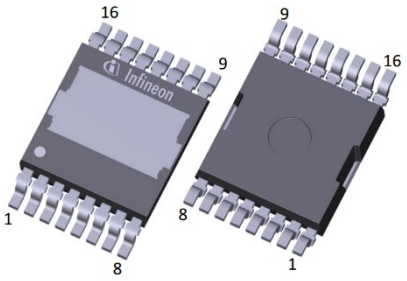
英飞凌MOSFET

英飞凌600V CoolMOS™ CM8 功率晶体管

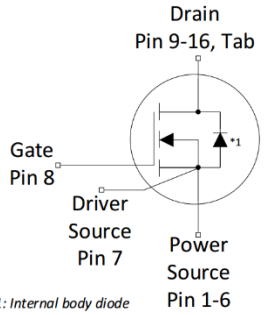
该器件基于英飞凌世界一流的超结 MOSFET 平台，集成了快速体二极管，应用广泛。它能以最低的系统成本实现最高的功率密度和卓越的可靠性。它增强了英飞凌的 WBG 产品，是 600 V CoolMOS™ 7 MOSFET 系列的后继产品。

TOLT



特性

- 同类最佳的 SJ Mosfet
- 适用于广泛的硬开关和软开关应用，具有极高的换向耐受性
- 集成快速体二极管和 ESD 保护功能
- .XT 互连技术，实现行业领先的热性能



优点

- 提供最佳性价比和同类最佳的 SJ Mosfet 性能
- 易于使用，缩短设计周期
- 支持多种拓扑结构
- 14-42% 更低 R_{th}，提升热性能

潜在应用

- 数据中心，AI 服务器，通信电源
- 微型和家用混合动力逆变器
- 便携式和民用储能设备，UPS
- 电动汽车充电、轻型电动汽车、电动叉车
- 高压固态配电系统
- 家用及专业工具
- 充电器、适配器、电视和控制台 SMPS

产品验证

通过 JEDEC 相关测试。

请注意：对于MOSFET 并联，通常建议在栅极上使用铁氧体磁珠或单独的图腾柱。

表 1　　主要性能参数

Parameter	Value	Unit
V_{DS} @ $T_{j,max}$	650	V
$R_{DS(on),max}$	99	mΩ
$Q_{g,typ}$	31	nC
$I_{D,pulse}$	87	A
E_{oss} @ 400 V	4.2	µJ
Body diode di_F/dt	1300	A/µs
ESD class (HBM)	2	

Part number	Package	Marking	Related links
IPLT60R099CM8	PG-HDSOP-16	60R099C8	see Appendix A

本数据手册的原文使用英文撰写。为方便起见，英飞凌提供了译文；由于翻译过程中可能使用了自动化工具，英飞凌不保证译文的准确性。 为确认准确性，请务必访问 infineon.com 参考最新的英文版本（控制文档）。

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1 最大额定值

除非另有规定， T_j = 25 °C

表 2 最大额定值

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Continuous drain current [1]	I_D	-	-	30	A	T_C = 25°C
Continuous drain current	I_D	-	-	18	A	T_C = 100°C
Pulsed drain current [2]	$I_{D,pulse}$	-	-	87	A	T_C = 25°C
Avalanche energy, single pulse	E_{AS}	-	-	51	mJ	I_D = 2.7 A; V_{DD} = 50 V; see table 10
Avalanche energy, repetitive	E_{AR}			0.26		
Avalanche current, single pulse	I_{AS}	-	-	2.7	A	-
MOSFET dv/dt ruggedness	dv/dt	-	-	120	V/ns	V_{DS} = 0...400 V
Gate source voltage (static)	V_{GS}	-20	-	20	V	static;
Gate source voltage (dynamic)	V_{GS}	-30	-	30	V	AC (f > 1 Hz)
Power dissipation	P_{tot}	-	-	186	W	T_C = 25°C
Storage temperature	T_{stg}	-55	-	150	°C	-
Operating junction temperature	T_j					
Extended operating junction temperature	T_j	150	-	175	°C	≤ 50 h in the application lifetime
Mounting torque	-	-	-	-	Ncm	-
Continuous diode forward current	I_S	-	-	30	A	T_C = 25°C
Diode pulse current [2]	$I_{S,pulse}$			87		
Reverse diode dv/dt [3]	dv/dt	-	-	70	V/ns	V_{DS} = 0...400 V, I_{SD} ≤ 30 A, T_j = 25°C see table 8
Maximum diode commutation speed	di_F/dt			1300	A/µs	
Insulation withstand voltage	V_{ISO}	-	-	n.a.	V	V_{rms}, T_C = 25°C, t = 1 min

1) 受限于 $T_{j,max}$.

2) 脉冲宽度 t_p 受限于 $T_{j,max}$

3) 相同低侧和高侧开关，具有相同的 R_G

2 热特性

表 3 热特性

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Thermal resistance, junction - case	R_{thJC}	-	-	0.67	K/W	-
Thermal resistance, junction - ambient	R_{thJA}	-	-	62	K/W	device on PCB, minimal footprint
Thermal resistance, junction - ambient for SMD version	R_{thJA}	-	45	55	K/W	Device on 40 mm*40 mm*1.5 mm epoxy PCB FR4 with 6 cm^2 (one layer, 70 µm thickness) copper area for drain connection and cooling. PCB is vertical without air stream cooling.
Soldering temperature, wave- & reflow soldering allowed	T_{sold}	-	-	260	°C	reflow MSL1

