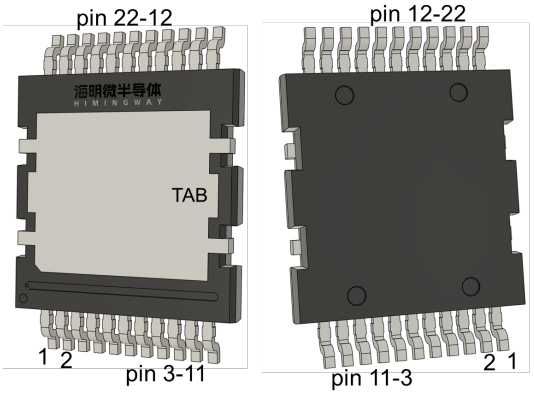
DATA SHEET

海明微半导体
HIMINGWAY

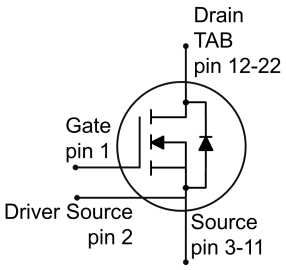
HC032N120E7T

1200V N-Channel SiC MOSFET



产品特点/Product features

- Top side cooling structure
  顶部散热结构
- High Efficiency & Low Loss Performance
  高效率与低损耗性能
- Optimized High-Frequency Switching
  优化的开关性能与高频率支持
- High Power Density
  高功率密度
- Enhanced Drive Stability (Kelvin Source)
  增强的驱动稳定性（开尔文源极）
- Simplification & Cost Reduction
  系统简化与成本降低
- The device is RoHS Compliant
  符合 RoHS 标准



应用领域/Applications

- General Power Supply & Industrial Drives
  通用电源与工业驱动
- Energy Storage & Battery Management
  能源存储与电池管理
- Renewable Energy & Grid Integration
  新能源发电与电网接入
- EV Energy Infrastructure
  电动汽车能源基础设施
- Specialized Industrial Power Applications
  特殊工业电源应用

关键性能参数/Key Performance Parameters

Parameter	Value	Unit
V_{DSS}	1200	V
$R_{DS(on)}$,typ	32	mΩ
I_{DM}	211	A

Type/型号	Package/封装	Marking/标识	Packaging method/包装方式
HC032N120E7T	QDPAK	HC032N120T	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	1200	V
Drain current[1] 连续漏极电流	I_D	T_C=25°C,V_{GS}=18V	91	A
		T_C=100°C,V_{GS}=18V	65	
Peak drain current[2] 峰值漏极电流	I_{DM}	T_j≤175°C	211	A
Continuous diode current[1] 连续二极管电流	I_S	T_C=25°C,V_{GS}=-4V	91	A
Peak diode current[2] 峰值二极管电流	I_{SM}	T_C=25°C,V_{GS}=-4V	211	A
Maximum gate source voltage 栅源最大电压	$V_{GS.MAX}$		-10~22	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}=31A,V_{DD}=100V,L=1.0mH	528	mJ
Power dissipation[1] 总耗散功率	P_{tot}	T_C=25°C	385	W
		T_C=100°C	192	

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	$R_{th(j-c)}$			0.39		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		1200			V
Gate threshold voltage 门极开启阀值电压	$V_{GS(th)}$	I_D=10mA,V_{DS}=V_{GS}	T_j=25°C	1.8	2.5	3.8	V
			T_j=175°C		1.8		
Drain-source on-state resistance 漏极-源极导通电阻	$R_{DS(on)}$	I_D=40A,$V_{GS(on)}$=15V	T_j=25°C		40		mΩ
			T_j=175°C		60		
		I_D=40A,$V_{GS(on)}$=18V	T_j=25°C		32		
			T_j=175°C		57		
Zero gate voltage drain current 集电极-发射极漏电	I_{DSS}	V_{DS}=1200V,V_{GS}=0V			0.1	10	μA
Gate to source Leakage current 门极-源极漏电流	I_{GSS}	V_{DS}=0V,V_{GS}=18V				100	nA
		V_{DS}=0V,V_{GS}=-4V				100	
Forward transconductance 正向跨导	g_{fs}	I_D=40A,V_{DS}=20V	T_j=25°C		25		S
			T_j=175°C		27		
Integrated gate resistor 内部门极电阻	R_G	f=1MHz			0.76		Ω

