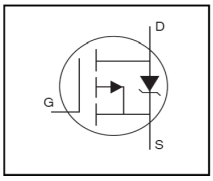
英飞凌HEXFET ®功率MOSFET

优点

- 先进工艺技术
- 表贴封装 (IRF9530NS)
- 低外形通孔（IRF9530NL）
- 工作温度 175°C
- 快速开关
- P沟道
- 雪崩完全额定
- 无铅



V_{DSS}	-100V
$R_{DS(on)}$	0.20Ω
I_D	-14A

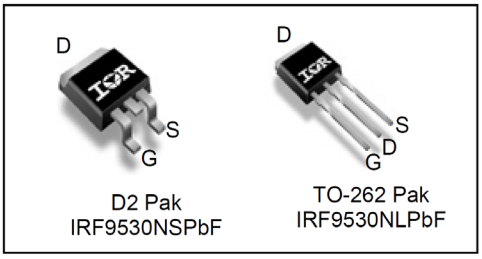
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说明

英飞凌国际整流器公司（International Rectifier）推出的第五代HEXFET® Power MOSFETs采用先进的工艺技术，实现了单位硅面积极低的导通电阻。这一优点与 HEXFET 功率 MOSFET 众所周知的快速开关速度和坚固耐用的器件设计相结合，为设计人员提供了一种可用于各种应用的极为高效和可靠的器件。

D2Pak 是一种表面贴装功率封装，可容纳最大尺寸为 HEX-4 的芯片。它在所有现有的表面贴装封装中，提供了最高的功率能力以及尽可能低的导通电阻。D2Pak 由于其内部连接电阻低，因此适用于大电流应用，在典型的表面贴装应用中，其散热能力可达 2.0W。

通孔版本（IRF9530NL）适用于低矮型应用。



G	D	S
Gate	Drain	Source

Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
~~IRF9530NLPbF~~	~~TO-262~~	~~Tube~~	~~50~~	~~IRF9530NLPbF~~ **(Obsolete)**
IRF9530NSPbF	D2-Pak	Tape and Reel Left	800	IRF9530NSTRLPbF

Absolute Maximum Ratings			
Symbol	**Parameter**	**Max.**	**Units**
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ -10V ⑤	-14	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ -10V ⑤	-10	
I_{DM}	Pulsed Drain Current ①⑤	-56	
P_D @T_A = 25°C	Maximum Power Dissipation	3.8	W
P_D @T_C = 25°C	Maximum Power Dissipation	79	W
	Linear Derating Factor	0.53	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy (Thermally Limited) ②⑤	250	mJ
I_{AR}	Avalanche Current ①	-8.4	A
E_{AR}	Repetitive Avalanche Energy ①	7.9	mJ
dv/dt	Peak Diode Recovery dv/dt③⑤	-5.0	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 175	°C
	Soldering Temperature, for 10 seconds (1.6mm from case)	300	
	Mounting torque, 6-32 or M3 screw	10 lbf•in (1.1N•m)	

热阻

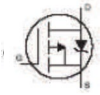
Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	---	1.9	°C/W
$R_{\theta JA}$	Junction-to-Ambient (PCB Mount, steady state) ⑥	---	40	

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）。

电气特性 @T_J = 25°C（除非另有说明）

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-100	---	---	V	V_{GS} = 0V, I_D = -250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	---	-0.11	---	V/°C	Reference to 25°C, I_D = -1mA ⑤
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	---	---	0.20	Ω	V_{GS} = -10V, I_D = -8.4A ④
$V_{GS(th)}$	Gate Threshold Voltage	-2.0	---	-4.0	V	V_{DS} = V_{GS}, I_D = -250μA
gfs	Forward Trans conductance	3.2	---	---	S	V_{DS} = -50V, I_D = -8.4A⑤
I_{DSS}	Drain-to-Source Leakage Current	---	---	-25	μA	V_{DS} = -100V, V_{GS} = 0V
		---	---	-250		V_{DS} = -80V,V_{GS} = 0V,T_J =150°C
I_{GSS}	Gate-to-Source Forward Leakage	---	---	-100	nA	V_{GS} = -20V
	Gate-to-Source Reverse Leakage	---	---	100		V_{GS} = 20V
Q_g	Total Gate Charge	---	---	58	nC	I_D = -8.4A V_{DS}
Q_{gs}	Gate-to-Source Charge	---	---	8.3		= -80V
Q_{gd}	Gate-to-Drain Charge	---	---	32		V_{GS} = -10V See Fig.6 and 13 ④⑤
$t_{d(on)}$	Turn-On Delay Time	---	15	---	ns	V_{DD} = -50V I_D
t_r	Rise Time	---	58	---		= -8.4A R_G=
$t_{d(off)}$	Turn-Off Delay Time	---	45	---		9.1Ω
t_f	Fall Time	---	46	---		R_D= 6.2Ω See Fig.6 ④⑤
L_S	Internal Source Inductance	---	7.5	---	nH	Between lead, and center of die contact
C_{iss}	Input Capacitance	---	760	---	pF	V_{GS} = 0V V_{DS} =
C_{oss}	Output Capacitance	---	260	---		-25V
C_{rss}	Reverse Transfer Capacitance	---	170	---		f = 1.0MHz, See Fig. 5 ⑤

源极-漏极额定值与特性

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	---	---	-14	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	---	---	-56		
V_{SD}	Diode Forward Voltage	---	---	-1.6	V	T_J = 25°C,I_S = -8.4A,V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	---	130	190	ns	T_J = 25°C ,I_F = -8.4A
Q_{rr}	Reverse Recovery Charge	---	650	970	nC	di/dt = -100A/μs ④⑤
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

注:

① 重复额定值；脉冲宽度受最高结温限制。（见图11）

② starting T_J = 25°C, L = 7.0mH, R_G = 25Ω, I_{AS} = -8.4A. (见图. 12)

③ I_{SD} ≤ -8.4A, di/dt ≤ -490A/μs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 175°C.

