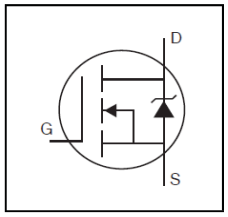
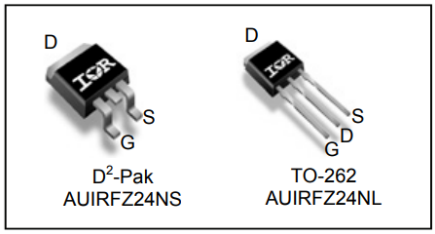
HEXFET®功率MOSFET

特性

- 先进平面技术
- 低电平导通电阻
- 动态 dV/dT 和 dI/dT 能力
- 工作温度 175°C
- 快速开关
- 雪崩完全额定
- 允许达到 Tjmax 的重复雪崩
- 无铅，符合RoHS要求
- 汽车认证 *



V_{DSS}	**55V**
$R_{DS(on)}$ **max.**	**0.07Ω**
I_D	**17A**



G	D	S
Gate	Drain	Source

描述

这款 HEXFET®功率MOSFET专为汽车应用而设计，采用最新的工艺技术实现单位硅面积极低的导通电阻。该设计的其他特点包括 175°C 工作结温、开关速度快和提高重复雪崩额定值。通过结合以上特点，使该设计成为一种极其高效和可靠的器件，可用于汽车应用和各种其他应用。

Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
AUIRFZ24NL	TO-262	Tube	50	AUIRFZ24NL
AUIRFZ24NS	D^2-Pak	Tube	50	AUIRFZ24NS
		Tape and Reel Left	800	AUIRFZ24NSTRL

绝对最大额定值

超过“绝对最大额定值”所列值的应力可能会对器件造成永久性损坏。这些仅仅是应力额定值，并不意味着器件在这些或任何其他超过该规范所示的条件下能够正常运行。延长暴露在绝对最大额定值条件的时间可能会影响器件的可靠性。热阻抗和功率耗散额定值是在装板和静止空气条件下测得的。环境温度（TA）为 25°C，除非另有规定。

Symbol	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V	17	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	12	
I_{DM}	Pulsed Drain Current ①	68	
P_D @T_A = 25°C	Maximum Power Dissipation	3.8	W
P_D @T_C = 25°C	Maximum Power Dissipation	45	
	Linear Derating Factor	0.3	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy (Thermally Limited) ②	71	mJ
I_{AR}	Avalanche Current ①	10	A
E_{AR}	Repetitive Avalanche Energy ①	4.5	mJ
dv/dt	Peak Diode Recovery ③	6.8	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	

热阻抗

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	---	3.3	°C/W
$R_{\theta JA}$	Junction-to-Ambient (PCB Mount), D^2 Pak⑤	---	40	

HEXFET® 是英飞凌的注册商标。

*认证标准可在 www.infineon.com 上找到

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）。

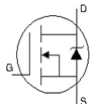
静态参数特性在 T_J = 25°C 时测得（除非另有规定）

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	55	---	---	V	V_{GS} = 0V, I_D = 250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	---	0.052	---	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	---	---	0.07	Ω	V_{GS} = 10V, I_D = 10A ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	---	4.0	V	V_{DS} = V_{GS}, I_D = 250μA
gfs	Forward Trans conductance	4.5	---	---	S	V_{DS} = 25V, I_D = 10A
I_{DSS}	Drain-to-Source Leakage Current	---	---	25	μA	V_{DS} = 55V, V_{GS} = 0V
		---	---	250		V_{DS} = 44V,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

动态电气特性在 T_J = 25°C时测得（除非另有规定）

Q_g	Total Gate Charge	---	---	20	nC	I_D = 10A V_{DS} = 44V V_{GS} = 10V, See Fig. 6 and 13 ④
Q_{gs}	Gate-to-Source Charge	---	---	5.3		
Q_{gd}	Gate-to-Drain Charge	---	---	7.6		
$t_{d(on)}$	Turn-On Delay Time	---	4.9	---	ns	V_{DD} = 28V I_D = 10A R_G= 24Ω R_D = 2.6Ω, See Fig. 10④
t_r	Rise Time	---	34	---		
$t_{d(off)}$	Turn-Off Delay Time	---	19	---		
t_f	Fall Time	---	27	---		
L_S	Internal Source Inductance	---	7.5	---	nH	Between lead, and center of die contact
C_{iss}	Input Capacitance	---	370	---	pF	V_{GS} = 0V V_{DS} = 25V f = 1.0MHz, See Fig. 5
C_{oss}	Output Capacitance	---	140	---		
C_{rss}	Reverse Transfer Capacitance	---	65	---		

二极管特性

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	---	---	17	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	---	---	68		
V_{SD}	Diode Forward Voltage	---	---	1.3	V	T_J = 25°C,I_S = 10A,V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	---	56	83	ns	T_J = 25°C ,I_F = 10A di/dt = 100A/μs ④
Q_{rr}	Reverse Recovery Charge	---	120	180	nC	
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 受 T_{Jmax} 限制，初始 T_J = 25°C、L = 1.0mH、R_G = 25 Ω 、I_{AS} = 10A、V_{GS} =10V。（见图 12）

③ I_{SD} ≤ 10A, di/dt ≤ 280A/μs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 175°C.

