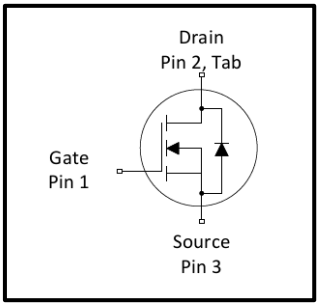
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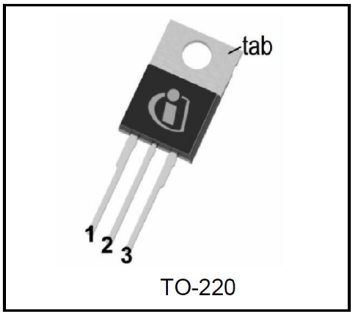
$V_{(BR)DSS}$	60V
$R_{DS(on)}$ max.	12mΩ
I_D	84A⑦

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特性

- 先进工艺技术
- 超低导通电阻
- 动态 dv/dt 额定值
- 工作温度 175°C
- 快速开关
- 雪崩完全额定
- 无铅





TO-220

说明

英飞凌第五代 HEXFET® 功率 MOSFET 采用先进的加工技术，实现了单位硅面积上最低的导通电阻。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。

在功率耗散约为 50 瓦的范围内，TO-220 封装是所有商业和工业应用中普遍首选的封装形式。TO-220 因具有低热阻和低封装成本的特点，因此在整个行业中得到了广泛采用。

Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRF1010EPbF	TO-220	Tube	50	IRF1010EPbF

绝对最大额定值

Symbol	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V	84⑦	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	59	
I_{DM}	Pulsed Drain Current ①	330	
P_D @T_C = 25°C	Maximum Power Dissipation	200	W
	Linear Derating Factor	1.4	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
I_{AR}	Avalanche Current ①	50	A
E_{AR}	Repetitive Avalanche Energy ①	17	mJ
dv/dt	Peak Diode Recovery dv/dt③	4.0	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	---	0.75	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	0.50	---	
$R_{\theta JA}$	Junction-to-Ambient	---	62	

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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	60	---	---	V	V_{GS} = 0V, I_D = 250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	---	0.064	---	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	---	---	12	mΩ	V_{GS} = 10V, I_D = 50A ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	---	4.0	V	V_{DS} = V_{GS}, I_D = 250μA
gfs	Forward Trans conductance	69	---	---	S	V_{DS} = 25V, I_D = 50A④
I_{DSS}	Drain-to-Source Leakage Current	---	---	25	μA	V_{DS} = 60V, V_{GS} = 0V
		---	---	250		V_{DS} = 48V,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	---	---	130	nC	I_D = 50A
Q_{gs}	Gate-to-Source Charge	---	---	28		V_{DS} = 48V
Q_{gd}	Gate-to-Drain Charge	---	---	44		V_{GS} = 10V, See Fig.6 and 13 ④
$t_{d(on)}$	Turn-On Delay Time	---	12	---	ns	V_{DD} = 30V
t_r	Rise Time	---	78	---		I_D = 50A
$t_{d(off)}$	Turn-Off Delay Time	---	48	---		R_G= 3.6Ω
t_f	Fall Time	---	53	---		V_{GS} = 10V, See Fig.10④
L_D	Internal Drain Inductance	---	4.5	---	nH	Between lead, 6mm (0.25in.) from package and center of die contact
L_S	Internal Source Inductance	---	7.5	---		
C_{iss}	Input Capacitance	---	3210	---	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	---	690	---		V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	---	140	---		f = 1.0MHz, See Fig.5
E_{AS}	Single Pulse Avalanche Energy②		1180⑤	320⑥		I_{AS} = 50A, L=260μH

二极管特性

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	---	---	84⑦	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	---	---	330		
V_{SD}	Diode Forward Voltage	---	---	1.3	V	T_J = 25°C,I_S = 50A,V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	---	73	110	ns	T_J = 25°C ,I_F = 50A
Q_{rr}	Reverse Recovery Charge	---	220	330	nC	di/dt = 100A/μs ④

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 = 260μH, R_G = 25Ω, I_{AS} = 50A, V_{GS} =10V.(见图. 12).