④ 脉冲宽度 ≤ 300μs; 占空比 ≤ 2%。

⑤ 使用IRF9530N 数据和测试条件。

⑦安装在 1 英寸方形PCB （FR-4 或 G-10 材料）上时。关于推荐的封装和焊接技术，请参阅应用笔记 #AN-994。

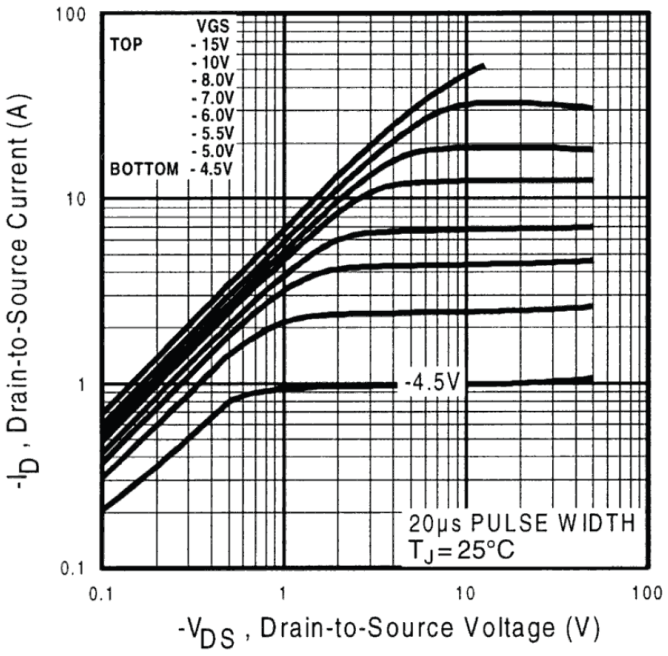


Fig. 1 Typical Output Characteristics

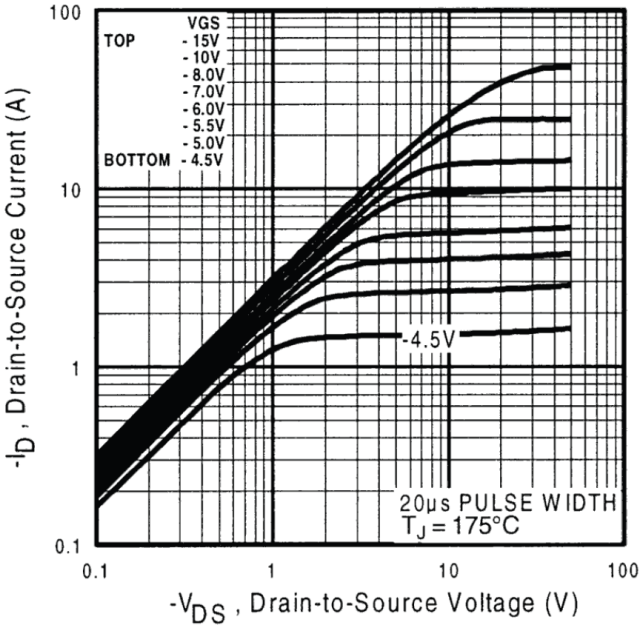


Fig. 2 Typical Output Characteristics

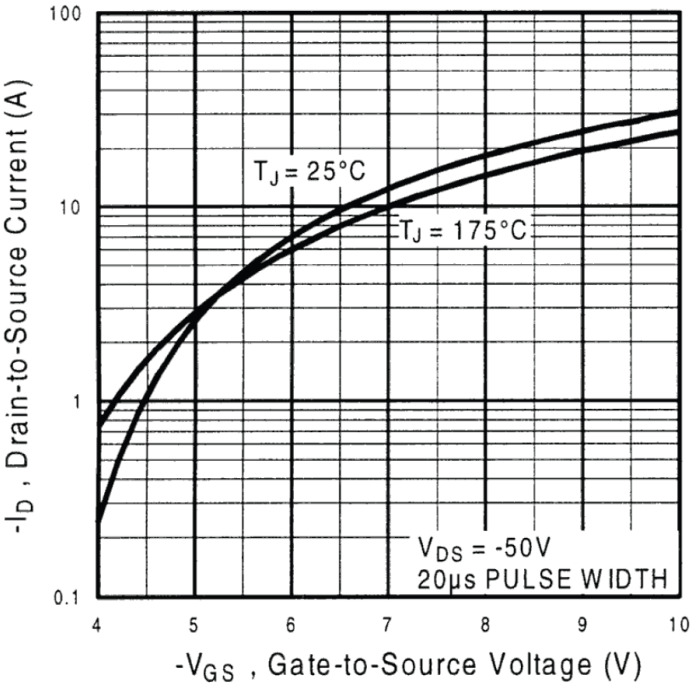


Fig. 3 Typical Transfer Characteristics

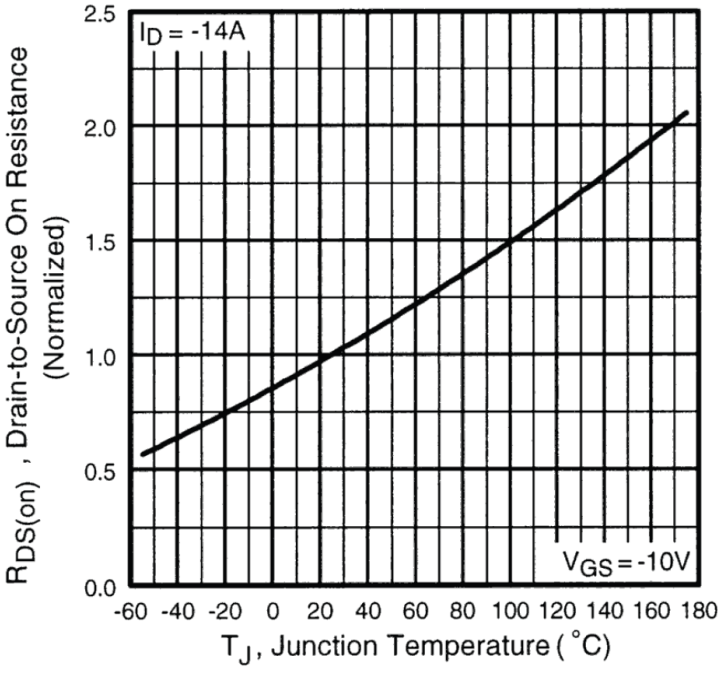


Fig. 4 Normalized On-Resistance vs. Temperature