④ 脉冲宽度≤ 400μs；占空比≤ 2%。

⑤ 安装在 1 英寸方形PCB （FR-4 或 G-10 材料）上时。有关推荐的封装和焊接技术，请参阅应用注释 #AN-994

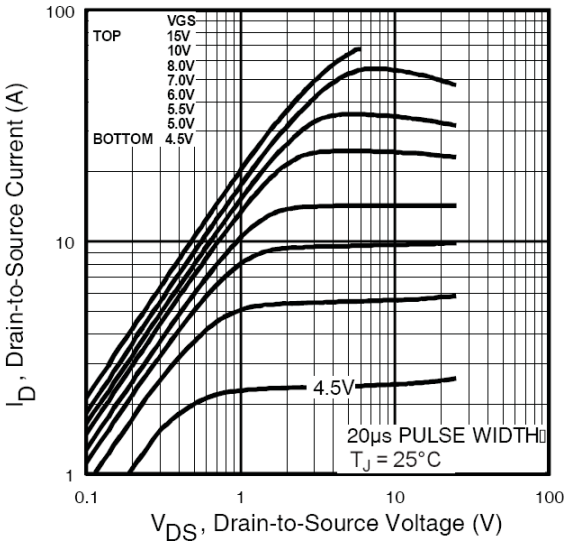


图 1典型输出特性

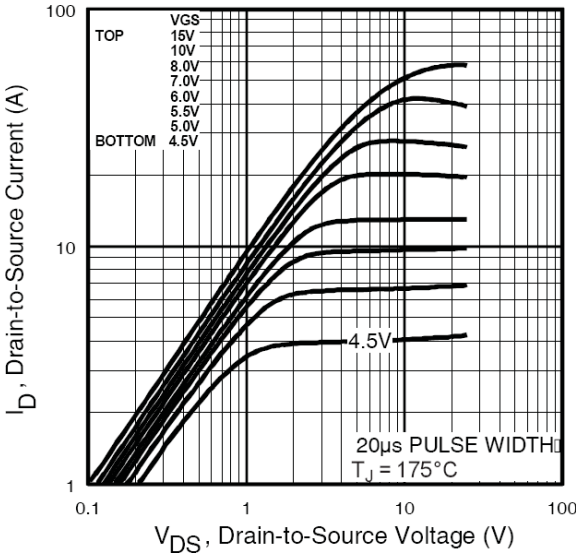


图 2典型输出特性

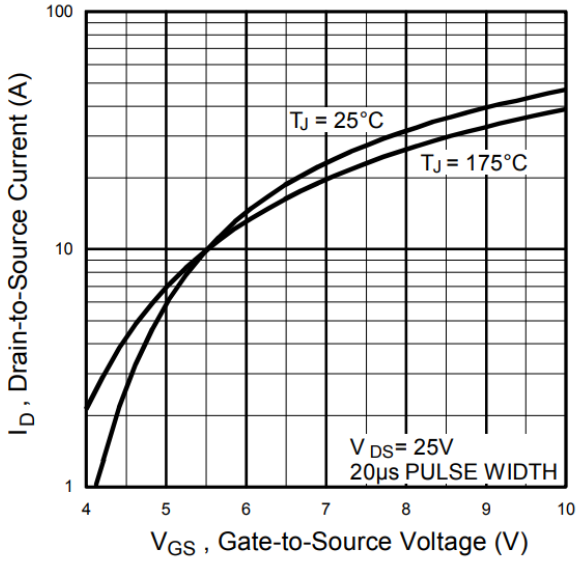


图 3典型转移特性