3 电气特性

除非另有规定， T_j = 25 °C

表 4 静态特性

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Drain-source breakdown voltage	$V_{(BR)DSS}$	600	-	-	V	V_{GS} = 0 V, I_D = 1 mA
Gate threshold voltage	$V_{(GS)th}$	3.7	4.2	4.7	V	V_{DS} = V_{GS}, I_D = 0.26 mA
Zero gate voltage drain current	I_{DSS}	-	-	1	µA	V_{DS} = 600 V, V_{GS} = 0 V, T_j = 25°C
			35.5	-		V_{DS} = 600 V, V_{GS} = 0 V, T_j = 150 °C
Gate-source leakage current	I_{GSS}	-	-	2	µA	V_{GS} = 20 V, V_{DS} = 0 V
Drain-source on-state resistance	$R_{DS(on)}$	-	0.083	0.099	Ω	V_{GS} = 10 V, I_D = 10.1 A, T_j = 25°C
			0.183	-		V_{GS} = 10 V, I_D = 10.1 A, T_j = 150°C
Gate resistance	R_G	-	8.9	-	Ω	f = 1 MHz

表 5 动态特性

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Input capacitance	C_{iss}	-	1330	-	pF	V_{GS} = 0 V, V_{DS} = 400 V, f = 250 kHz
Output capacitance	C_{oss}		18			
Effective output capacitance, energy related [4]	$C_{o(er)}$	-	53	-	pF	V_{GS} = 0 V, V_{DS} = 0...400 V
Effective output capacitance, time related [5]	$C_{o(tr)}$	-	533	-	pF	I_D = constant, V_{GS} = 0 V, V_{DS} = 0...400 V
Turn-on delay time	$t_{d(on)}$	-	16	-	ns	V_{DD} = 400 V, V_{GS}=13 V, I_D = 5.1 A, R_G = 5.3 Ω; see table 9
Rise time	t_r		6			
Turn-off delay time	$t_{d(off)}$		90			
Fall time	t_f		10			

[4] $C_{o(er)}$是一个固定电容，当V_{DS}从 0 升至 400 V 时，其存储能量与C_{oss}相同
[5] $C_{o(tr)}$是一个固定电容，当V_{DS} 从 0 升至 400 V 时，其充电时间与C_{oss}相同

表 6 栅极电荷特性

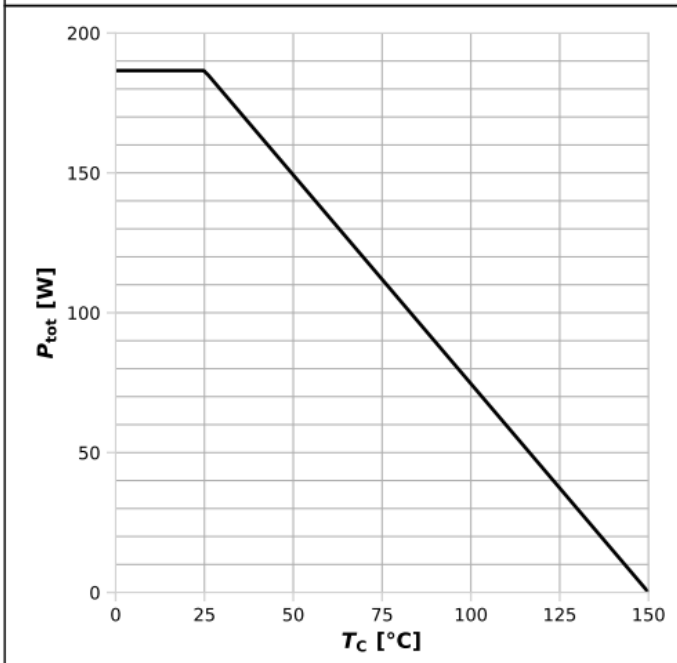
Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Gate to source charge	Q_{gs}	-	8	-	nC	V_{DD} = 400 V, I_D = 5.1 A, V_{GS} = 0 to 10 V
Gate to drain charge	Q_{gd}		11		nC	
Gate charge total	Q_g		31		nC	
Gate plateau voltage	$V_{plateau}$		6.0		V	

表 7 反向二极管特性

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Diode forward voltage	V_{SD}	-	0.9	-	V	V_{GS}= 0 V, I_F= 5.1 A, T_j= 25°C
Reverse recovery time	t_{rr}	-	77	97	ns	V_R= 400 V, I_F= 5.1 A, di_F/dt = 100 A/µs; see table 8
Reverse recovery charge	Q_{rr}		0.30	0.45	µC	
Peak reverse recovery current	I_{rrm}		7.8	-	A	