Table 4 Dynamic characteristics/动态特性

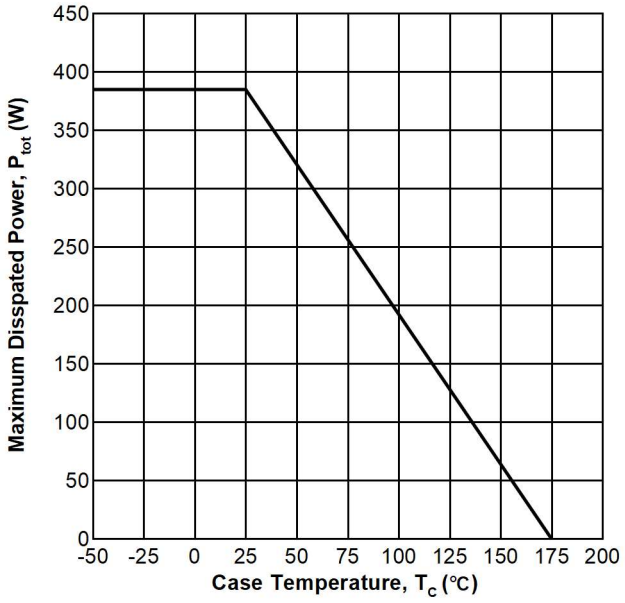
Parameter 参数	Symbol 符号	Test conditions 测试条件	Value/值			Unit 单位
			Min.	Typ.	Max.	
Total gate charge 总栅极电荷	$Q_{G(tot)}$	V_{DD}=800V, I_D=40A, V_{GS}=-4/18V		88		nC
Gate source charge 栅-源极电荷	Q_{GS}			22		
Gate-drain charge 栅-漏极电荷	Q_{GD}			35		
Input capacitance 输入电容	C_{iss}	V_{DS}=1000V, V_{GS}=0V, f=100KHz		1855		pF
Output capacitance 输出电容	C_{oss}			91		
Reverse transfer capacitance 反向传输电容	C_{rss}			6.6		
Coss stored energy 输出电容存储能量	E_{oss}	Calculated based on C_{oss}		36		μJ

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

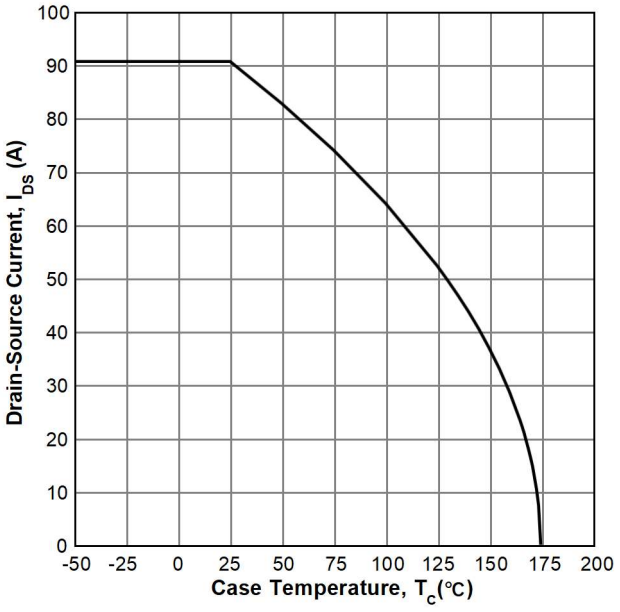
Parameter 参数	Symbol 符号	Test conditions 测试条件	Value/值			Unit 单位
			Min.	Typ.	Max.	
Drain-source reverse voltage 体二极管正向压降	V_{SD}	I_S=20A,V_{GS}=0V		3.1		V
		I_S=20A,V_{GS}=-2V		3.6		
		I_S=20A,V_{GS}=-5V		3.8		

4. Electrical characteristics diagrams
电气特性图表

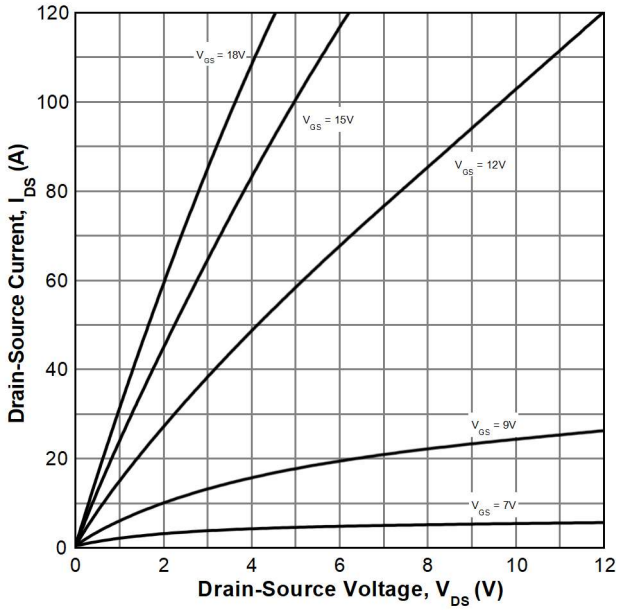
Power dissipation/耗散功率
P_{tot}=f(T_C); T_J≤175℃



