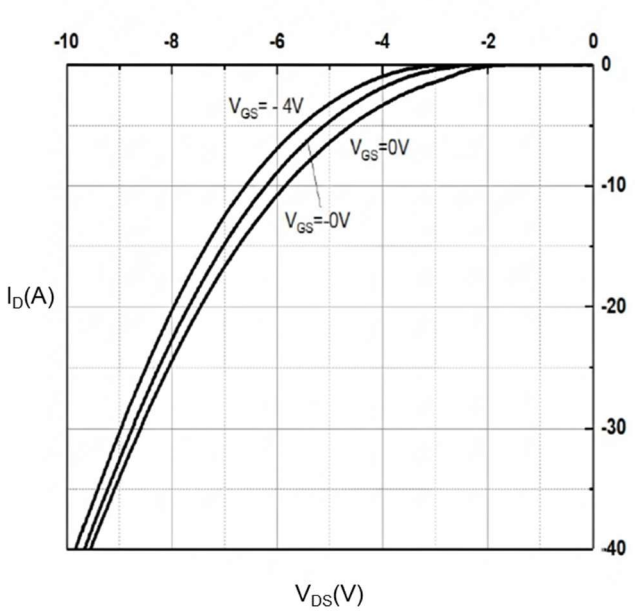
Typ.Drain-source on-state resistance/典型漏源导通电阻
$R_{DS(on)}=f(T_j)$; I_D=5A,V_{GS}=18V



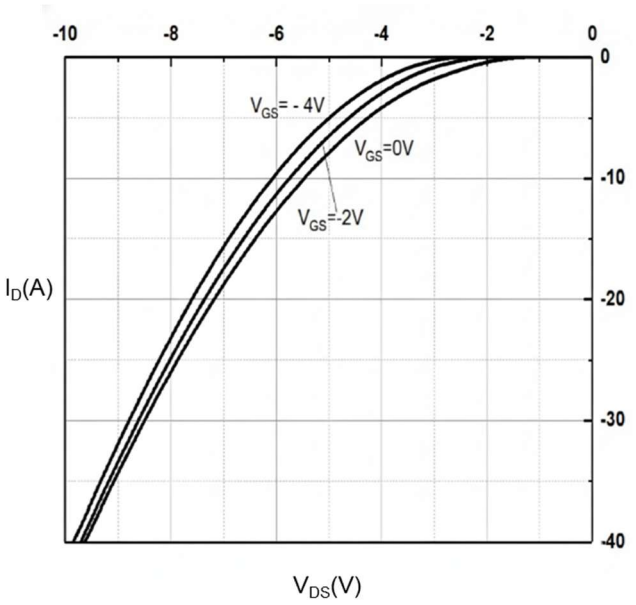
Typ.Transfer characteristics/典型传输特性
$I_D=f(V_{GS})$; V_{GS}=18V,T_j=25℃



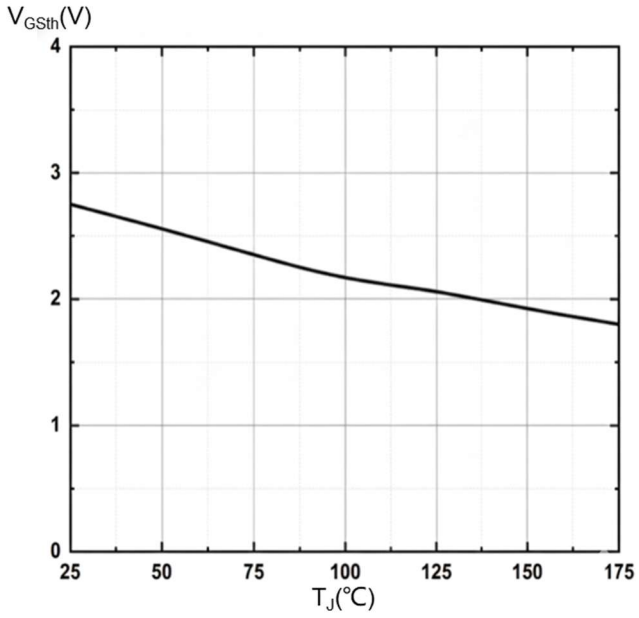
Typ.Reverse drain current characteristics/典型二极管特性
$I_D=f(V_{DS})$; $T_j=25℃$