③ I_{SD} ≤ 50A, di/dt ≤ 230A/μs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 175°C.

⑤ 脉冲宽度 ≤ 400μs; 占空比 ≤ 2%。

⑤ 这是器件损坏时的典型值，表示超出额定限制的操作。

⑥ 这是一个计算值，限制在 T_J = 175°C 的条件下。

⑨ 根据最大允许结温计算连续电流。封装限制电流为 75A。

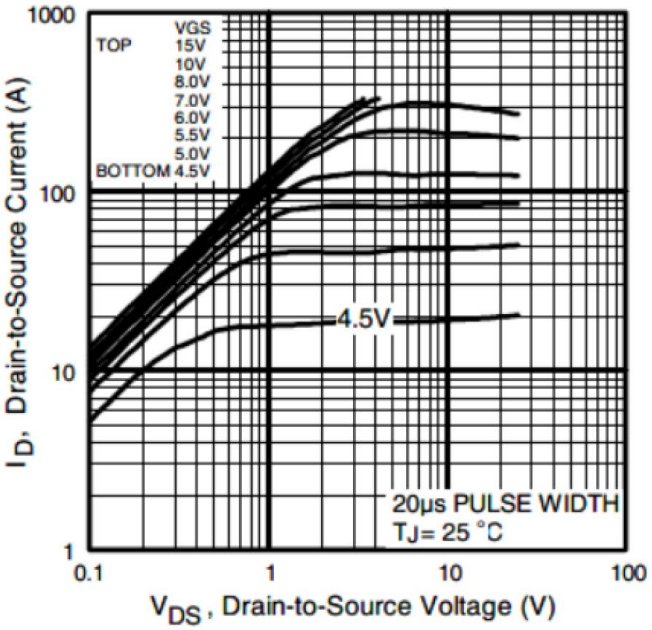


Fig. 1 Typical Output Characteristics