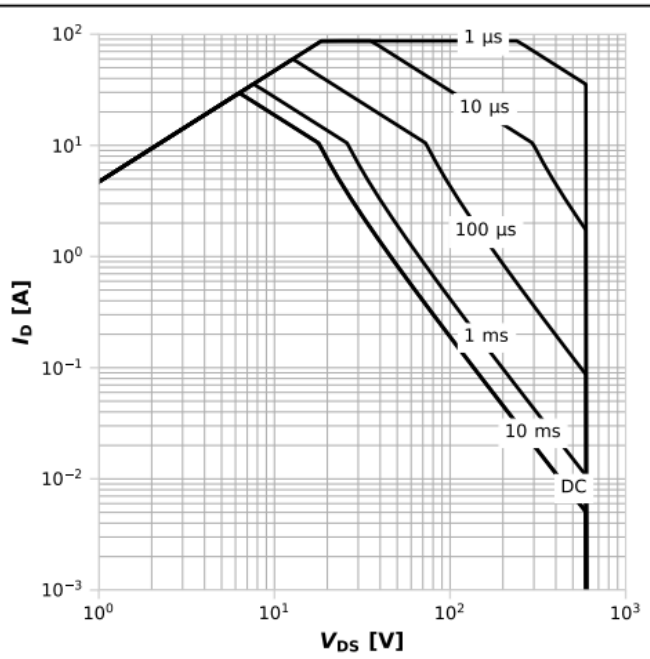
4 电气特性图

Diagram 1: Power dissipation



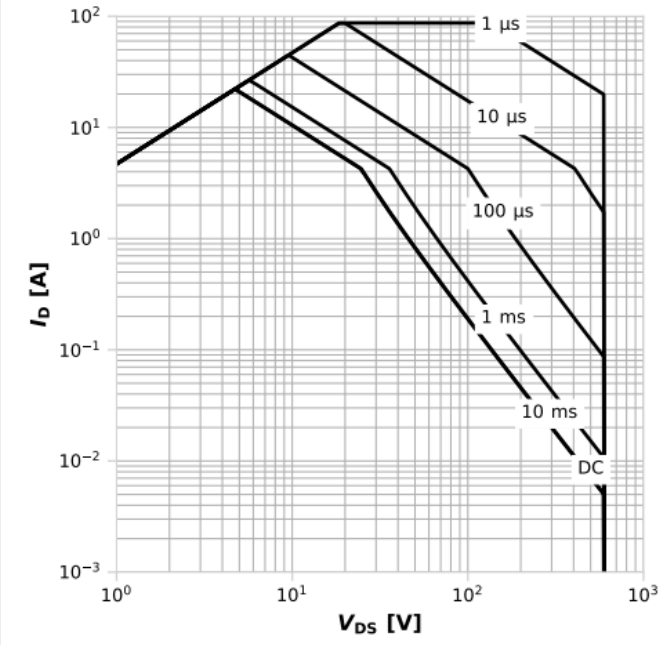
$P_{tot} = f(T_C)$

Diagram 2: Safe operating area



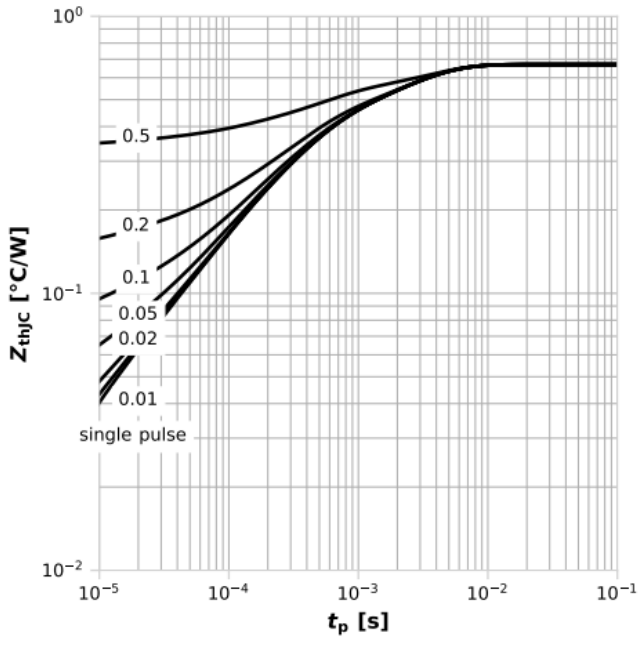
$I_D = f(V_{DS})$; $T_C = 25°C$; $D = 0$; parameter: t_p

Diagram 3: Safe operating area



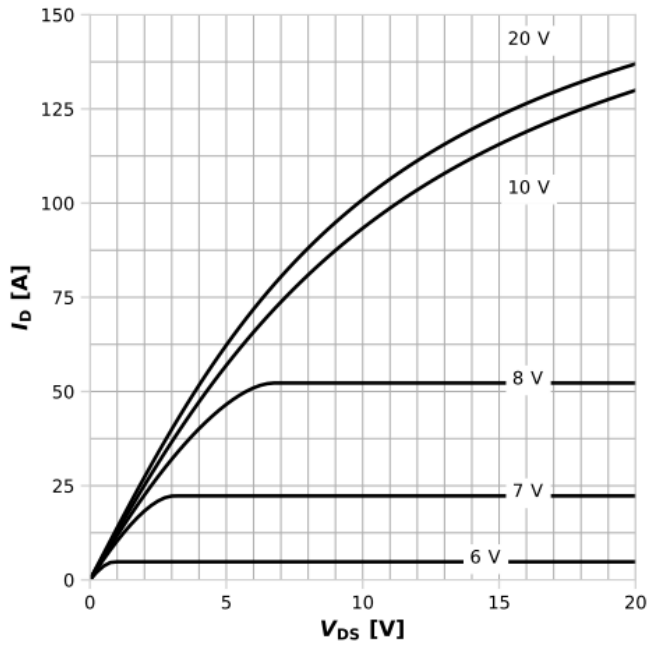
$I_D = f(V_{DS})$; $T_C = 80°C$; $D = 0$; parameter: t_p