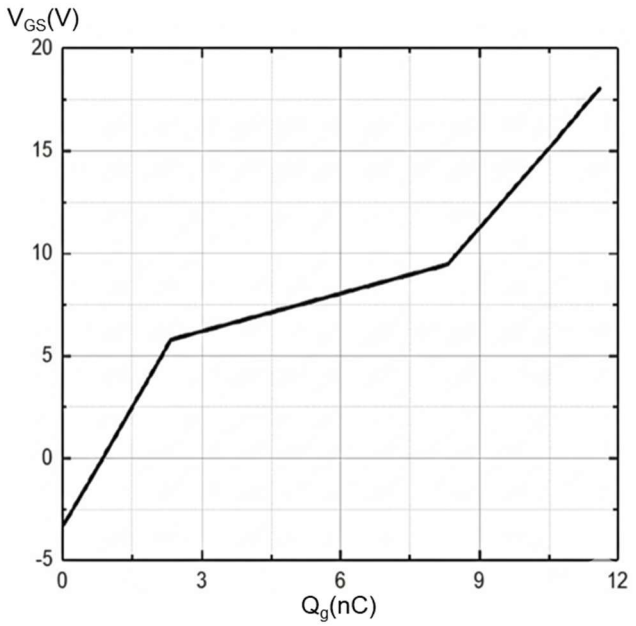
Typ.Reverse drain current characteristics/典型二极管特性
$I_D=f(V_{DS})$; $T_j=175℃$



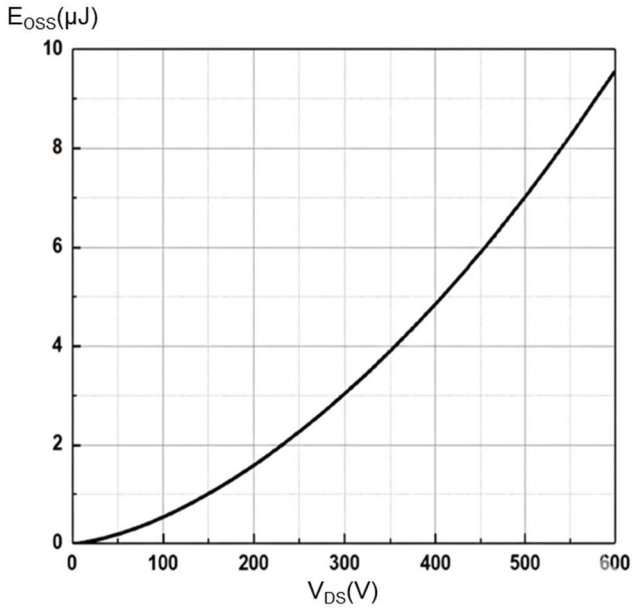
Typ.Gate threshold voltage/门级阈值电压结温特性
$V_{GSth}=f(T_j)$; $I_D=1.33mA, V_{DS}=V_{GS}$



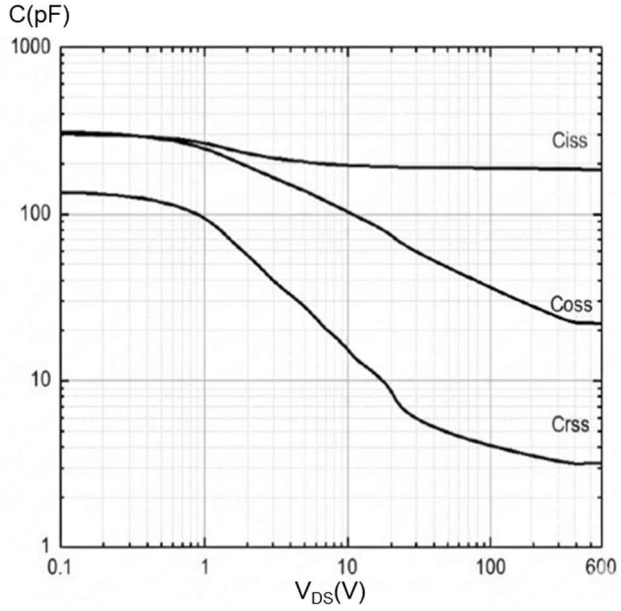
Typ.Gate charge/典型门级电荷
$V_{GS}=f(Q_G)$; $I_D=4.5A, V_{DS}=400V, T_j=25℃$