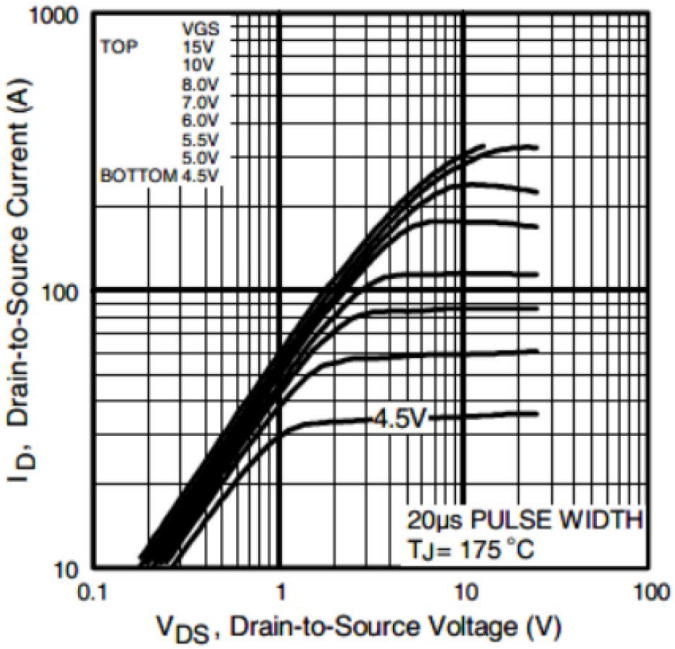


Fig. 2 Typical Output Characteristics

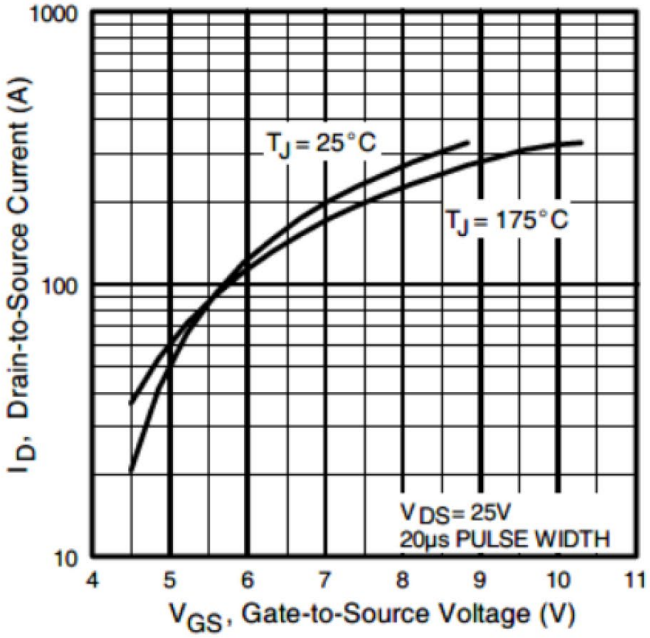


Fig. 3 Typical Transfer Characteristics

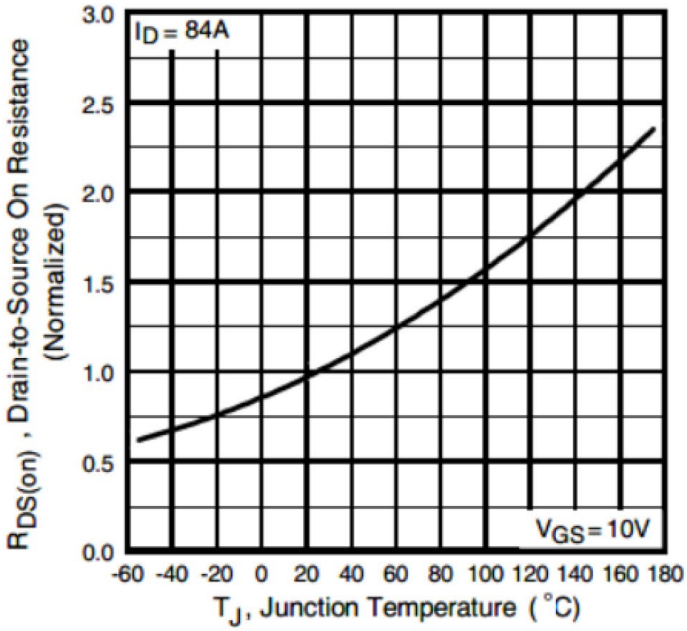


Fig. 4 Normalized On-Resistance vs. Temperature