Diagram 4: Max. transient thermal impedance



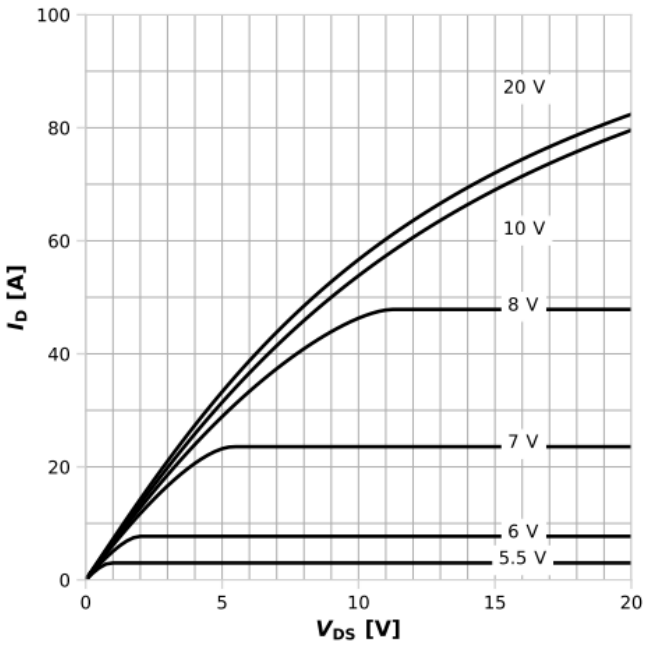
$Z_{thJC} = f(t_P)$; parameter: $D = t_p / T$

Diagram 5: Typ. output characteristics



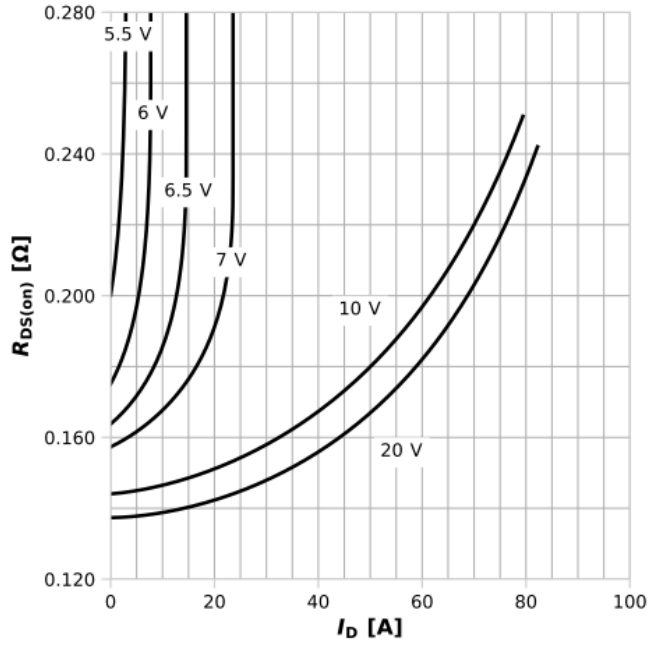
$I_D = f(V_{DS})$; $T_j = 25°C$; parameter: V_{GS}

Diagram 6: Typ. output characteristics



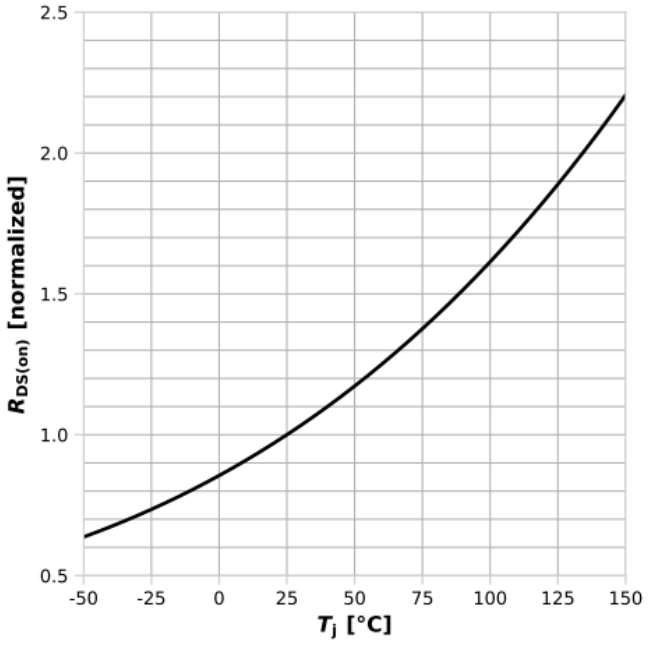
$I_D = f(V_{DS})$; $T_j = 125°C$; parameter: V_{GS}

Diagram 7: Typ. drain-source on-state resistance



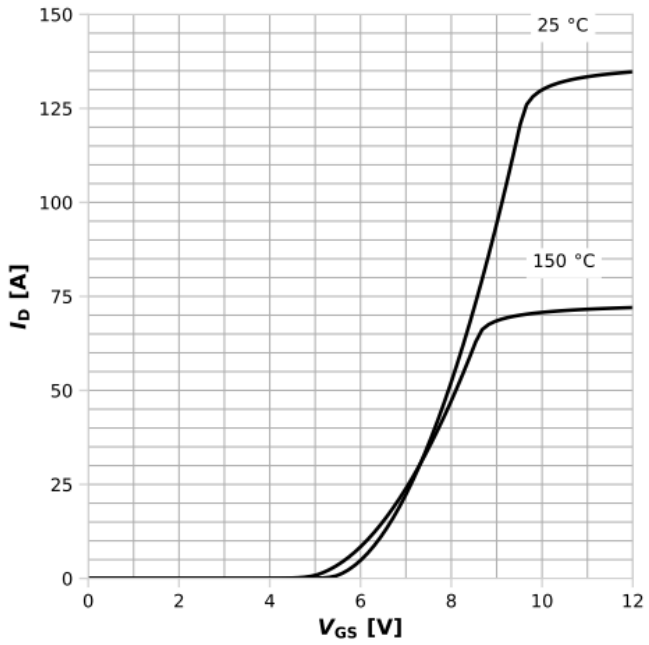
$R_{DS(on)} = f(I_D)$; $T_j = 125°C$; parameter: V_{GS}