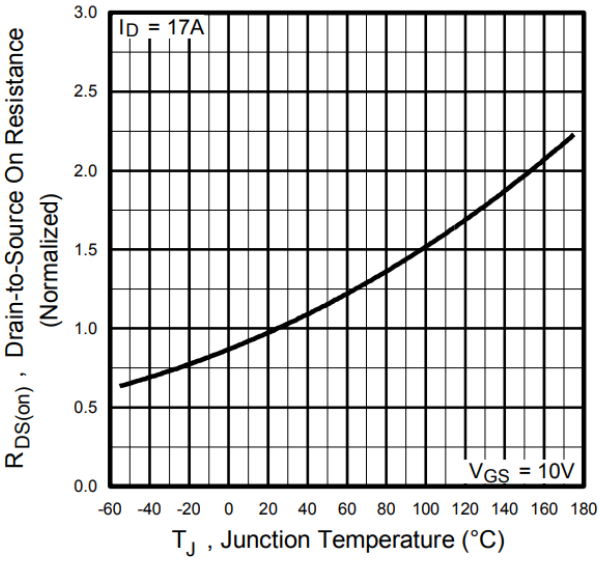


图4归一化导通电阻与温度的关系曲线

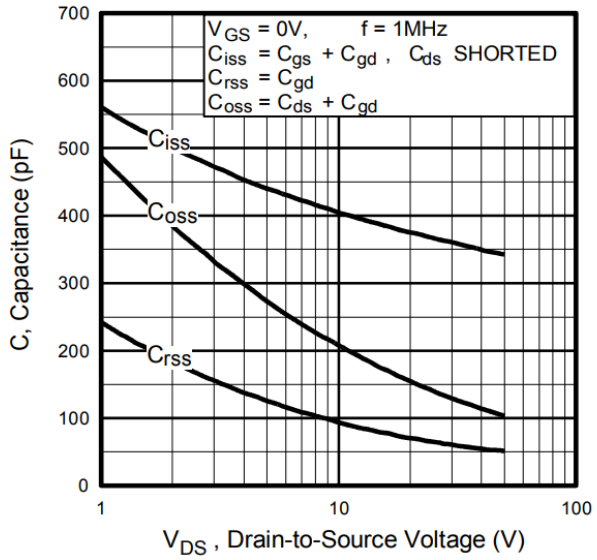


图 5.典型电容值与漏源电压的关系

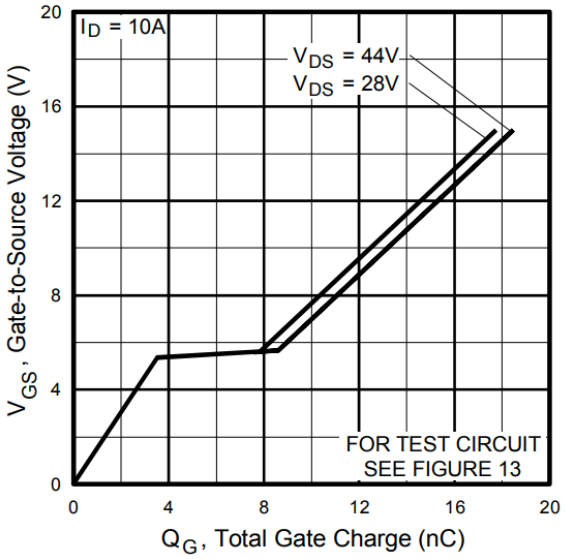


图 6.典型栅极电荷与栅源电压的关系

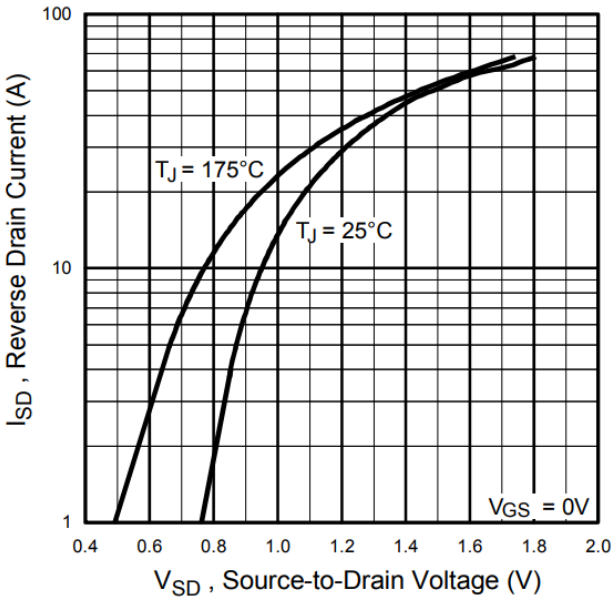


图 7典型源漏二极管正向电压