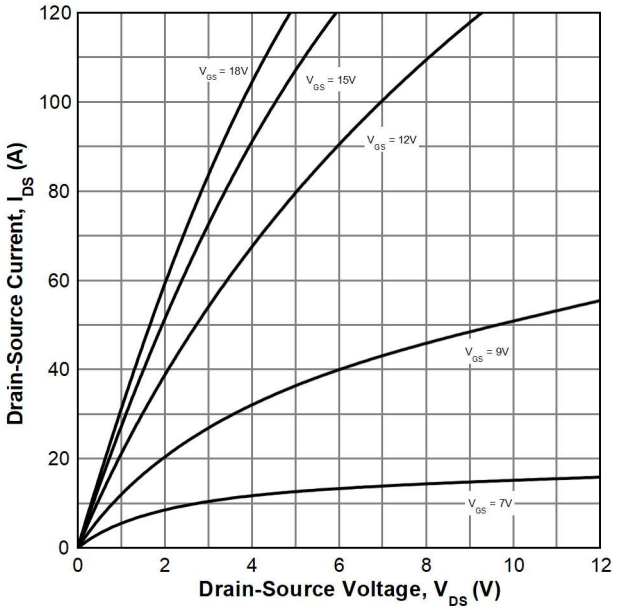
Continuous Drain Current/连续漏电与壳温
I_{DS}=f(T_C); T_J≤175℃



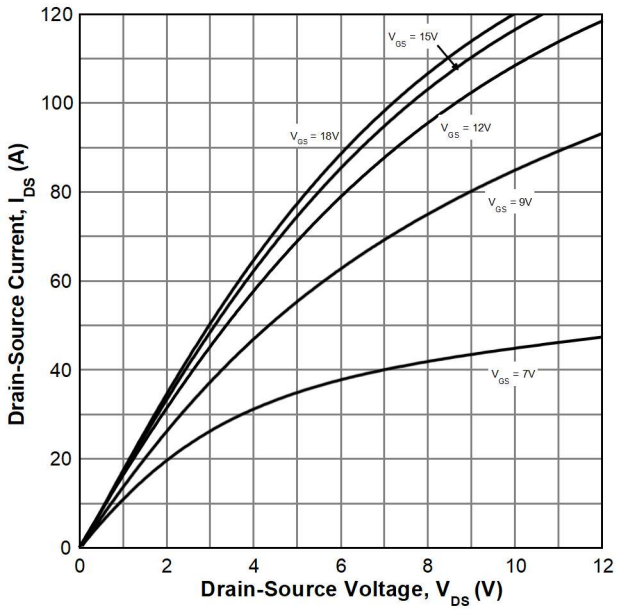
Typ.Output Characteristic/典型输出特性
I_{DS}=f(V_{DS}); T_J=-55℃



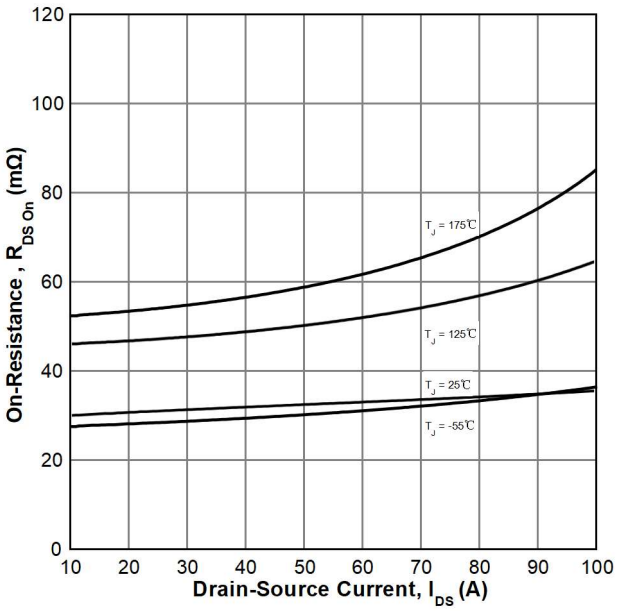
Typ.Output Characteristic/典型输出特性
I_{DS}=f(V_{DS}); T_J=25℃