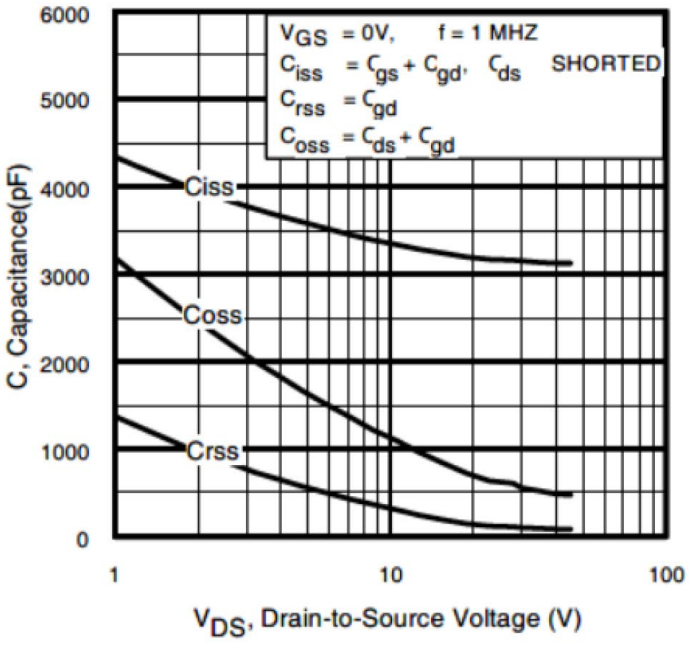


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

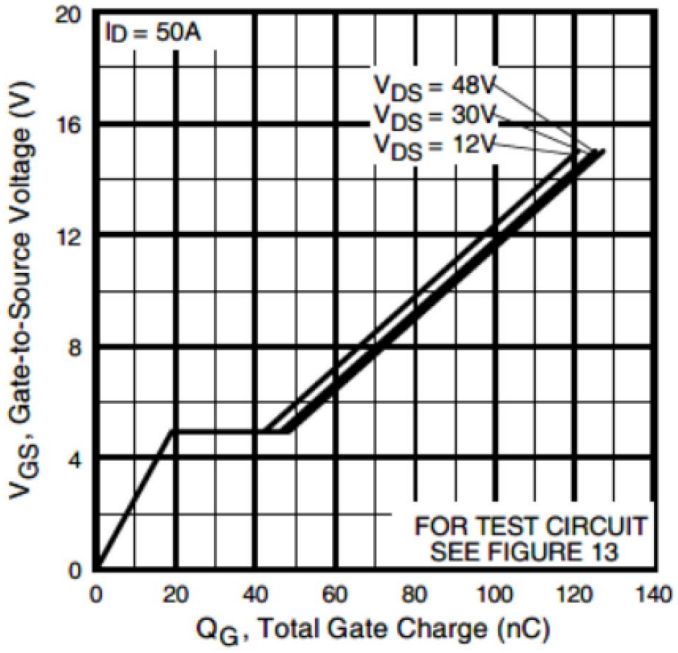


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

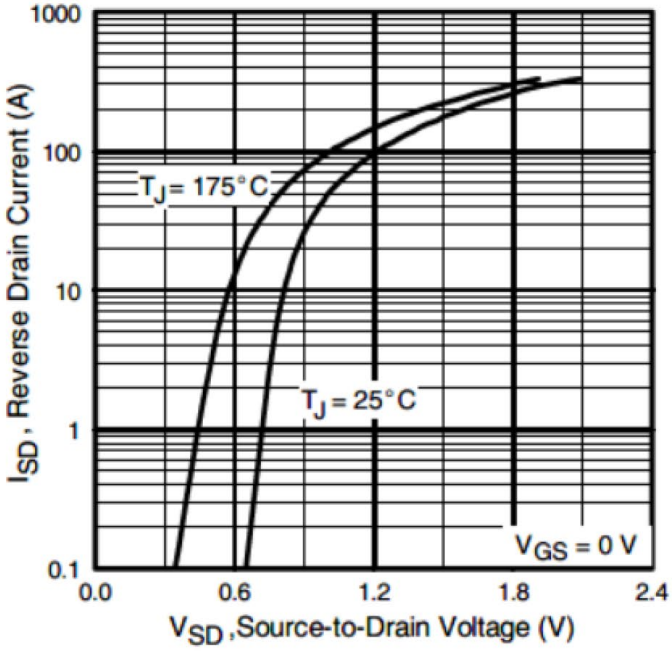


Fig. 7 Typical Source-to-Drain Diode Forward Voltage