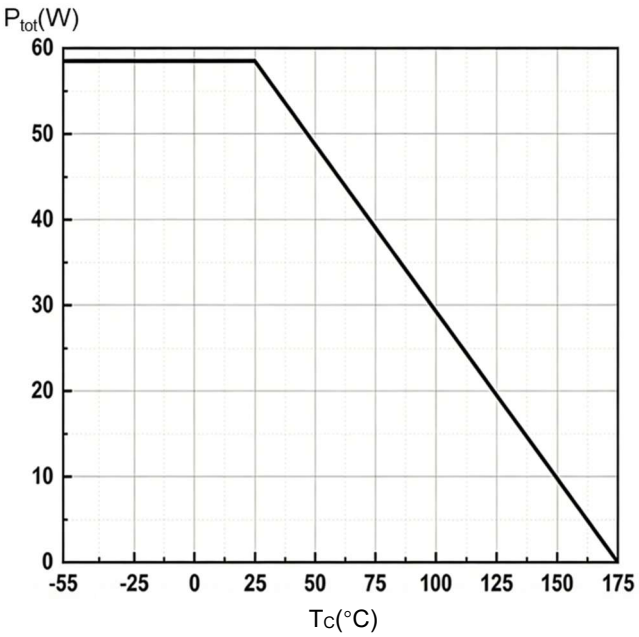
Typ.Coss stored energy/典型Coss存储能量
$E_{OSS}=f(V_{DS})$; $T_j=25℃$



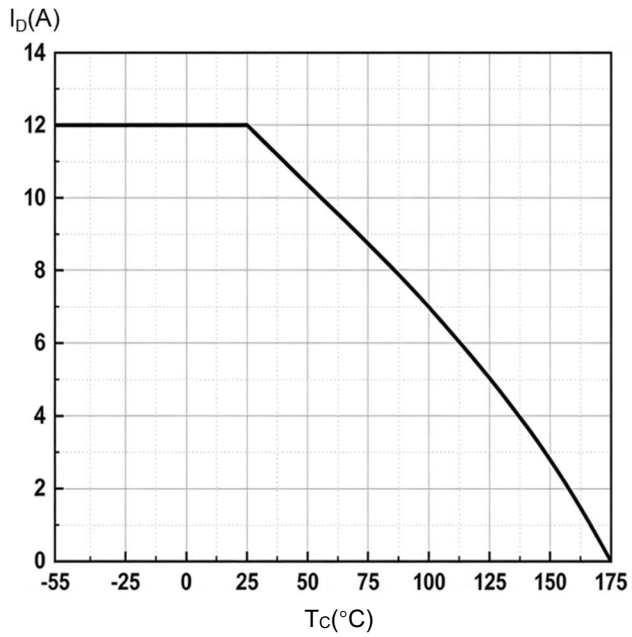
Typ.Capacitances/典型电容特性
$C=f(V_{DS})$; $V_{AC}=25mV,f=1MHz,T_j=25℃$