Diagram 8: Drain-source on-state resistance



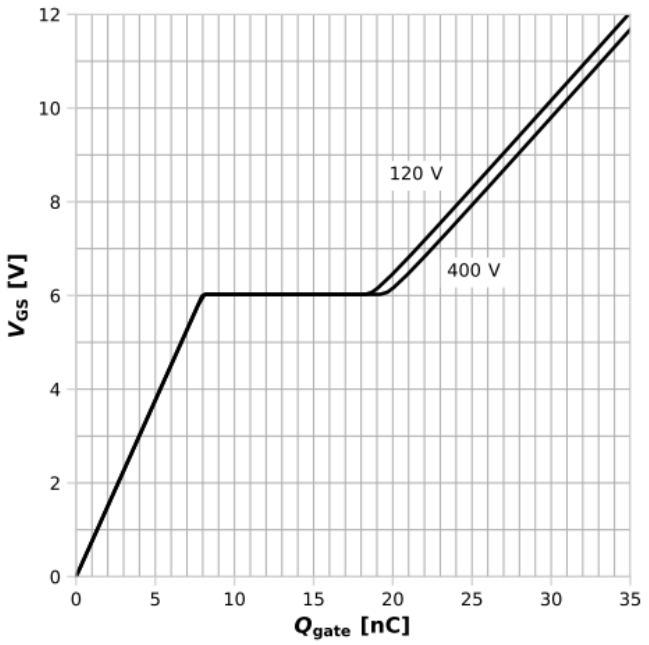
$R_{DS(on)} = f(T_j)$; $I_D = 10.1$ A; $V_{GS} = 10$ V

Diagram 9: Typ. transfer characteristics



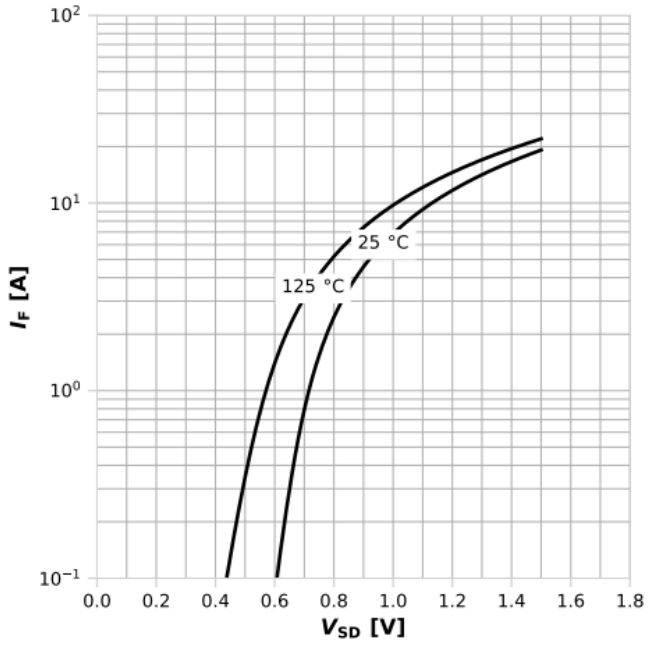
$I_D = f(V_{GS})$; $V_{DS} = 20$ V; parameter: T_j

Diagram 10: Typ. gate charge



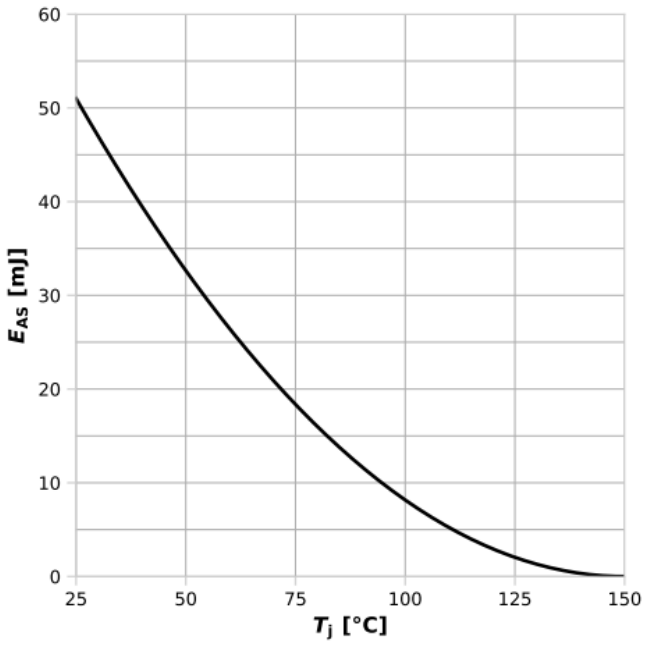
$V_{GS} = f(Q_{gate})$; $I_D = 5.1$ A pulsed; parameter: V_{DD}