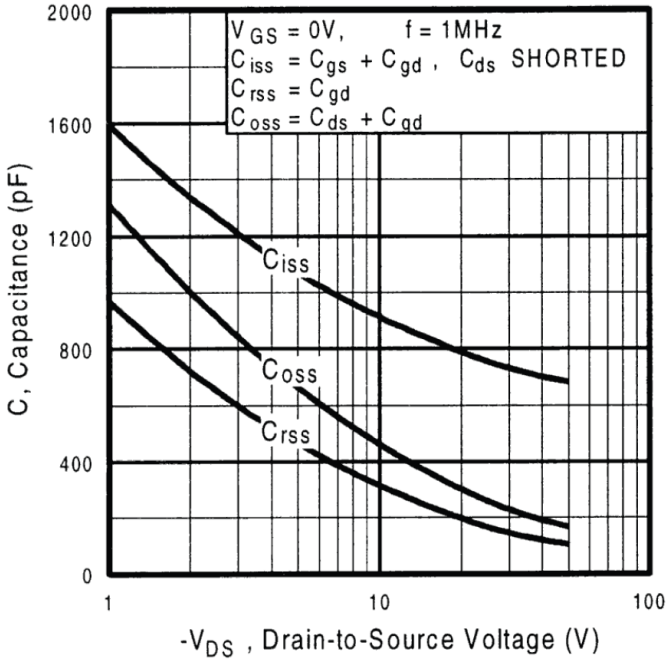


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

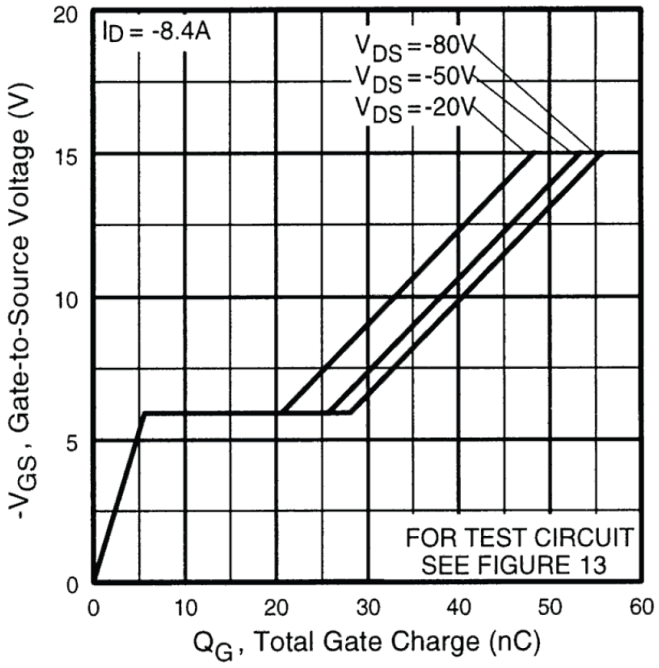


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

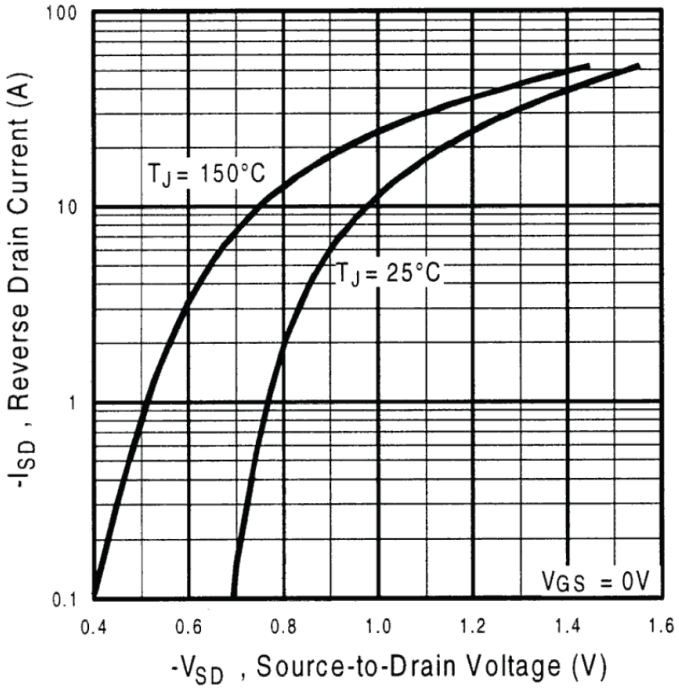


Fig. 7 Typical Source-to-Drain Diode Forward Voltage

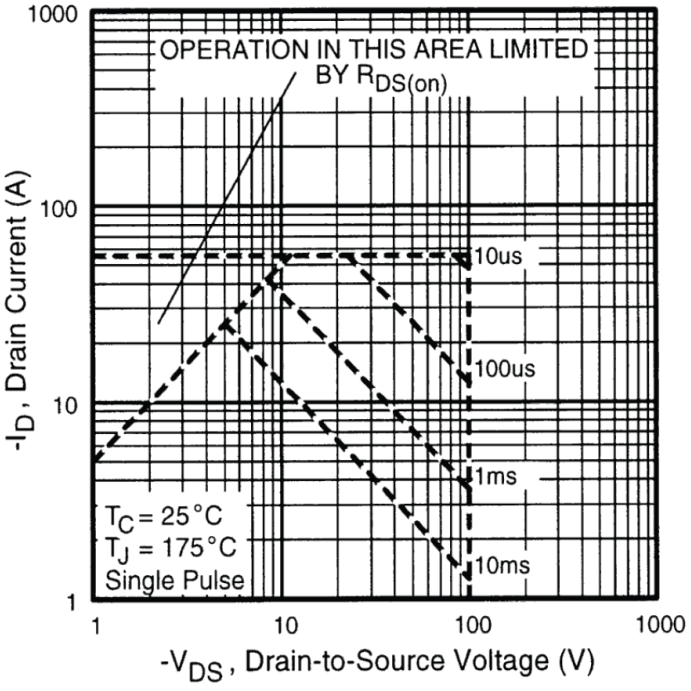


Fig 8. Maximum Safe Operating Area

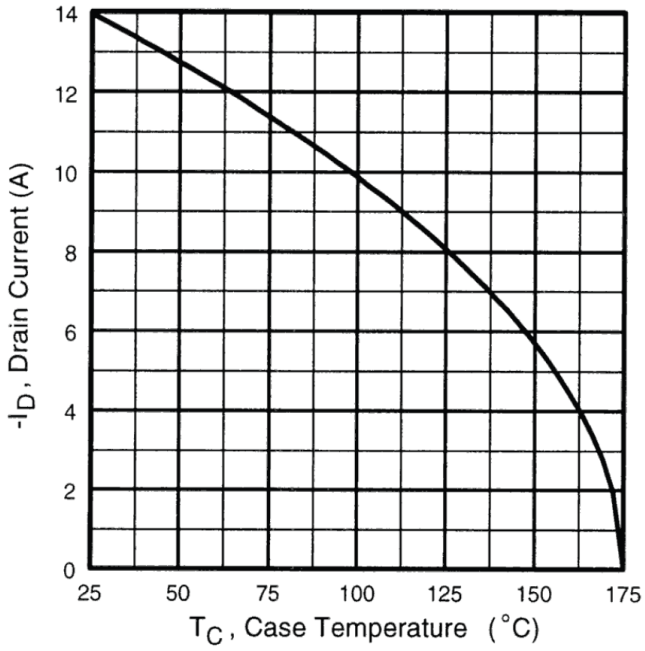


Fig 9. Maximum Drain Current vs. Case Temperature