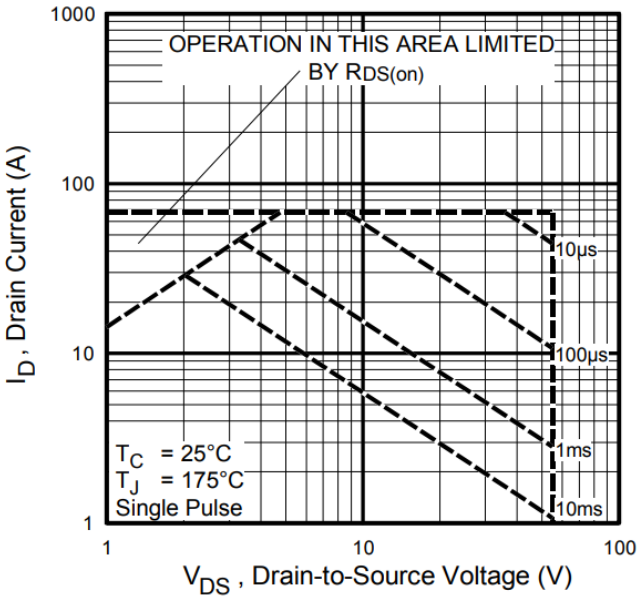


图 8.最大安全工作区

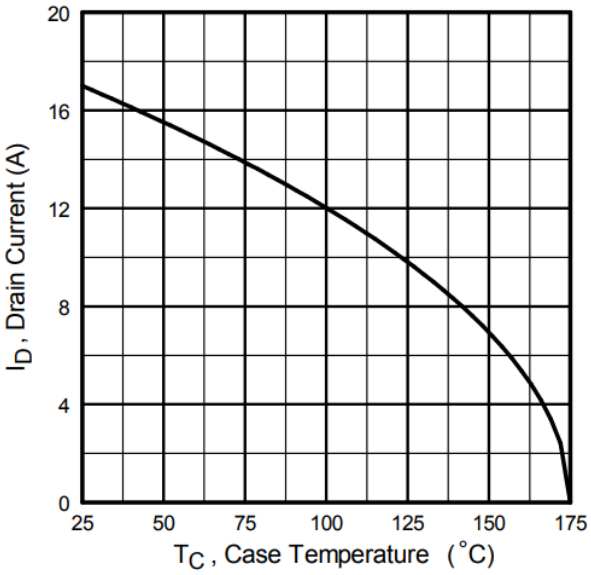


图 9.最大漏极电流与……
壳温

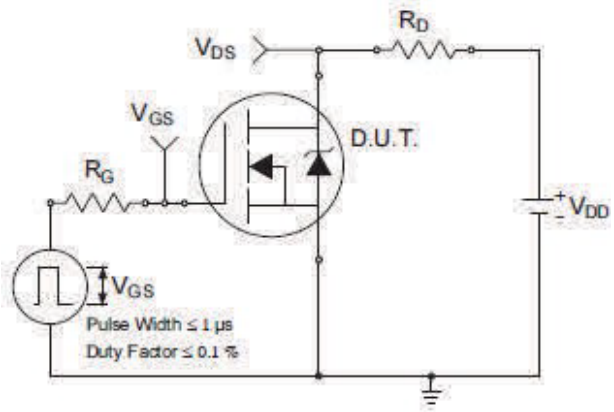


图 10a.开关时间测试电路

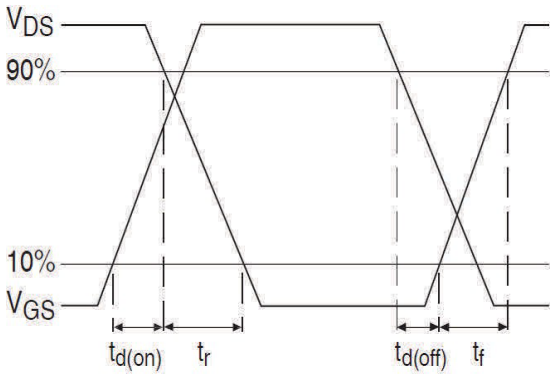


图 10b.开关时间波形

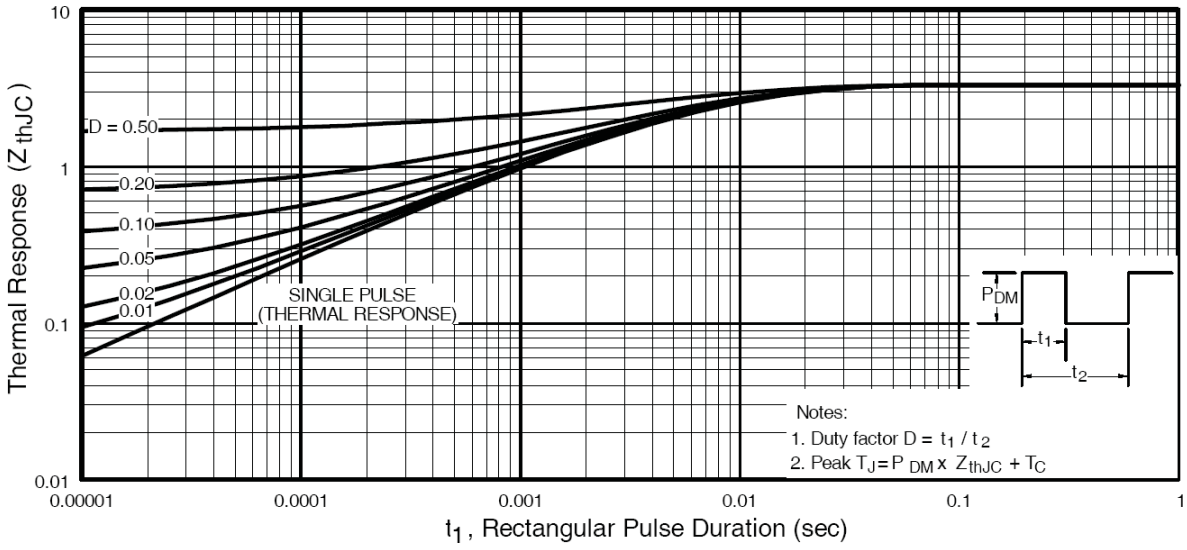