Diagram 11: Forward characteristics of reverse diode



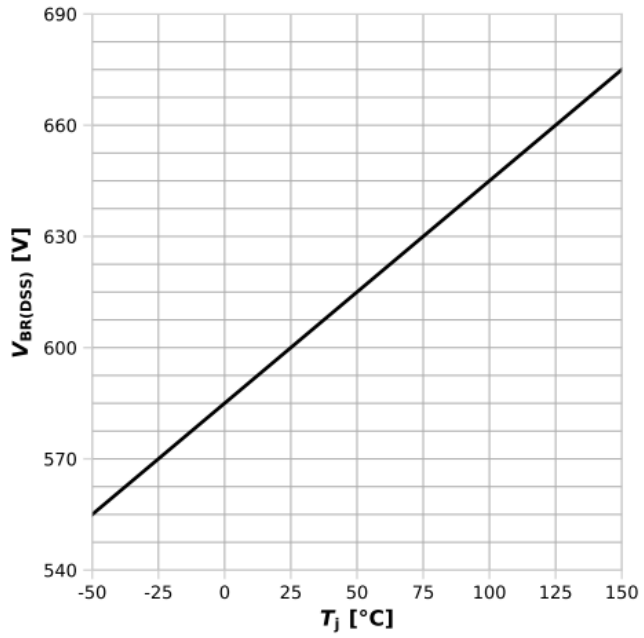
$I_F = f(V_{SD})$; parameter: T_j

Diagram 12: Avalanche energy



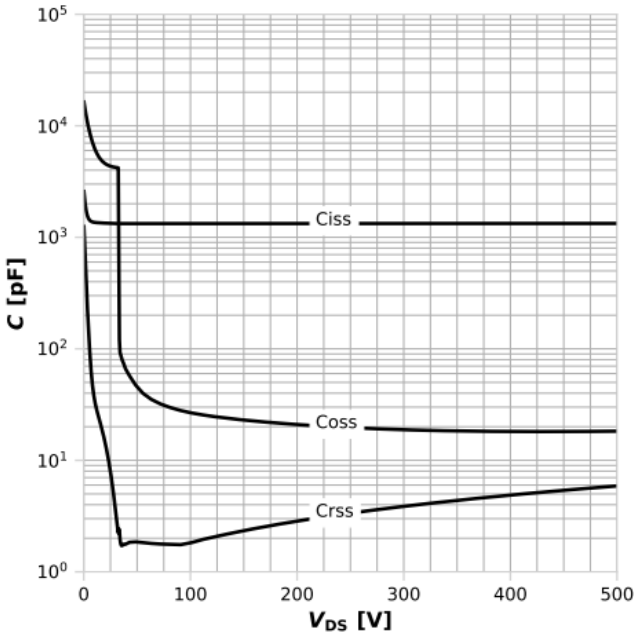
$E_{AS} = f(T_j)$; $I_D = 2.7$ A; $V_{DD} = 50$ V

Diagram 13: Drain-source breakdown voltage



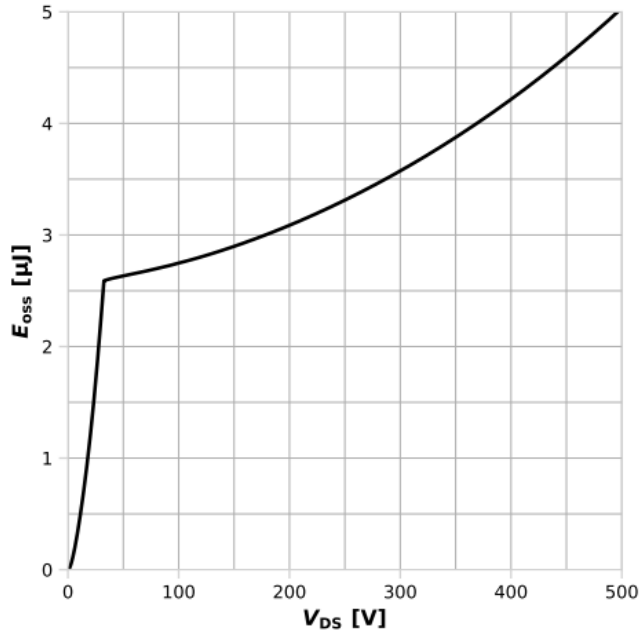
$V_{BR(DSS)} = f(T_j)$; $I_D = 1$ mA

Diagram 14: Typ. capacitances



$C = f(V_{DS})$; $V_{GS} = 0$ V; $f = 250$ kHz

Diagram 15: Typ. Coss stored energy



$E_{oss} = f(V_{DS})$

5 测试电路

表 8 二极管特性

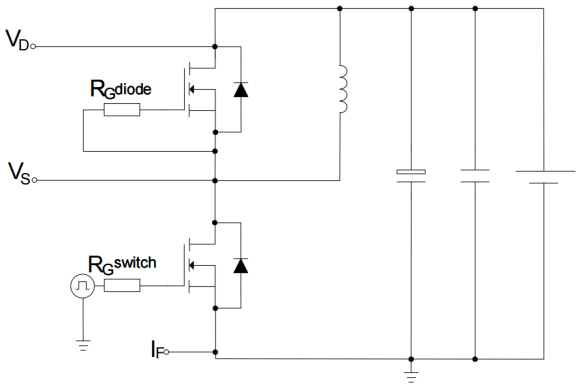
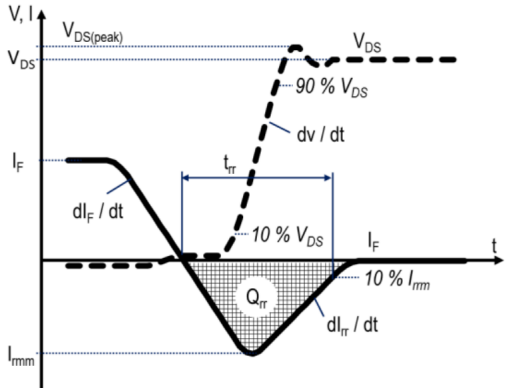
Test circuit for diode characteristics	Diode recovery waveform
	

表 9 开关时间 (ss)