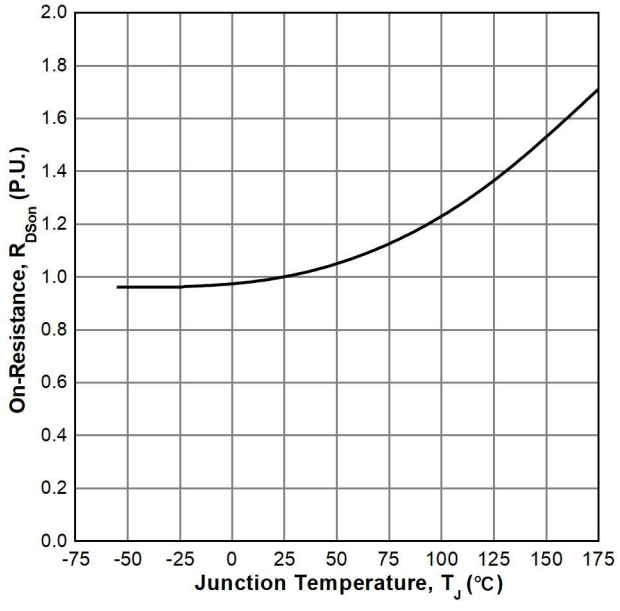
Typ.Output characteristic/典型输出特性
I_{DS}=f(V_{DS}); T_J=175℃



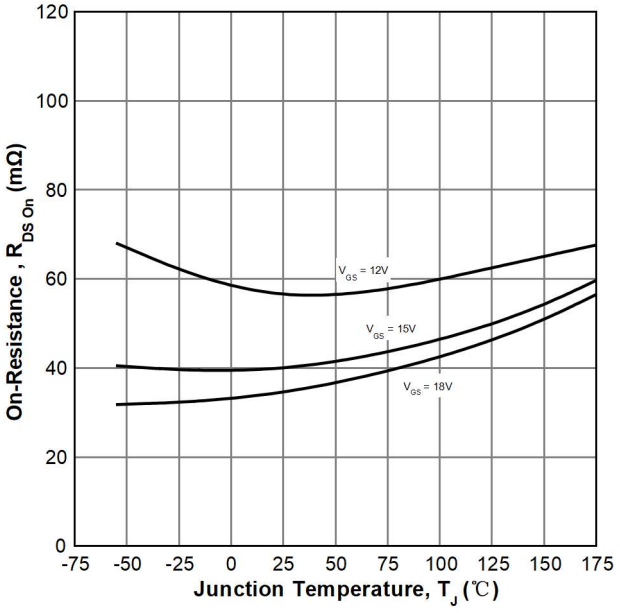
Typ.Drain-source on-state resistance/典型漏源导通电阻
$R_{DS(on)}$=f(I_{DS}); V_{GS}=18V,I_{DS}=40A



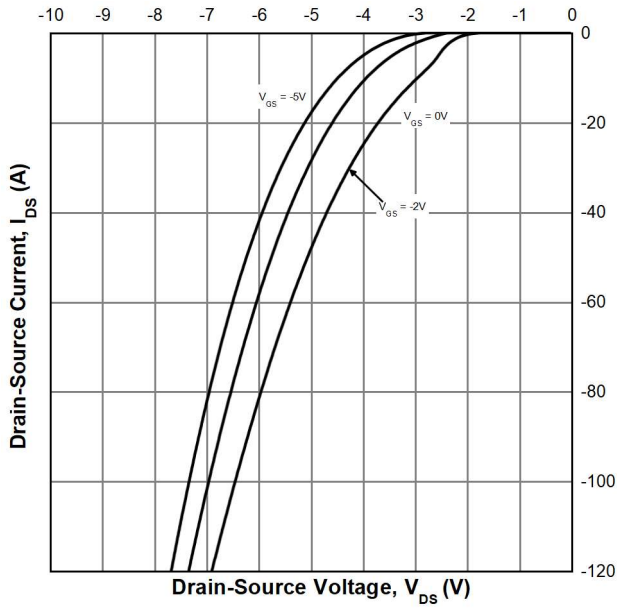
Typ.Drain-source on-state resistance/漏源导通电阻
$R_{DS(on)}$=f(T_J); I_{DS}=40A,V_{GS}=18V



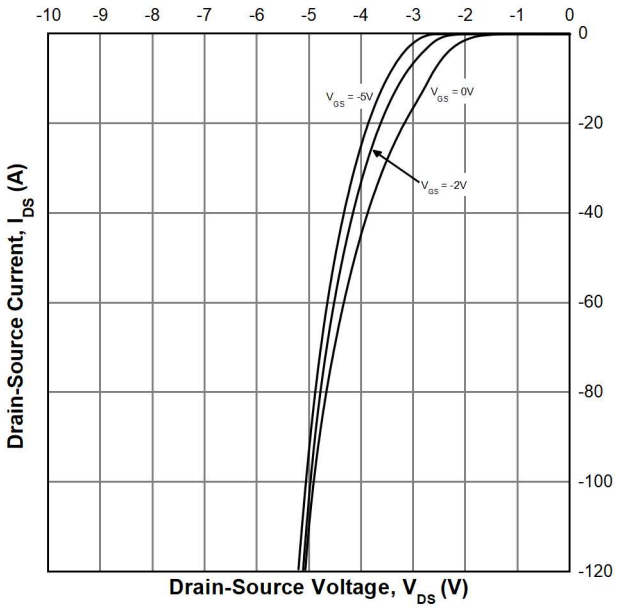
Typ.Drain-source on-state resistance/漏源导通电阻
$R_{DS(on)}$=f(T_J); I_{DS}=40A