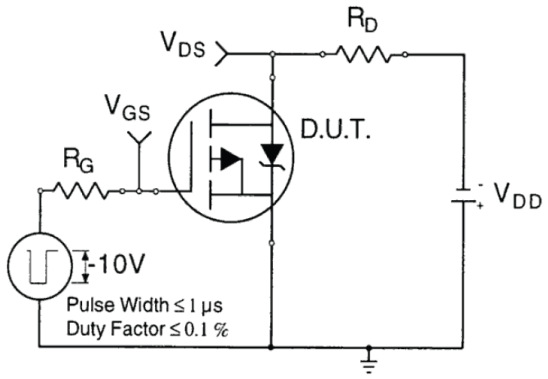


Fig 10a. Switching Time Test Circuit

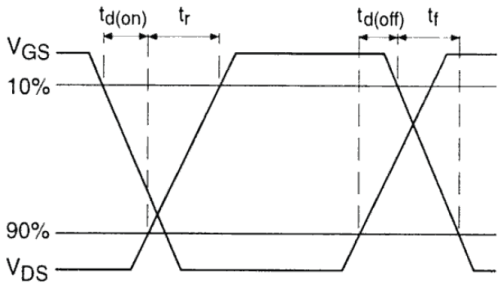


Fig 10b. Switching Time Waveforms

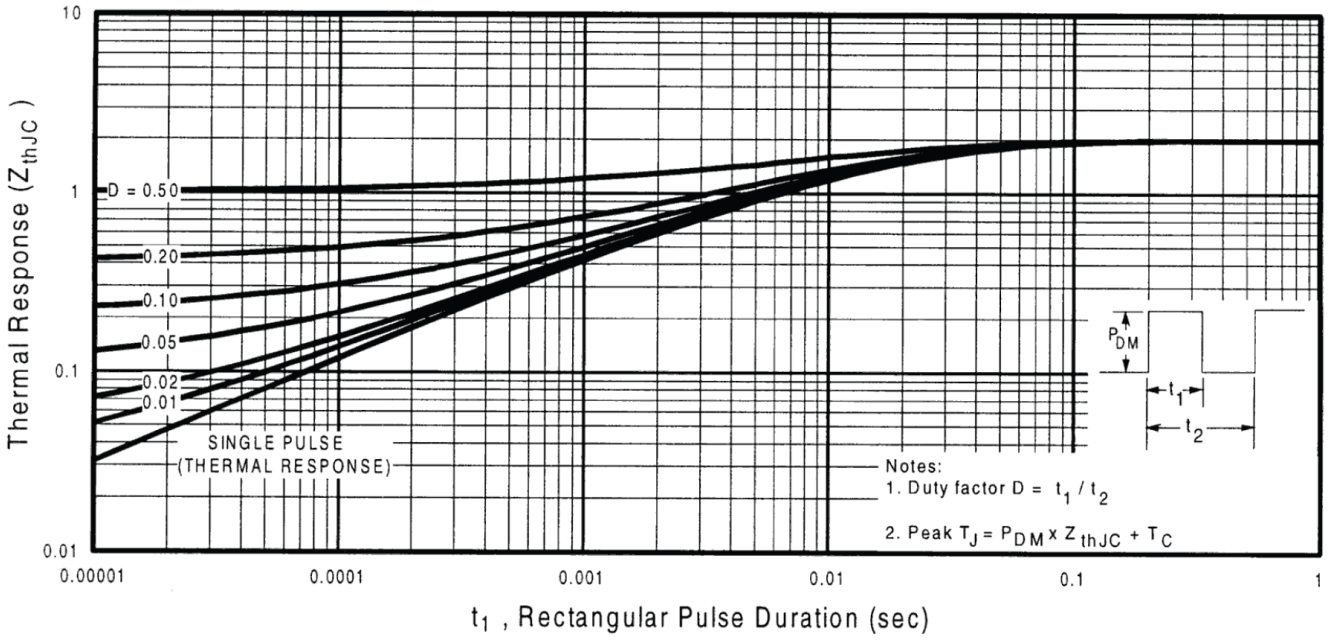


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

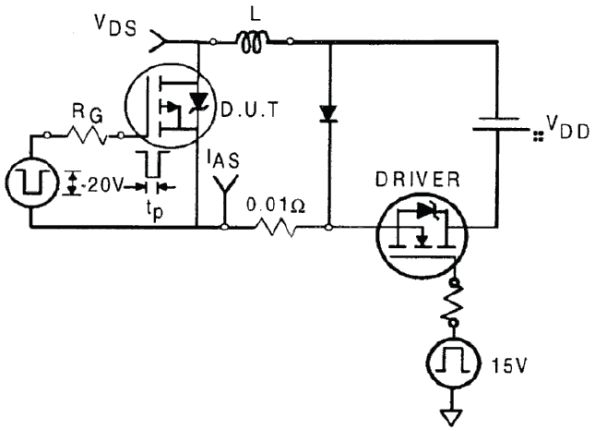


Fig 12a. Unclamped Inductive Test Circuit

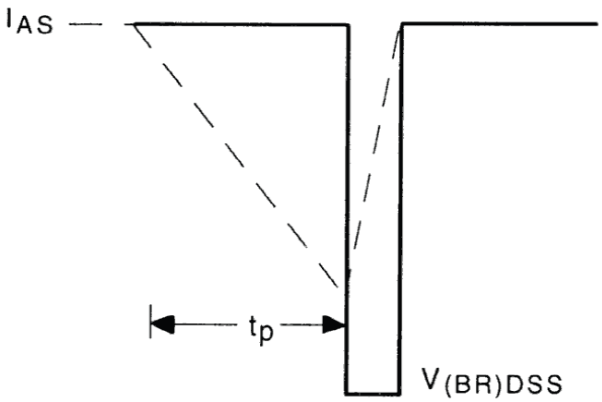


Fig 12b. Unclamped Inductive Waveforms

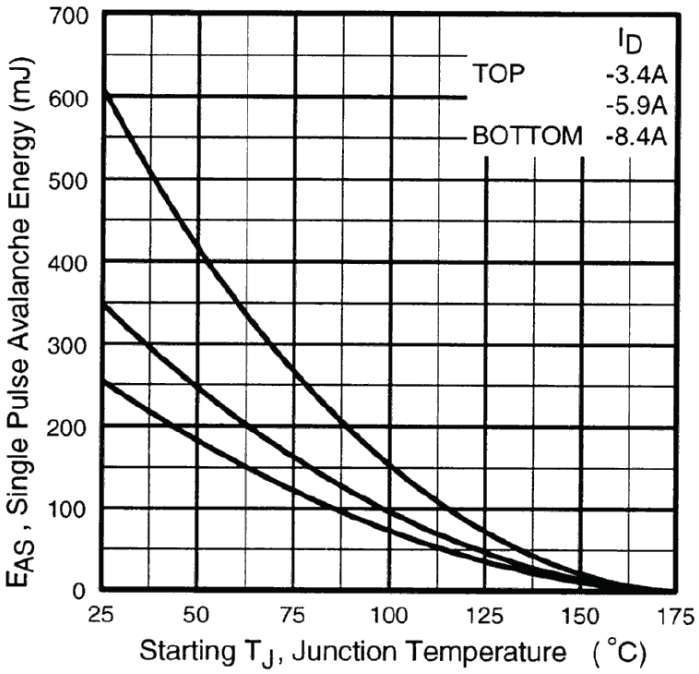