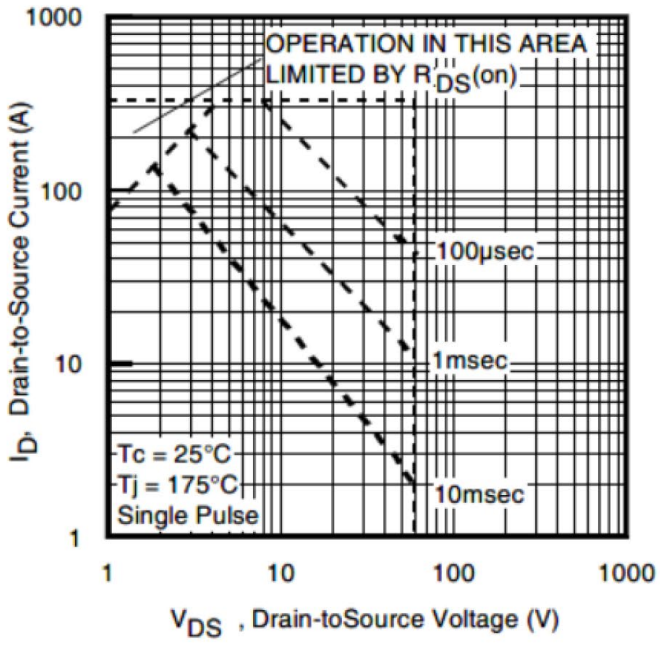


Fig 8. Maximum Safe Operating Area

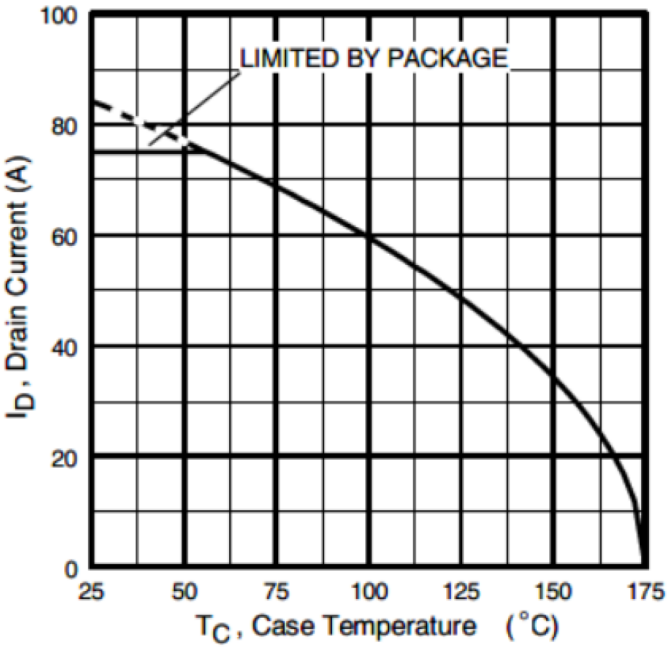


Fig 9. Maximum Drain Current vs. Case Temperature

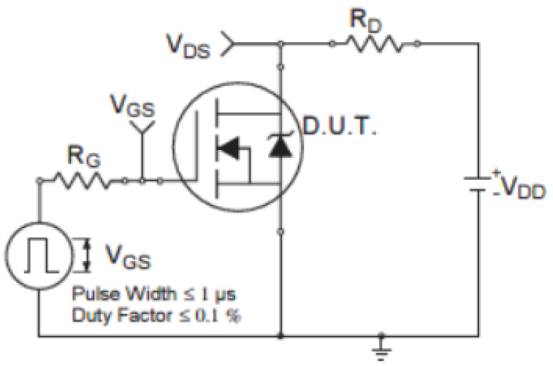


Fig 10a. Switching Time Test Circuit

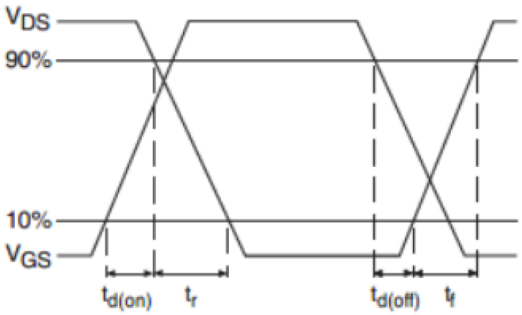