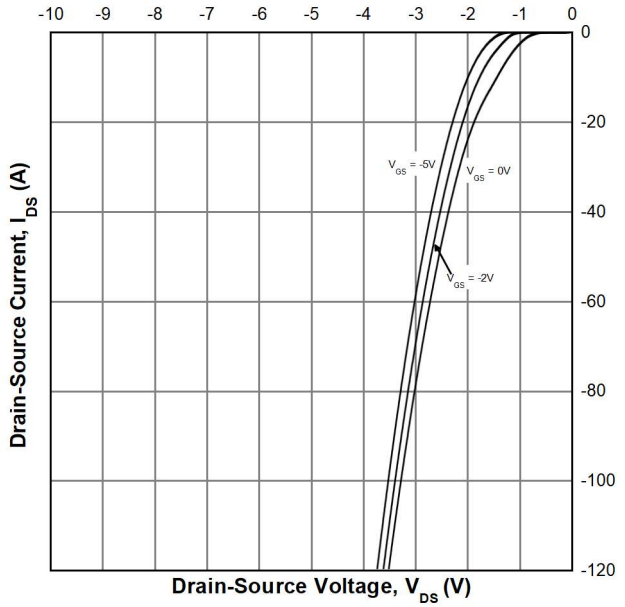
Typ.Reverse drain current characteristics/典型体二极管特性
$I_{SD}=f(V_{SD})$; T_J=-55℃



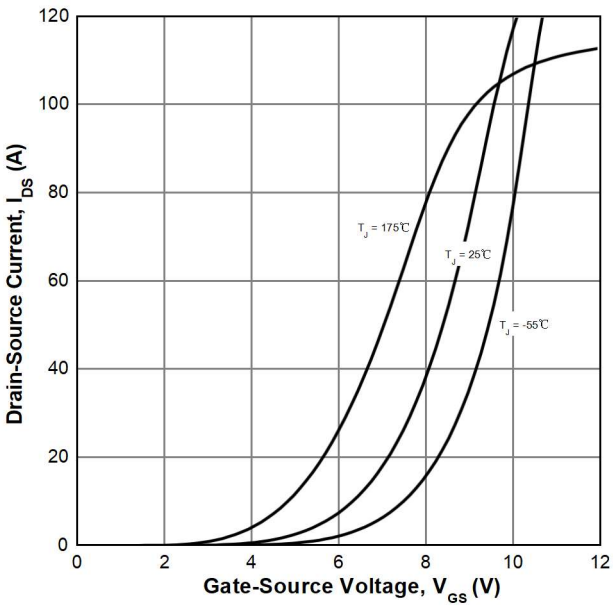
Typ.Reverse drain current characteristics/典型体二极管特性
$I_{SD}=f(V_{SD})$; T_J=25℃



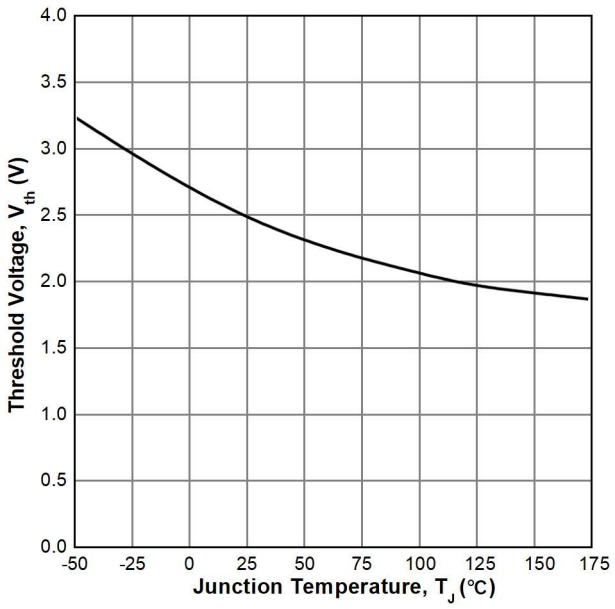
Typ.Reverse drain current characteristics/典型体二极管特性
$I_{SD}=f(V_{SD})$; T_J=175℃