Fig 12c. Maximum Avalanche Energy vs. Drain Current

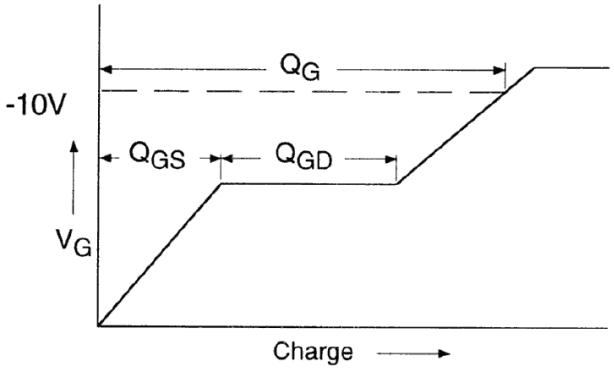


Fig 13a. Gate Charge Waveform

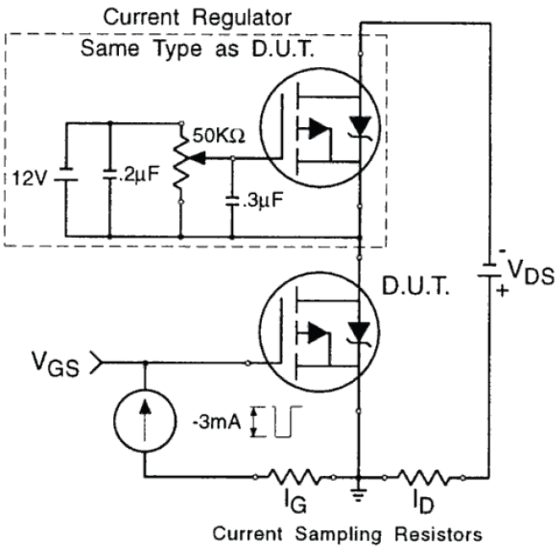


Fig 13b. Gate Charge Test Circuit

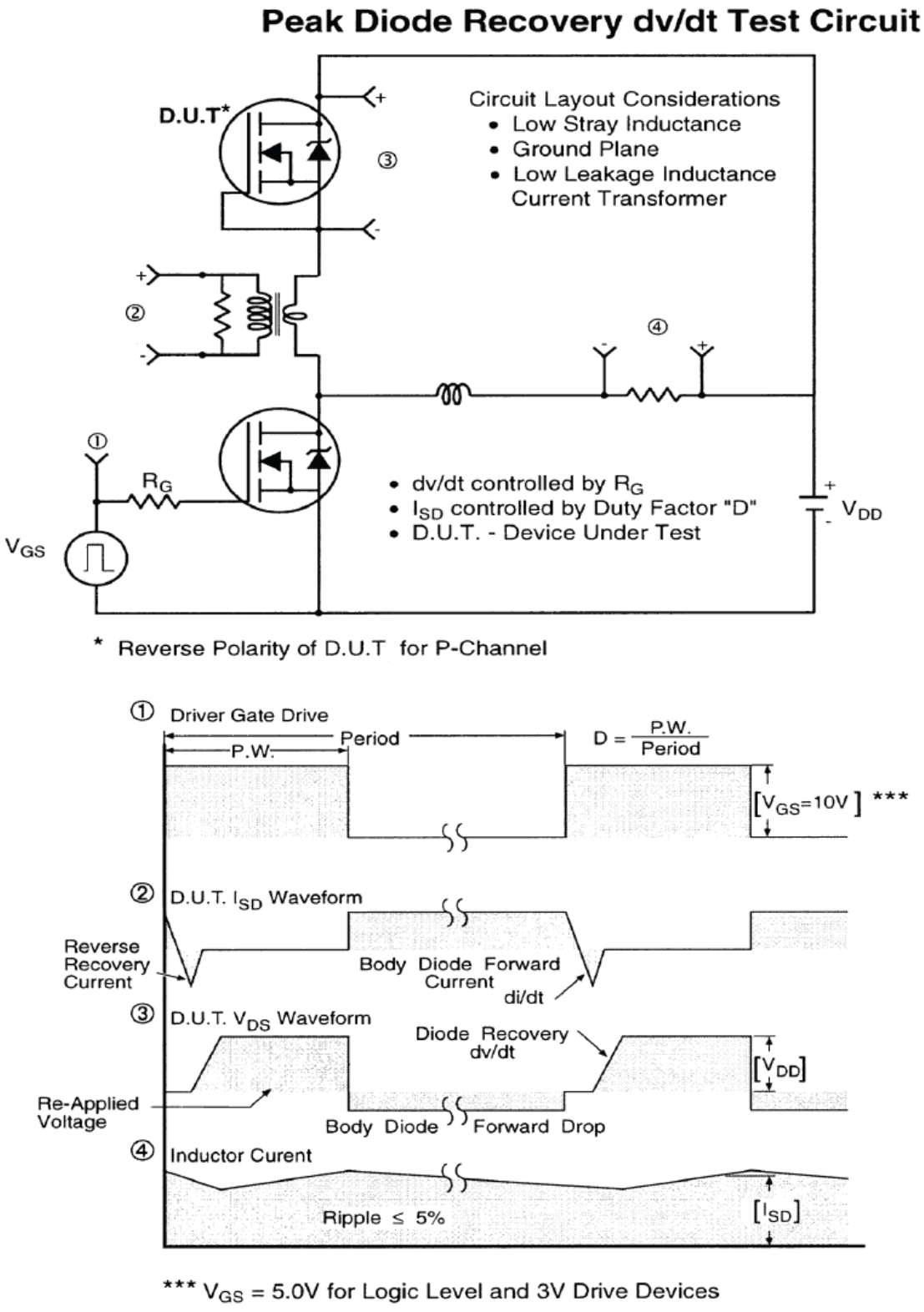
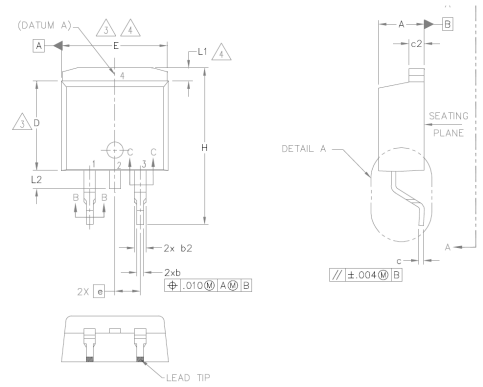


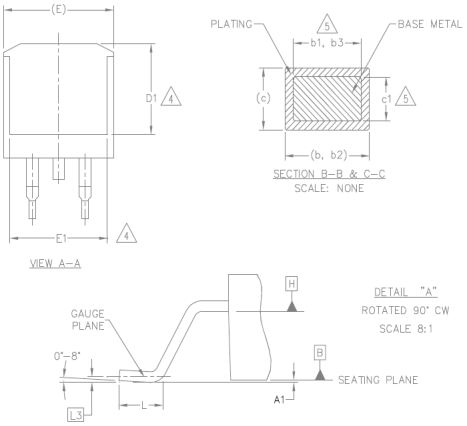
Fig 14. Peak Diode Recovery dv/dt Test Circuit for PChannel HEXFET® Power MOSFETs

D 2 Pak (TO-263AB) 封装外形（尺寸以毫米（英寸）为单位）



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M–1994
2. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
3. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.127 [.005"] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY AT DATUM H.
4. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSION E, L1, D1 & E1.
5. DIMENSION b1, b3 AND c1 APPLY TO BASE METAL ONLY.
6. DATUM A & B TO BE DETERMINED AT DATUM PLANE H.
7. CONTROLLING DIMENSION: INCH.
8. OUTLINE CONFORMS TO JEDEC OUTLINE TO-263AB.



SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	.160	.190	
A1	0.00	0.254	.000	.010	
b	0.51	0.99	.020	.039	
b1	0.51	0.89	.020	.035	5
b2	1.14	1.78	.045	.070	
b3	1.14	1.73	.045	.068	5
c	0.38	0.74	.015	.029	
c1	0.38	0.58	.015	.023	5
c2	1.14	1.65	.045	.065	
D	8.38	9.65	.330	.380	3
D1	6.86	–	.270	–	4
E	9.65	10.67	.380	.420	3,4
E1	6.22	–	.245	–	4
e	2.54 BSC		.100 BSC		
H	14.61	15.88	.575	.625	
L	1.78	2.79	.070	.110	
L1	–	1.68		.066	4
L2	–	1.78		.070	
L3	0.25 BSC		.010 BSC		

LEAD ASSIGNMENTS

DIODES

1.– ANODE (TWO DIE) / OPEN (ONE DIE)
2, 4.– CATHODE
3.– ANODE

HEXFET

1.– GATE
2, 4.– DRAIN
3.– SOURCE

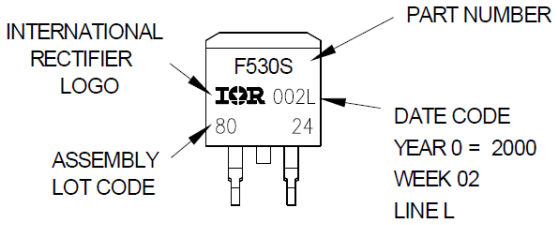
IGBTs, CoPACK

1.– GATE
2, 4.– COLLECTOR
3.– EMITTER

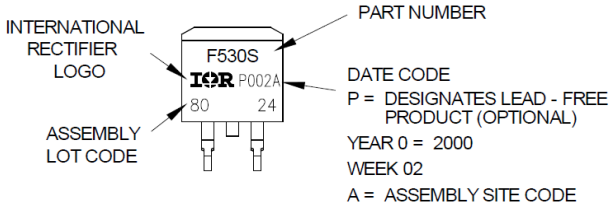
D2-Pak（TO-263AB）零件信息标识

EXAMPLE: THIS IS AN IRF530S WITH LOT CODE 8024
ASSEMBLED ON WW 02, 2000
IN THE ASSEMBLY LINE "L"

Note: "P" in assembly line position indicates "Lead – Free"

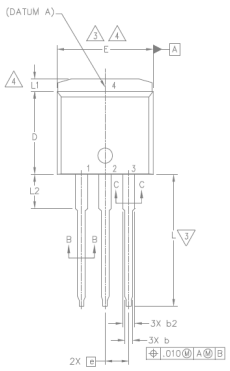


OR



注：有关最新图纸，请参阅英飞凌网站 https://www.infineon.cn/ 及其链接。

TO-262 封装外形（尺寸以毫米（英寸）为单位）



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M–1994
2. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
3. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.127 [.005"] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY.
4. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSION E, L1, D1 & E1.
5. DIMENSION b1 AND c1 APPLY TO BASE METAL ONLY.
6. CONTROLLING DIMENSION: INCH.
7. OUTLINE CONFORM TO JEDEC TO-262 EXCEPT A1(max.), b(min.) AND D1(min.) WHERE DIMENSIONS DERIVED THE ACTUAL PACKAGE OUTLINE.

LEAD ASSIGNMENTS

IGBTs, CoPACK

1.– GATE
2.– COLLECTOR
3.– EMITTER
4.– COLLECTOR

HEXFET

1.– GATE
2.– DRAIN
3.– SOURCE
4.– DRAIN

DIODES

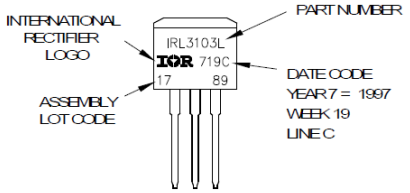
1.– ANODE (TWO DIE) / OPEN (ONE DIE)
2, 4.– CATHODE
3.– ANODE

SYMBOL	DIMENSIONS				NOTES
	MILLIMETERS		INCHES		
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	.160	.190	
A1	2.03	3.02	.080	.119	
b	0.51	0.99	.020	.039	
b1	0.51	0.89	.020	.035	5
b2	1.14	1.78	.045	.070	
b3	1.14	1.73	.045	.068	5
c	0.38	0.74	.015	.029	
c1	0.38	0.58	.015	.023	5
c2	1.14	1.65	.045	.065	
D	8.38	9.65	.330	.380	3
D1	6.86	–	.270	–	4
E	9.65	10.67	.380	.420	3,4
E1	6.22	–	.245		4
e	2.54 BSC		.100 BSC		
L	13.46	14.10	.530	.555	
L1	–	1.65	–	.065	4
L2	3.56	3.71	.140	.146	

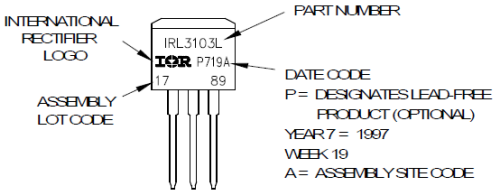
TO-262 零件标识信息

EXAMPLE: THIS IS AN IRL3103L
LOT CODE 1789
ASSEMBLED ON WW 19, 1997
IN THE ASSEMBLY LINE "C"

Note: "P" in assembly line position indicates "Lead – Free"