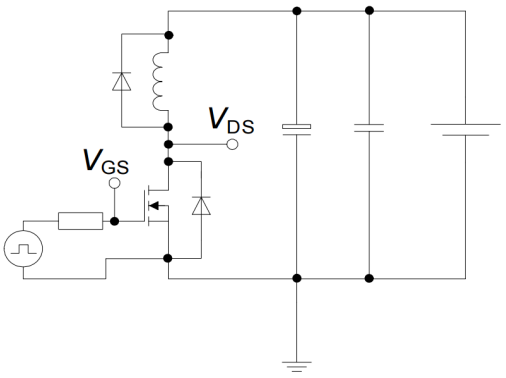
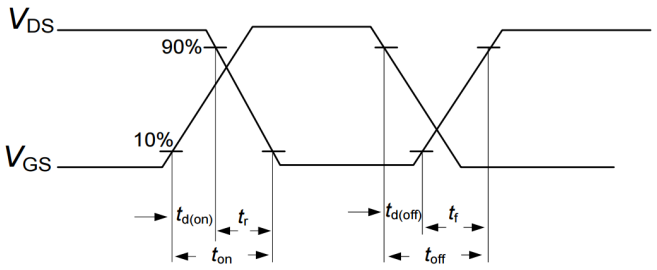
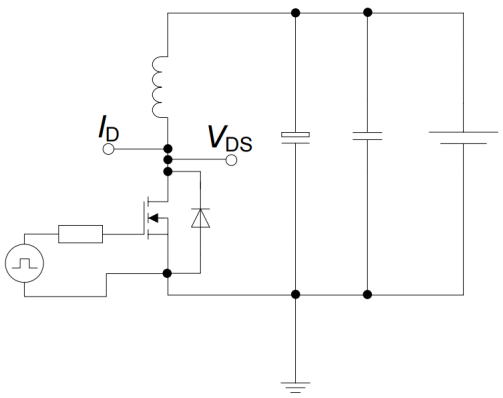
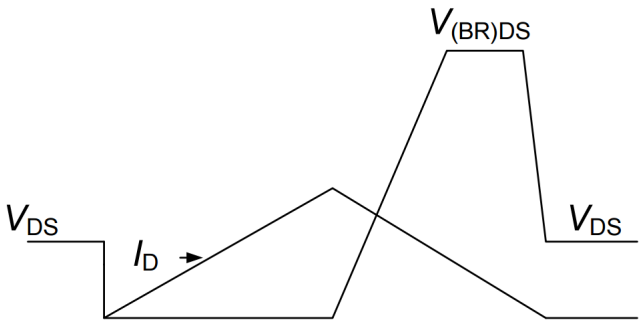
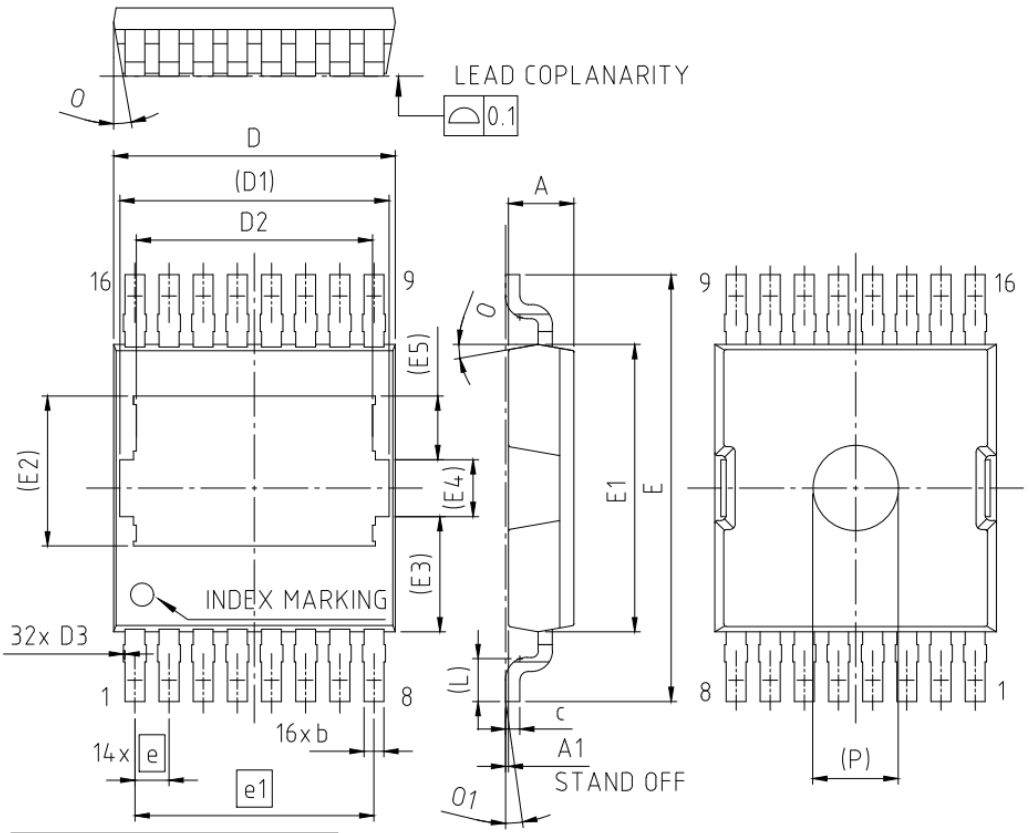
Switching times test circuit for inductive load	Switching times waveform
	

表 10 非钳位感性负载 (ss)

Unclamped inductive load test circuit	Unclamped inductive waveform
	

6 封装外形



PACKAGE - GROUP NUMBER:	PG-HDSOP-16-U02				
DIMENSIONS	MILLIMETERS		DIMENSIONS	MILLIMETERS	
	MIN.	MAX.		MIN.	MAX.
A	2.25	2.35	e	1.20	
A1	0.00	0.15	e1	8.40	
b	0.60	0.80	L	1.50	
c	0.40	0.60	P	3.00	
D	9.70	10.10	O	10°	
D1	9.46		O1	0.00°	8°
D2	8.20	8.40			
D3	0.15				
E	14.80	15.20			
E1	10.00	10.30			
E2	5.27				
E3	4.05				
E4	2.00				
E5	2.24				