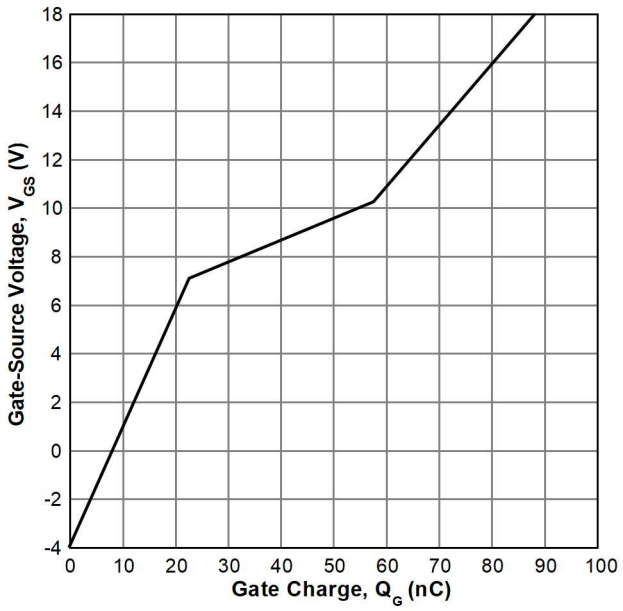
Typ.Transfer characteristics/传输特性
$I_{DS}=f(V_{GS})$; V_{DS}=20V



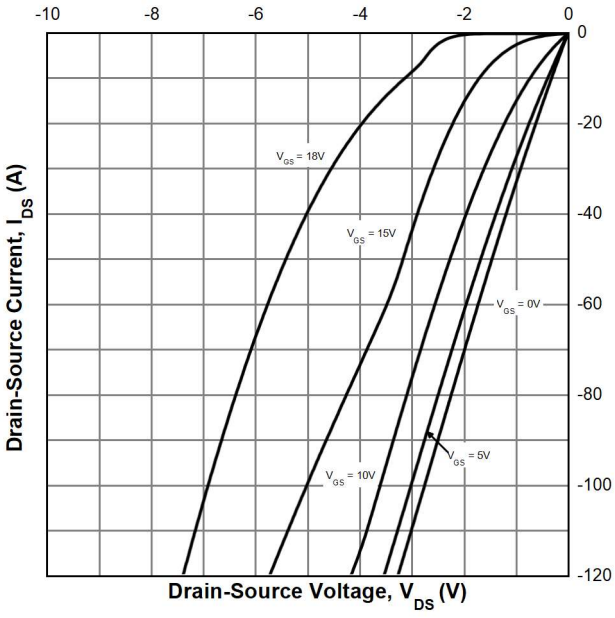
Typ.Gate threshold voltage/门级阈值电压结温特性
V_{GS}=f(T_J); I_D=10mA,V_{DS}=V_{GS}



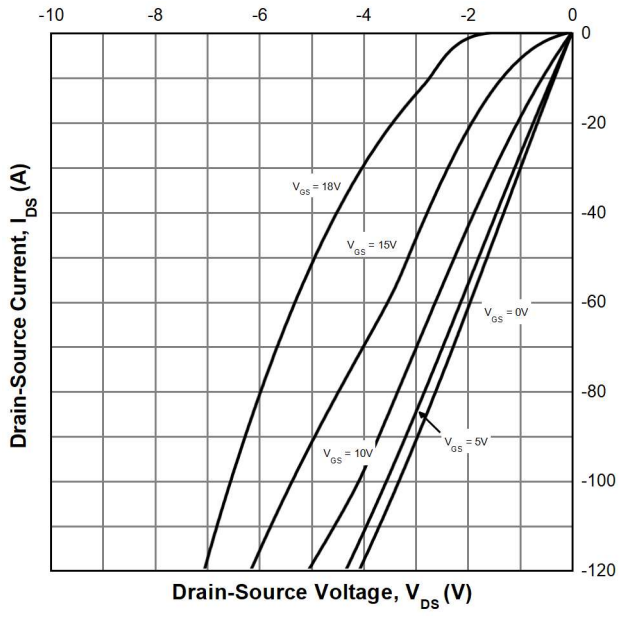
Typ.Gate charge/典型门级电荷
V_{GS}=f(Q_G); I_{DS}=40A,I_{GS}=50mA,V_{DS}=800V,T_J=25℃