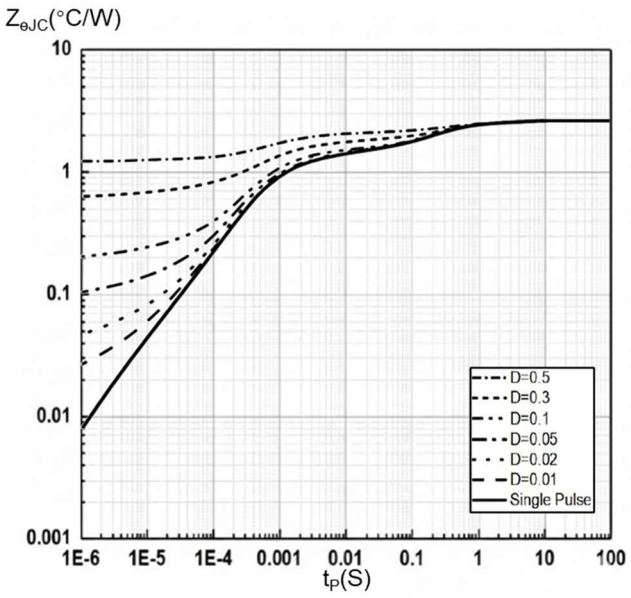
Power dissipation/耗散功率
$P_{tot}=f(T_C)$;



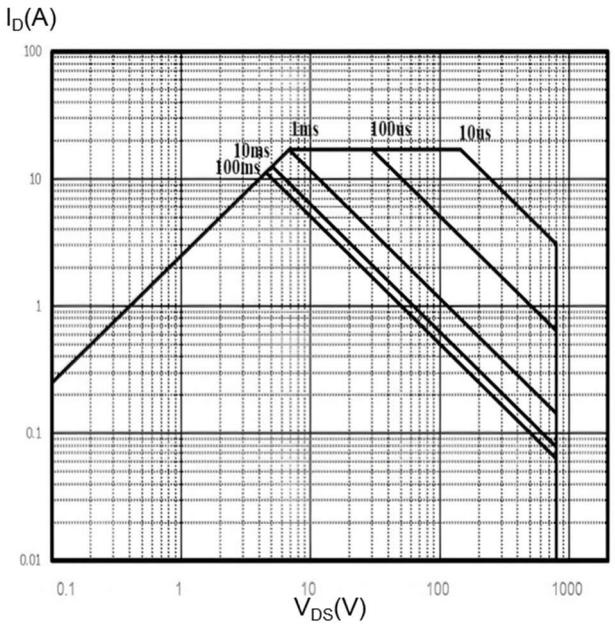
Continuous Drain Current/连续漏电与壳温
$I_D=f(T_C)$; $T_j\leq175℃$



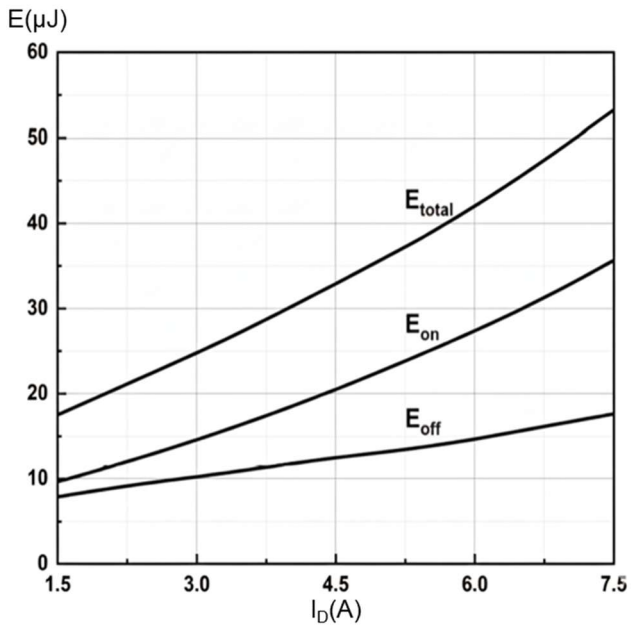
Transient thermal impedance/热阻特性
$Z_{\theta JC}=f(t_P)$; ($R_{th(j-c),typ}$)