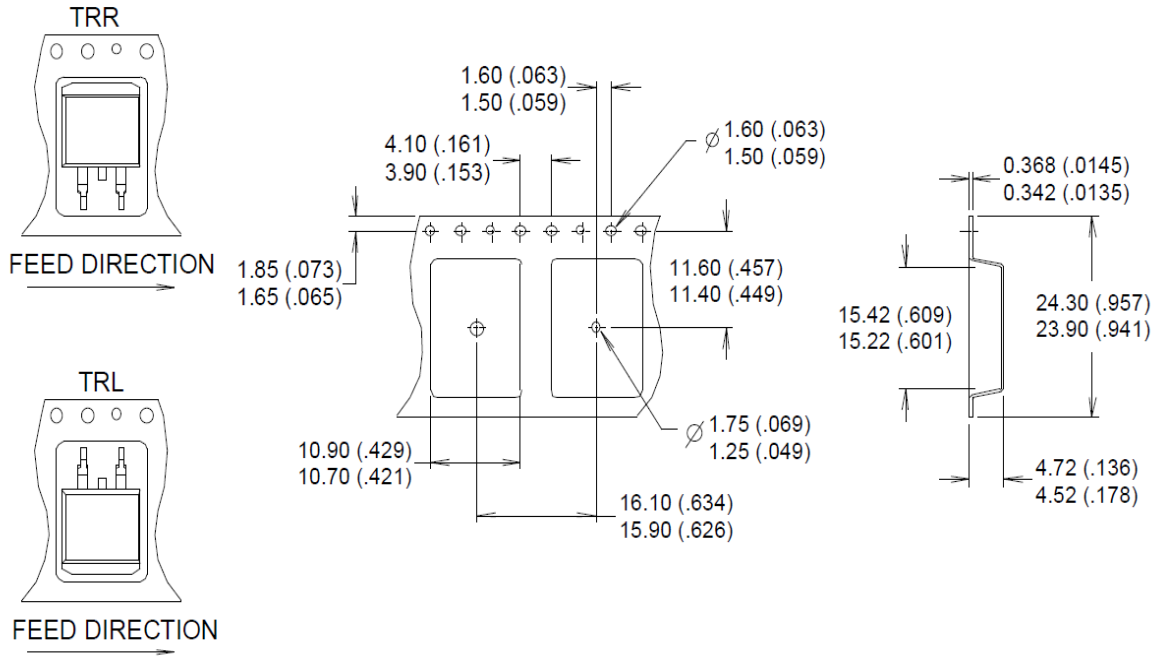


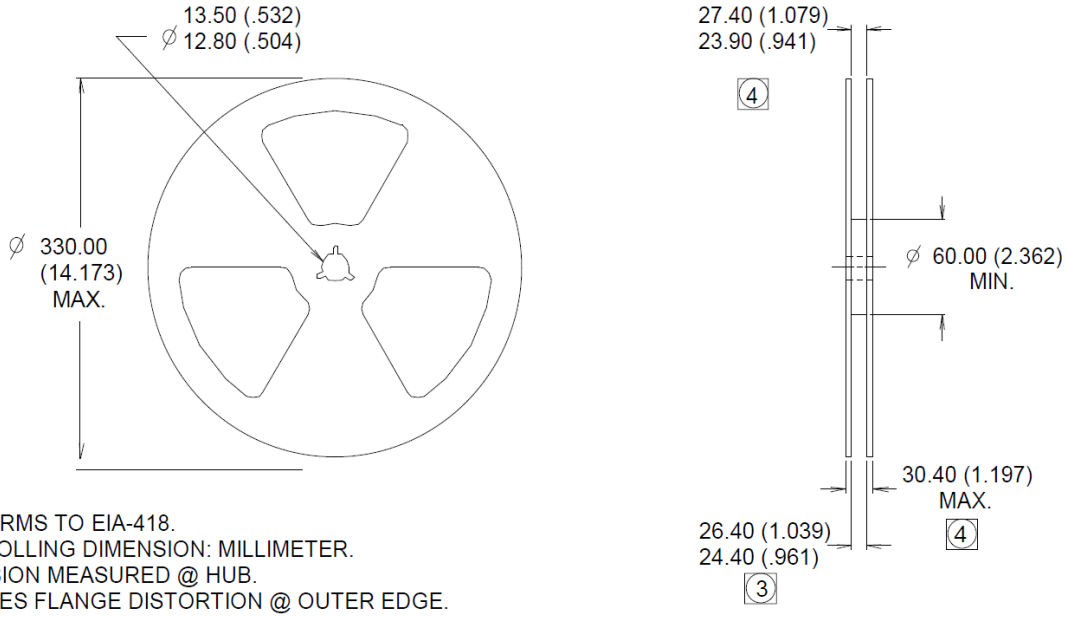
OR



注：有关最新图纸，请参阅英飞凌网站 https://www.infineon.cn/ 及其链接。

D2-Pak （TO-263AB）卷料和带料信息 （尺寸以毫米（英寸）为单位）





NOTES :
1. COMFORMS TO EIA-418.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION MEASURED @ HUB.
4. INCLUDES FLANGE DISTORTION @ OUTER EDGE.

注：有关最新图纸，请参阅英飞凌网站 https://www.infineon.cn/ 及其链接。

资质信息†

Qualification Level	Industrial (per JEDEC JESD47F) ††	
Moisture Sensitivity Level	D2-Pak	MSL1 (per JEDEC J-STD-020D) ††
	TO-262	N/A
RoHS Compliant	Yes	

† Qualification standards can be found at Infineon's web site www.infineon.com

†† 产品发布时的 JEDEC 标准适用版本。

修订记录

Date	Comments
5/27/2016	• Updated datasheet with corporate template. • Added disclaimer on last page. • TO-262 package was removed from ordering information since it is EOL on page 1.

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