图 11.最大有效瞬态热阻，结到壳

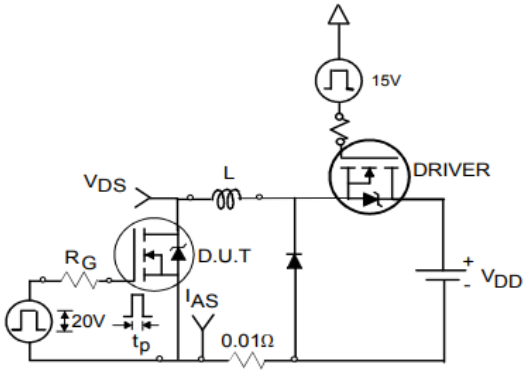


Fig 12a. Unclamped Inductive Test Circuit

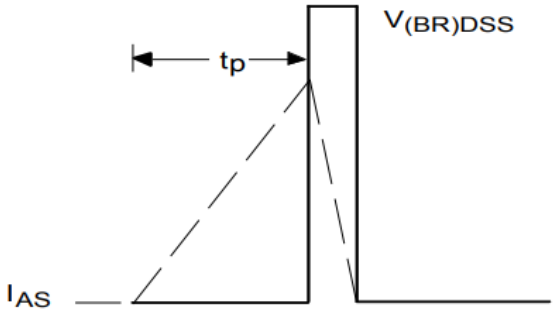


Fig 12b. Unclamped Inductive Waveforms

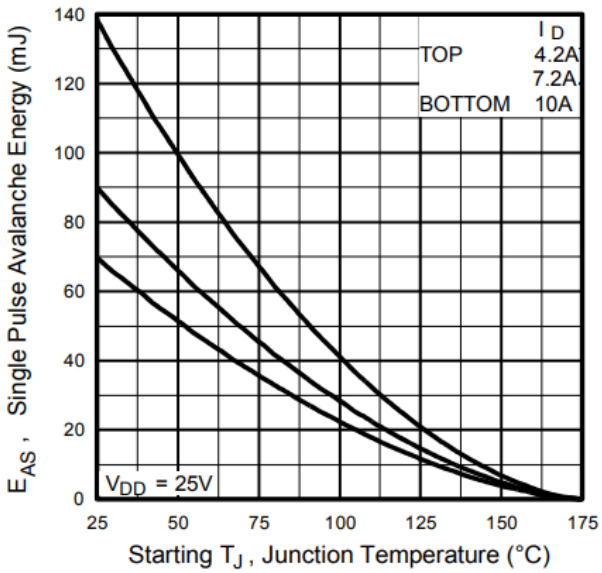


Fig 12c. Maximum Avalanche Energy vs. Drain Current