NOTES:
ALL METAL SURFACES TIN PLATED EXCEPT AREA OF CUT
DIMENSIONS DO NOT INCLUDE MOLD FLASH,
PROTRUSION OR GATE BURRS

图 1　　PG-HDSOP- 16 封装外形图，尺寸单位为毫米

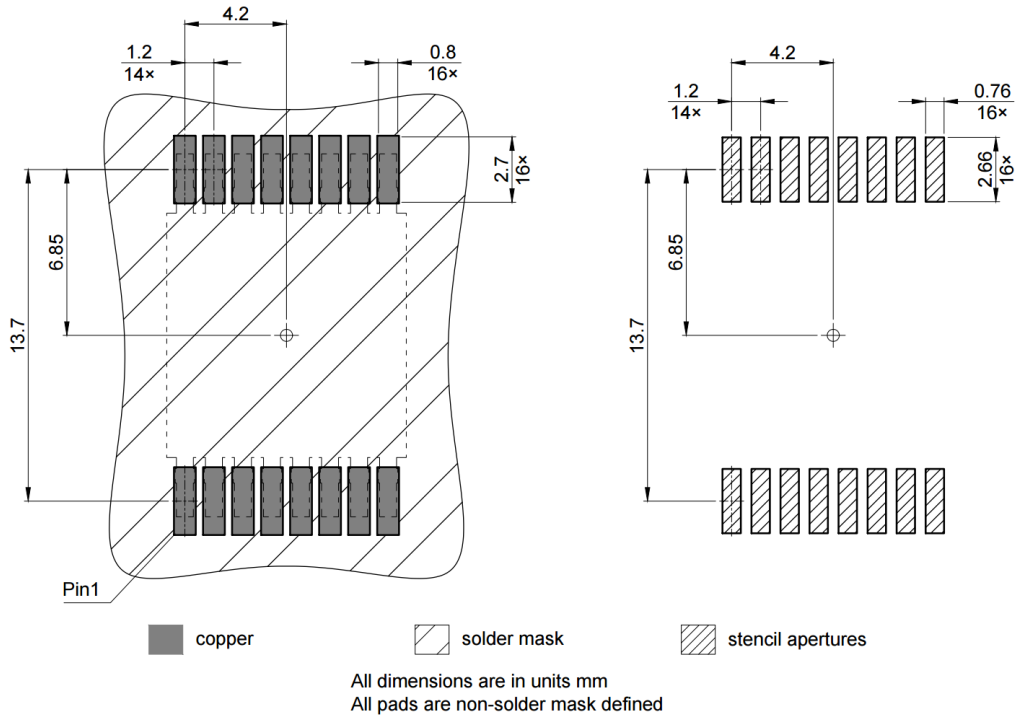


图 2　　PG-HDSOP- 16 封装图，尺寸单位为毫米

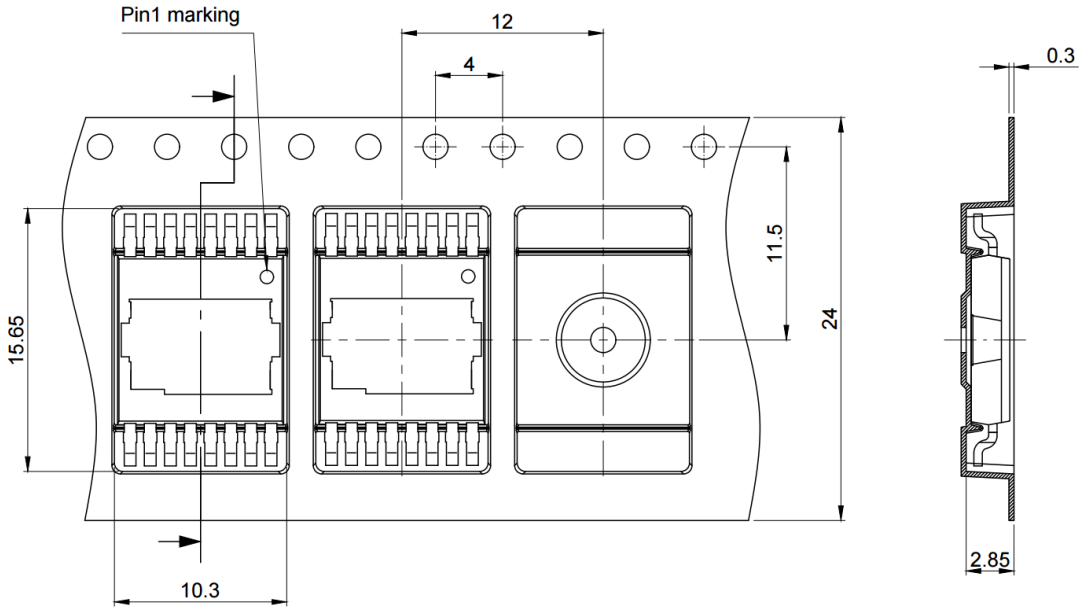


图 3　　PG-HDSOP- 16 封装变体，尺寸单位为毫米

7 附录A

表 11 相关链接

- IFX CoolMOS CM8 网页
- IFX CoolMOS CM8 应用笔记
- IFX CoolMOS CM8 仿真模型
- IFX 设计工具

修订记录

IPLT60R099CM8

Revision 2025-11-18, Rev. 2. 0

Previous revisions

Revision	Date	Subjects (major changes since last revision)
2.0	2025-11-18	Release of final version

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