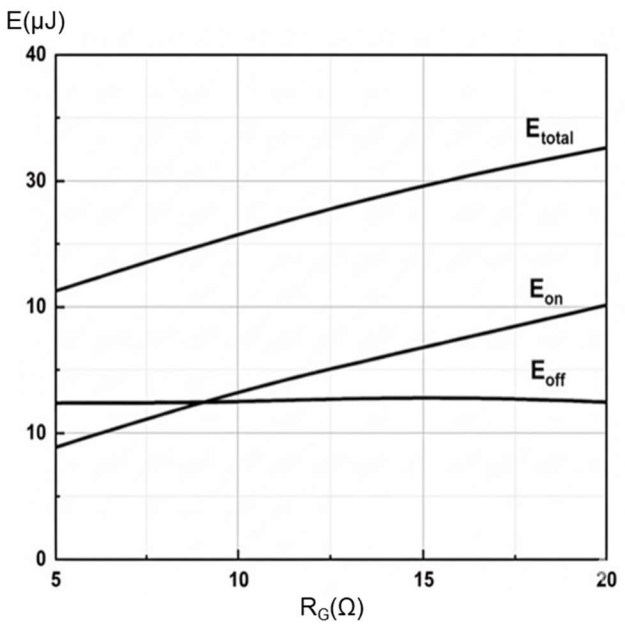
Safe operating area/安全工作区
$I_D=f(V_{DS})$;



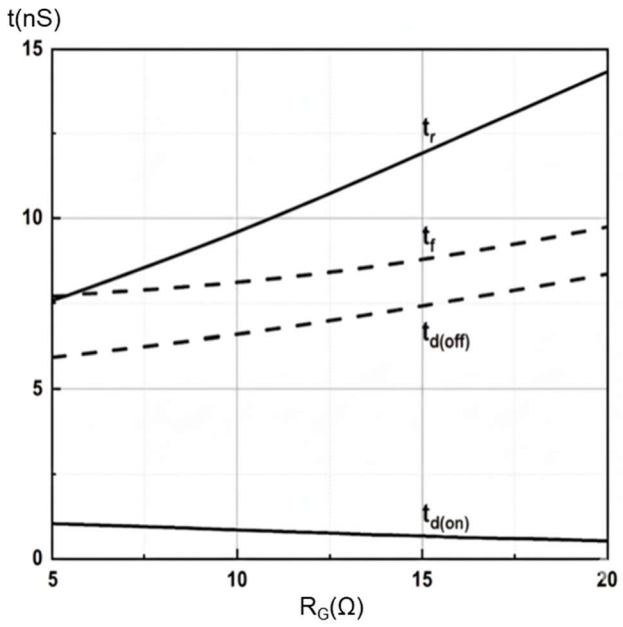
Typ. Switching Losses vs current /动态损耗-电流特性
$E=f(I_D)$;V_{GS}=-4/18V,R_G=20Ω,V_{DD}=400V,T_j=25℃



Typ.Switching losses vs resistance/动态损耗-门级电阻特性
$E=f(R_G)$; V_{GS}=-4/18V,V_{DD}=400V,I_D=4.5A,T_j=25℃