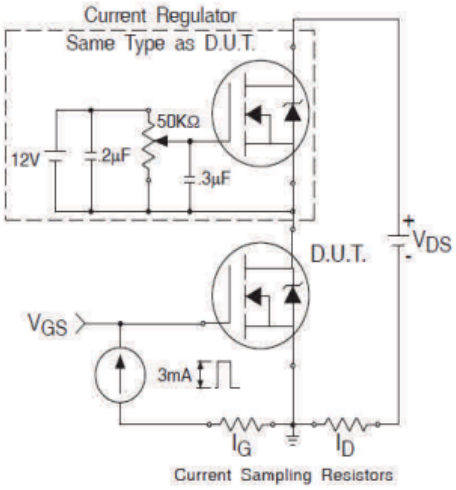


Fig 13a. Gate Charge Test Circuit

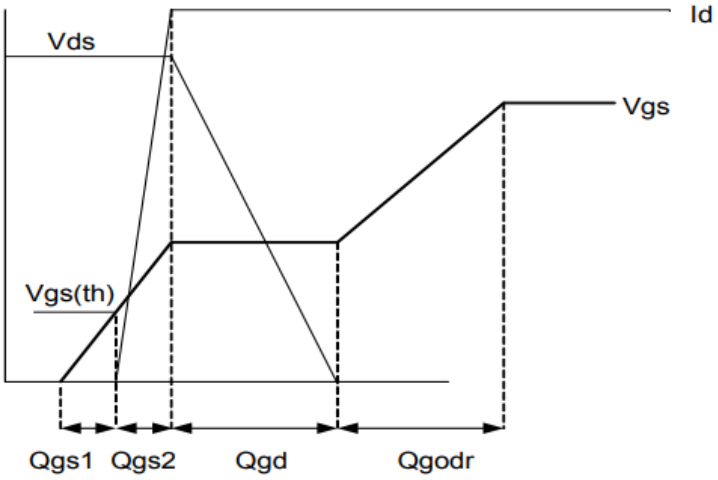


Fig 13b. Gate Charge Waveform

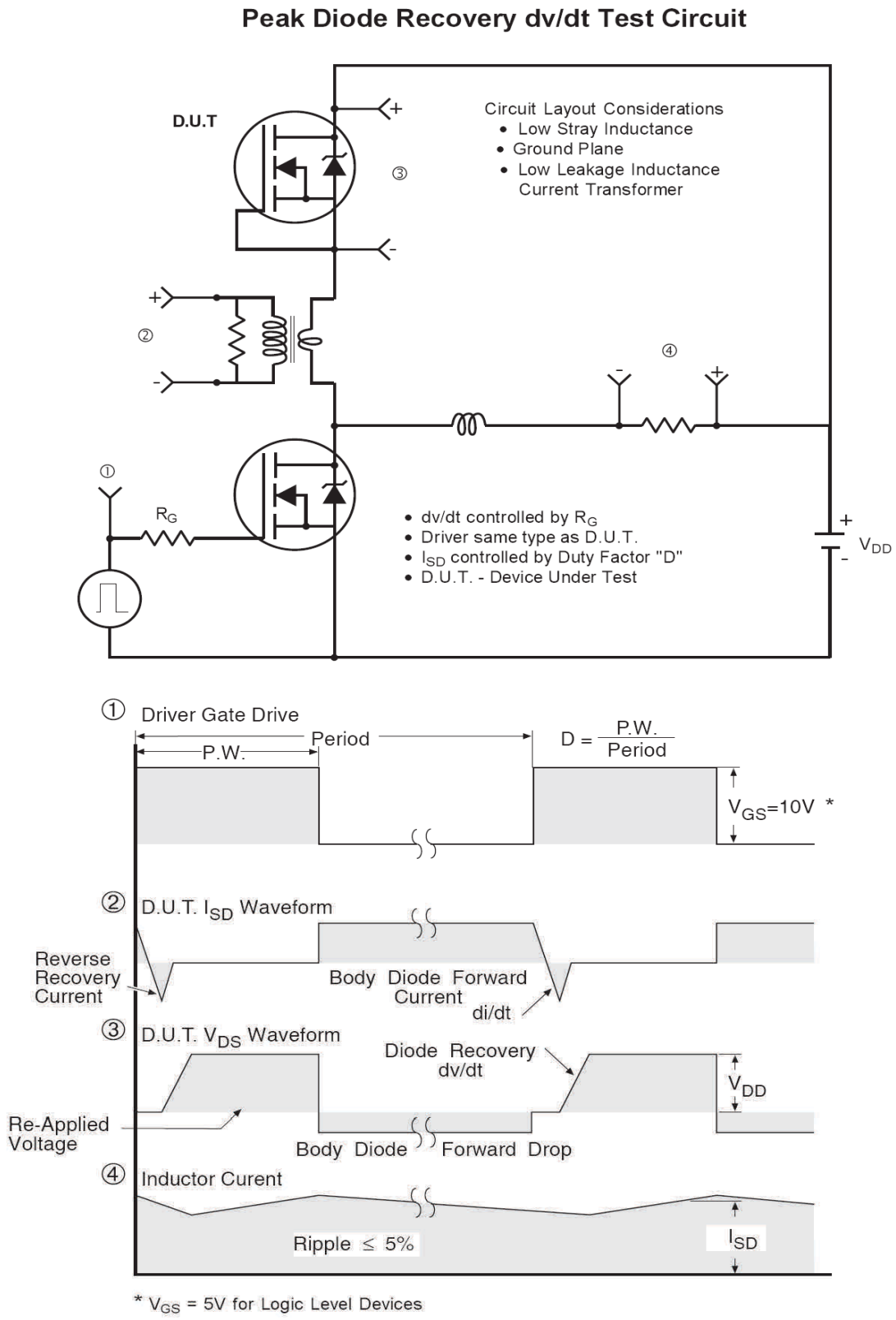
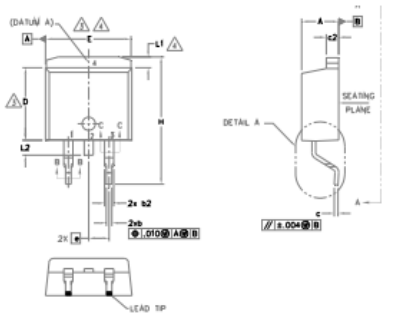