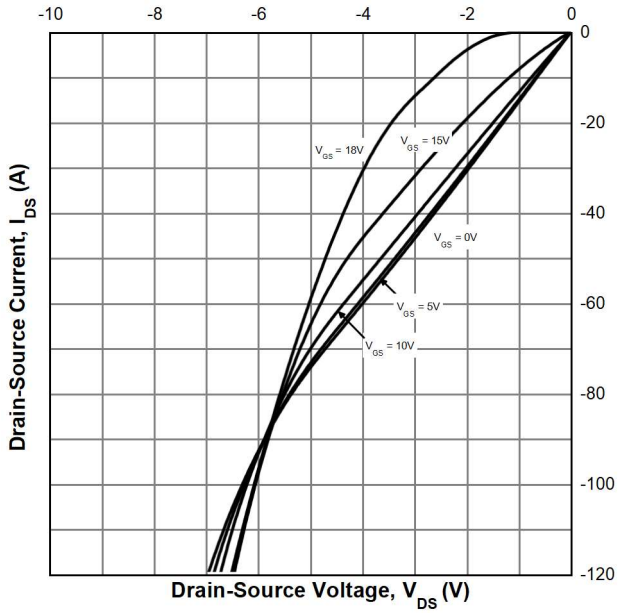
Typ.3rd Quadrant Characteristics/典型第三象限特性
I_{DS}=f(V_{DS}); T_J=-55℃



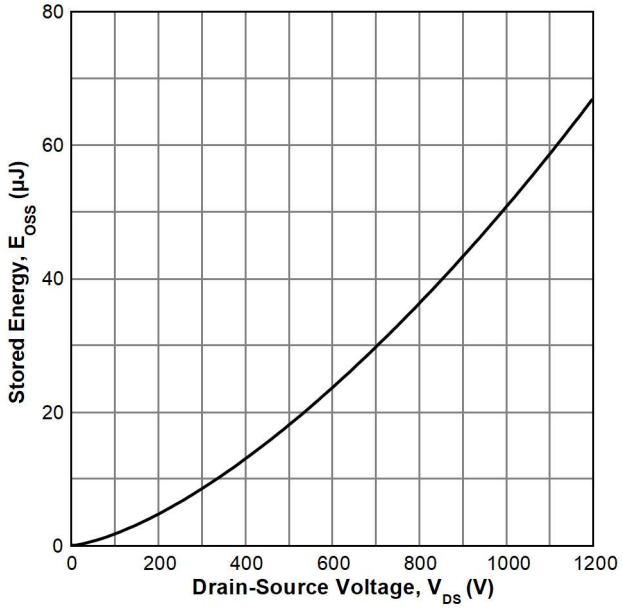
Typ.3rd Quadrant Characteristics/典型第三象限特性
I_{DS}=f(V_{DS}); T_J=25℃



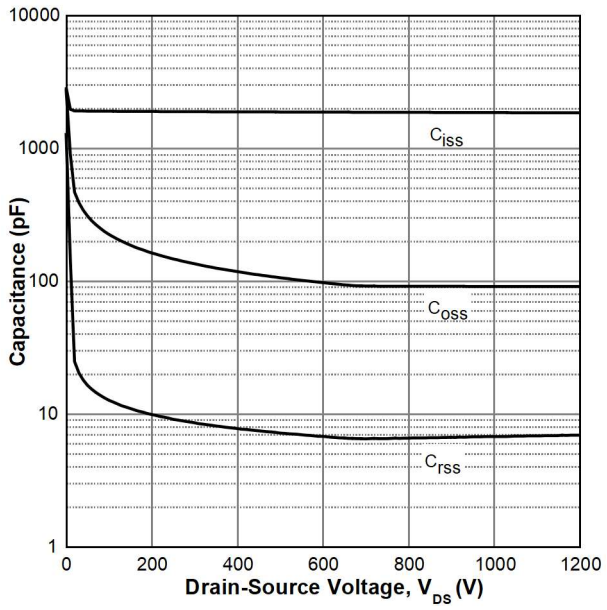
Typ.3rd Quadrant Characteristics/典型第三象限特性
$I_{DS}=f(V_{DS})$; $T_J=25℃$



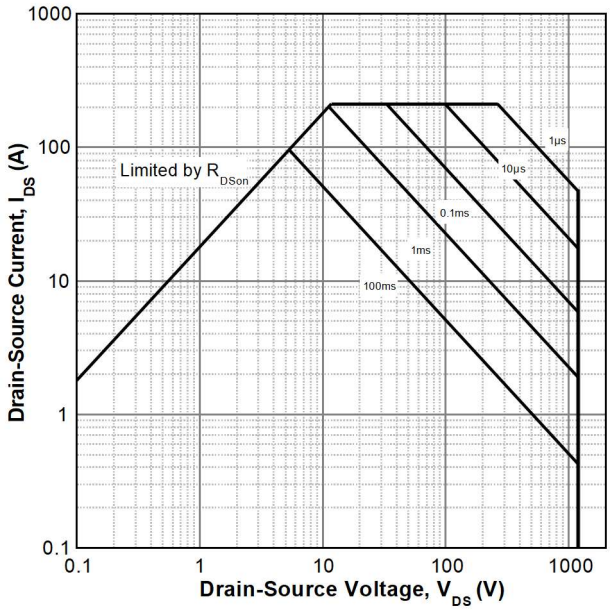
Typ.Coss stored energy/典型C_{OSS}存储能量
$E_{OSS}=f(V_{DS})$; $T_J=25℃$