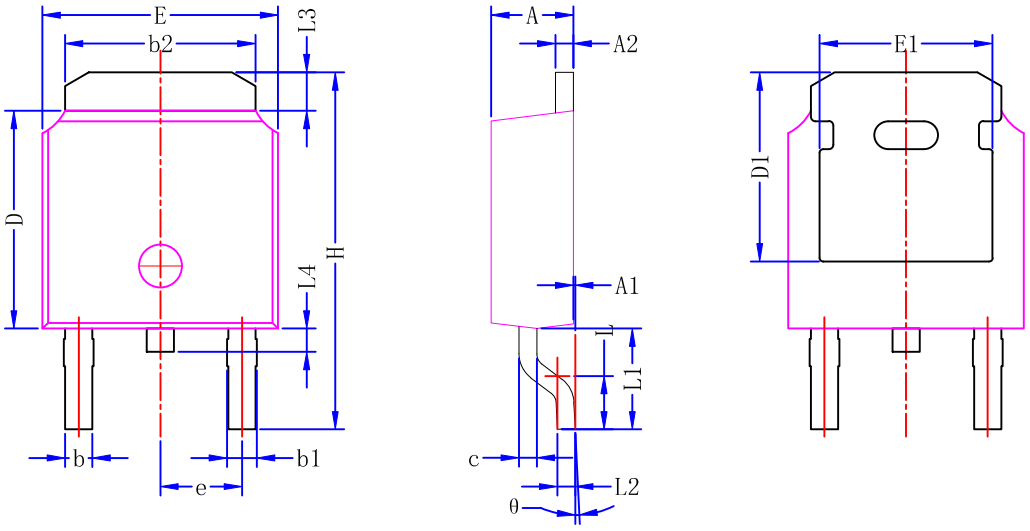


Typ.Switching times vs resistance/开关时间-门级电阻特性
$t=f(R_G)$; V_{GS}=-4/18V,V_{DD}=400V,I_D=4.5A,T_j=25℃



5. Package outline
封装外形

Figure 1. Outline TO252-2L, dimensions in mm/TO252-2L外形尺寸（毫米）



SYMBOL	DIMENSIONS		
	MIN.	NOM.	MAX.
A	2.20	2.30	2.40
A1	0.00	0.127	0.13
A2	0.46	0.50	0.58
b	0.64	0.76	0.88
b1	0.77	0.84	1.14
b2	5.21	5.34	5.46
c	0.46	0.50	0.60
D	6.00	6.10	6.22
D1	5.21	---	---
E	6.40	6.60	6.73
E1	4.40	---	---
e		2.286 BSC	
H	9.40	10.00	10.40
L	1.40	1.52	1.77
L1		2.743 REF.	
L2		0.508 REF.	
L3	0.89	---	1.27
L4	0.64	---	1.01
Q	0°	---	10°

NOTES:
- Package body sizes exclude mold flash, Protrusion or gate burrs. Mold flash, Protrusion or gate burrs shall not exceed 0.10mm per side.
- Package body sizes determined at the outermost extremes of the plastic body, Exclusive of mold flash, gate burrs and interlead flash, but including any mismatch between the top bottom of the plastic body.
- The package top may be smaller than the package bottom.
- Dimension b′ does not include dambar protrusion. Allowable dambar protrusion shall be 0.10mm total in excess of b dimension at maximum material condition. The dambar can't be located on the lower radius of the foot.

注:
- 封装本体尺寸不包括模具飞边、突出物或浇口残余。模具飞边、突出物或浇口残余在每侧不得超过 0.10 mm。
- 封装本体尺寸是在塑胶本体的最外极限确定的，不包括模具飞边、浇口残余和引脚间的飞边，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。
- 封装的顶部尺寸可能小于底部尺寸。
- 尺寸 b′ (引脚宽度) 不包括防焊条突出物。在最大材料条件下，允许的防焊条突出总量在 b 尺寸基础上不得超过 0.10 mm。防焊条不能位于引脚脚部的下部圆角上。

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
2025-12-05	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]

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]

We reserve all rights to the intellectual property contained within this document, and unauthorized reproduction is prohibited. For the sake of continuous improvement, the content is subject to change without prior notice. Designers are obligated to consult and use the latest revision of this datasheet to ensure optimal performance and accuracy in their final product.

【版权与版本管理】

本文件的所有知识产权和版权均归我方所有，严禁未经授权的复制与传播。为持续优化产品性能，本文件内容可能随时变更，恕不另行通知。设计人员有义务查阅并使用最新的版本数据手册，以确保设计准确性并实现最佳系统性能。

[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.

【应用安全与知识产权】

我方提供本产品，不应被视为授予任何第三方知识产权的许可或权利。客户应对其终端应用中的功能安全性、系统鲁棒性以及不侵犯任何第三方专利负全部责任。此外，本产品未被设计或认证用于生命维持或极高风险的关键系统。在将本产品用于此类高可靠性应用之前，客户必须设计充分的冗余和安全机制，并事先与我方签署专门的高可靠性供货协议。

http://www.hmwsemi.com/