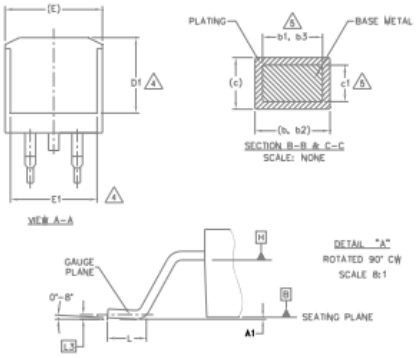
图 14. N 沟道 HEXFET® 功率 MOSFET 体内二极管峰值恢复 dv/dt 测试电路

D² 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

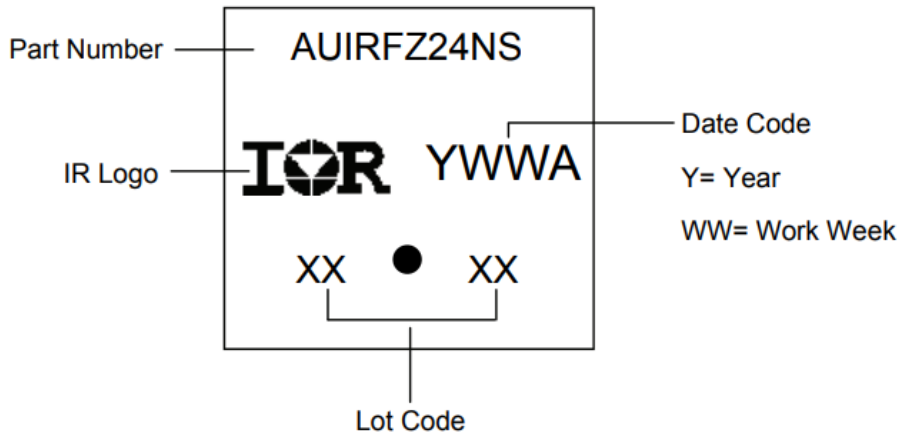
HEXFET

1.– GATE
2, 4.– DRAIN
3.– SOURCE

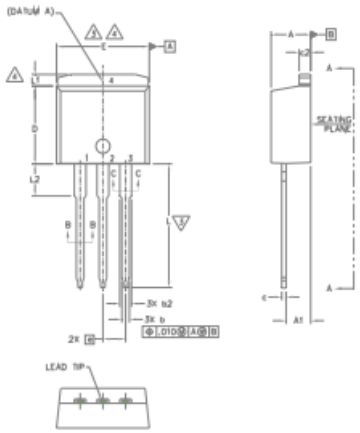
IGBTs, CoPACK

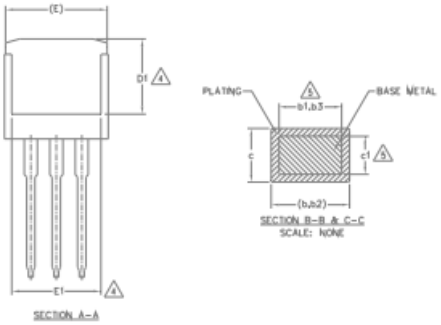
1.– GATE
2, 4.– COLLECTOR
3.– EMITTER

D² Pak（TO-263AB）零件信息标识



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

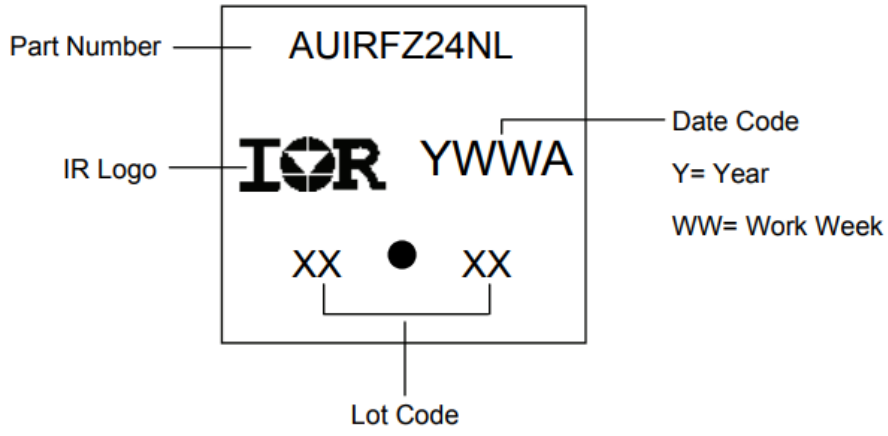
1.– GATE
2.– DRAIN
3.– SOURCE
4.– DRAIN

DIODES

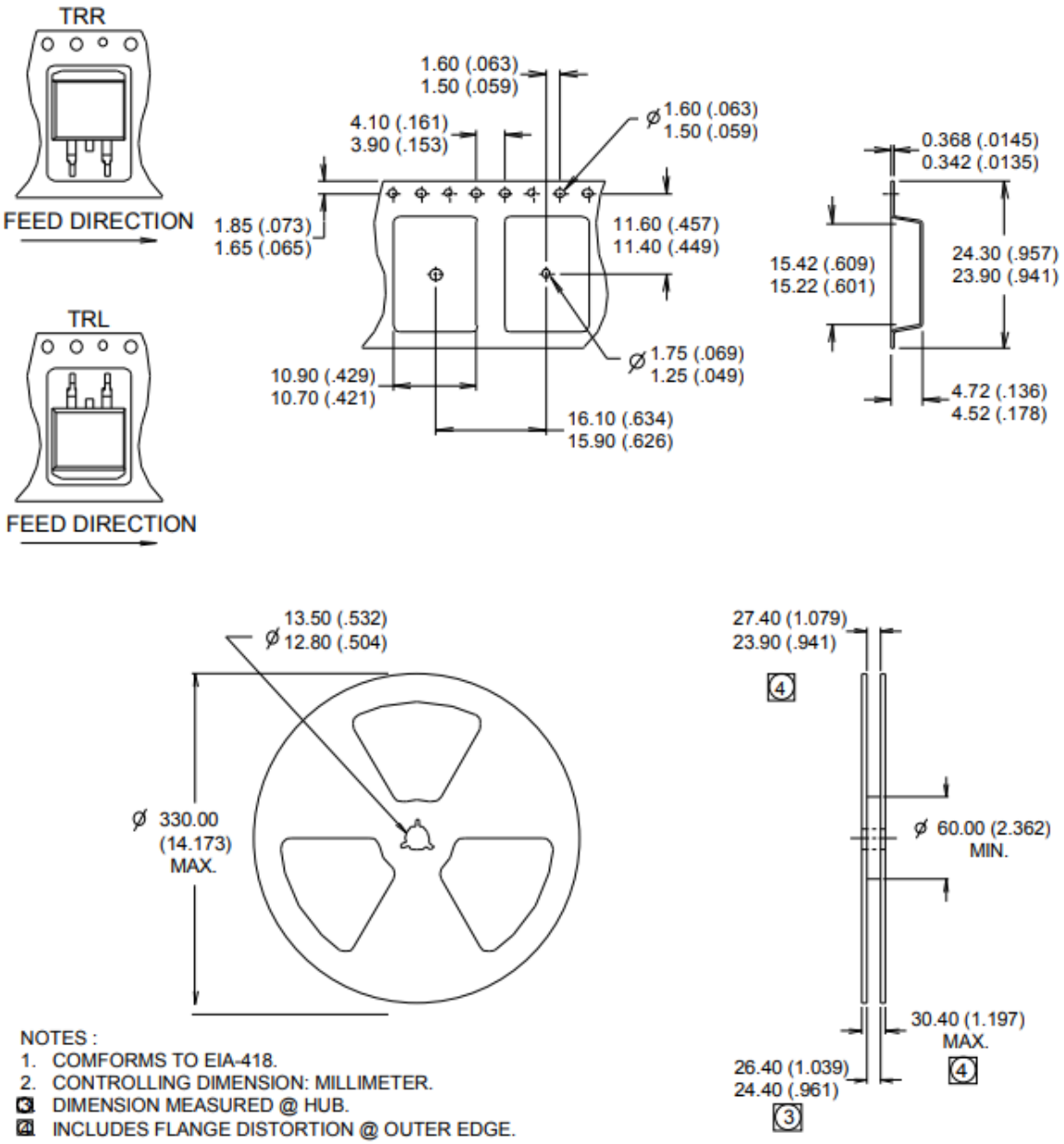
1.– ANODE (TWO DIE) / OPEN (ONE DIE)
2, 4.– CATHODE
3.– ANODE

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



D ² 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.

Qualification Information

Qualification Level		Automotive (per AEC-Q101)	
		Comments: This part number(s) passed Automotive qualification. Infineon's Industrial and Consumer qualification level is granted by extension of the higher Automotive level.	
Moisture Sensitivity Level		D^2-Pak	MSL1
		TO-262	
ESD	Machine Model	Class M2 (+/- 150V)† AEC-Q101-002	
	Human Body Model	Class H1A (+/- 500V)† AEC-Q101-001	
	Charged Device Model	Class C5 (+/- 2000V)† AEC-Q101-005	
RoHS Compliant		Yes	

† 最高通过电压。

修订记录

Date	Comments
10/27/2015	• Updated datasheet with corporate template • Corrected ordering table on page 1.
10/13/2017	• Corrected typo error on part marking on page 8,9.

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