Typ.Capacitances/典型电容特性
$C=f(V_{DS})$; $V_{GS}=0V$,$T_J=25℃$



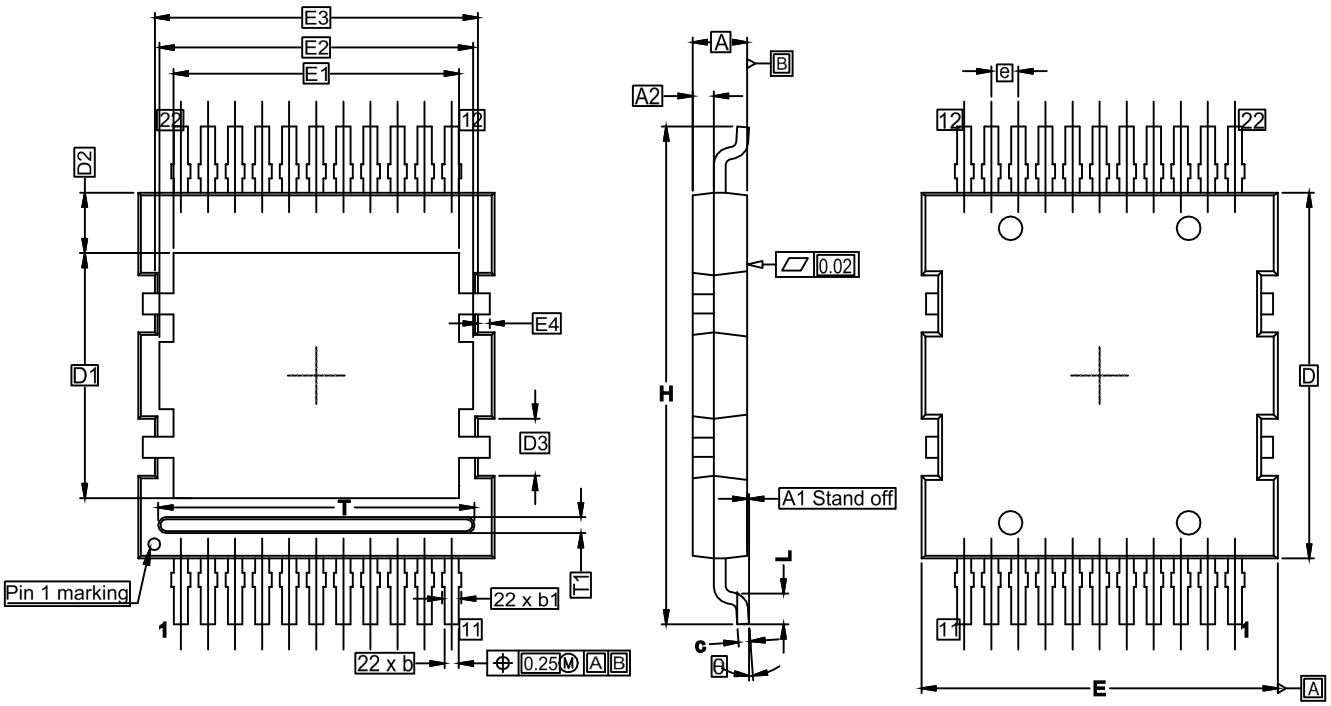
Forward bias safe operating area/安全工作区
$I_D=f(V_{DS})$; $T_C=25℃$,D=0



5. Package outline

封装外形

Figure 1. Outline QDPAK-22, dimensions in mm/QDPAK-22外形尺寸（毫米）



DIM SYMBOL	MIN.	NOM.	MAX.
A	2.20	2.30	2.35
A1	0.00	---	0.15
A2	0.80	0.90	1.00
b	0.50	0.60	0.70
b1	0.50	---	0.90
c	0.46	0.50	0.58
e		1.140 BSC	
D	15.30	15.40	15.50
D1	10.23	10.32	10.43
D2		2.540 REF.	
D3		2.400 REF.	
E	14.90	15.00	15.10
E1	11.91	12.01	12.11
E2		13.200 REF.	
E3		13.600 REF.	
E4		0.500 REF.	
H	20.81	20.96	21.11
L	1.20	1.30	1.40
Θ	0°	---	8°
T	13.21	13.31	13.41
T1	0.50	0.67	0.70

NOTES/注：
ALL METAL SUFACES ARE TIN PLATED,EXCEPT AREA OF CUT.
除切割区域外，所有金属表面均为镀锡。

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
2025-09-15	Rev. G 1.0	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】

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[Application Safety and Intellectual Property]

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