Fig 10a. Switching Time Waveforms

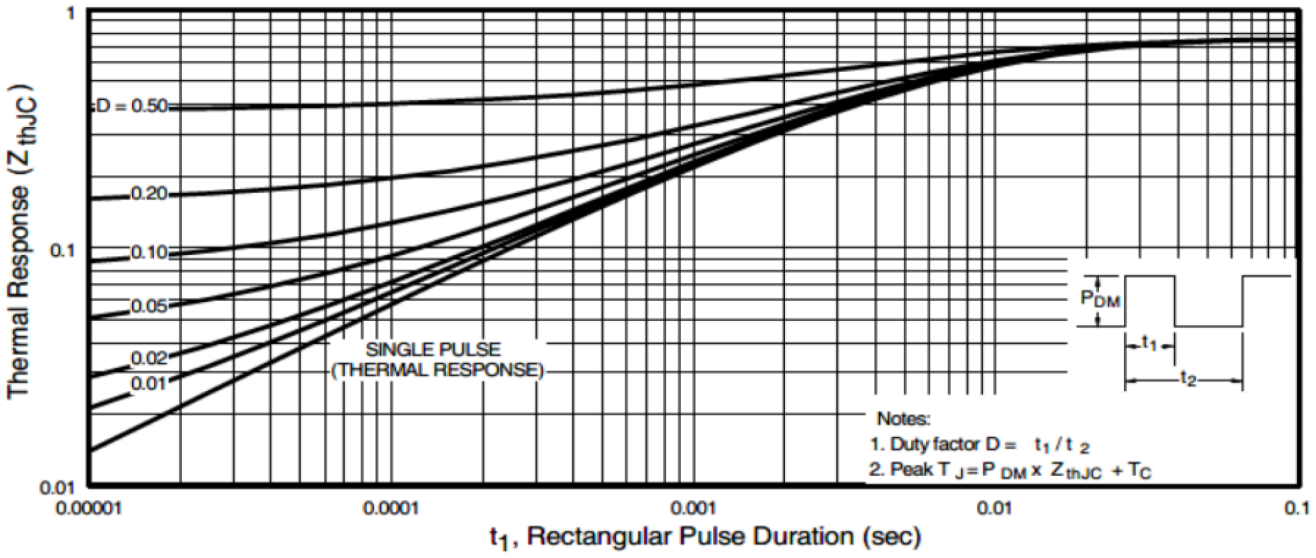


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

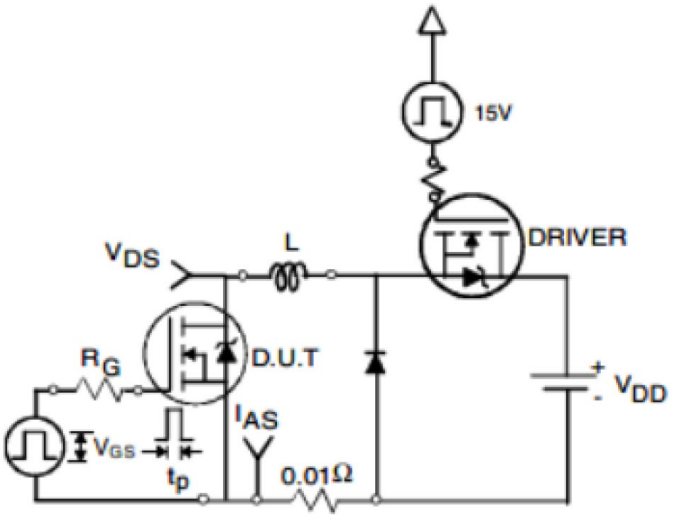


Fig. 12a. Unclamped Inductive Test Circuit

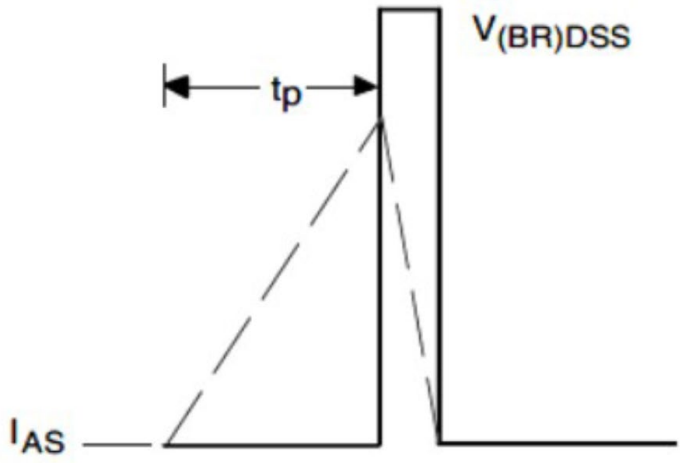


Fig. 12b. Unclamped Inductive Waveforms

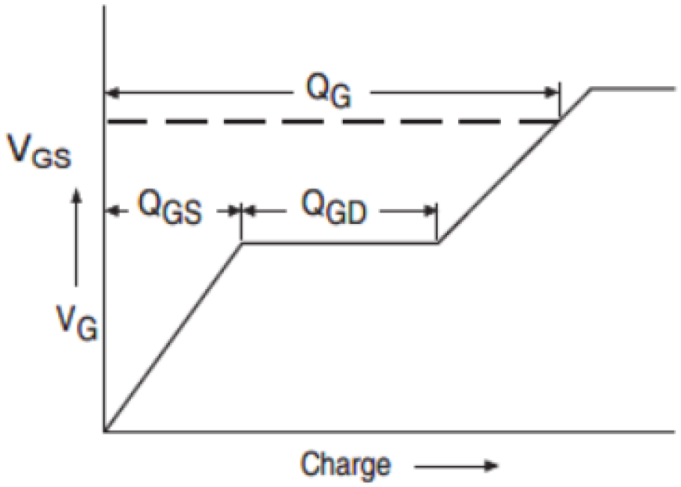


Fig 13a. Basic Gate Charge Waveform

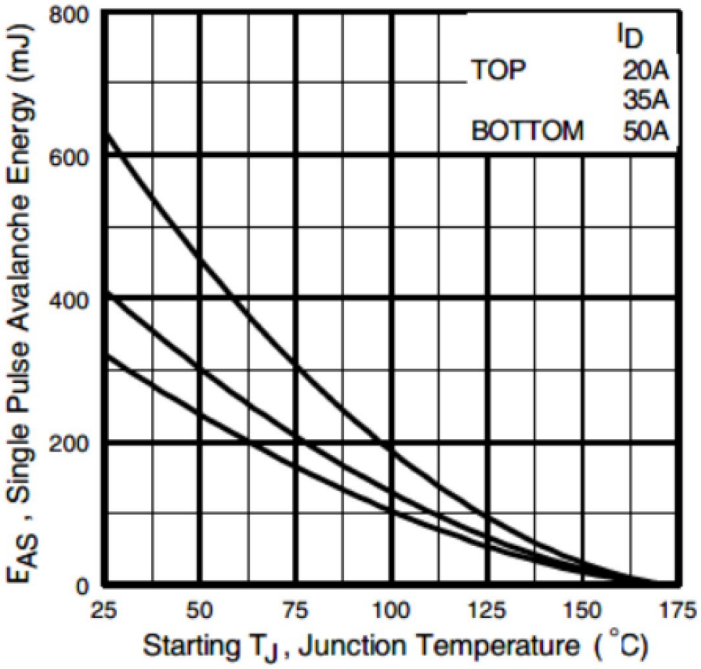


Fig 12c. Maximum Avalanche Energy vs. Drain Current

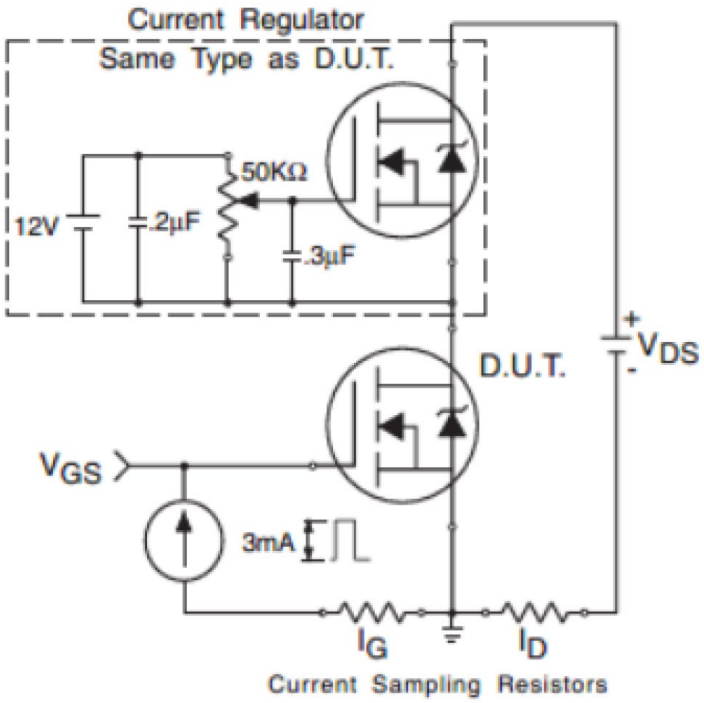


Fig 13b. Gate Charge Test Circuit

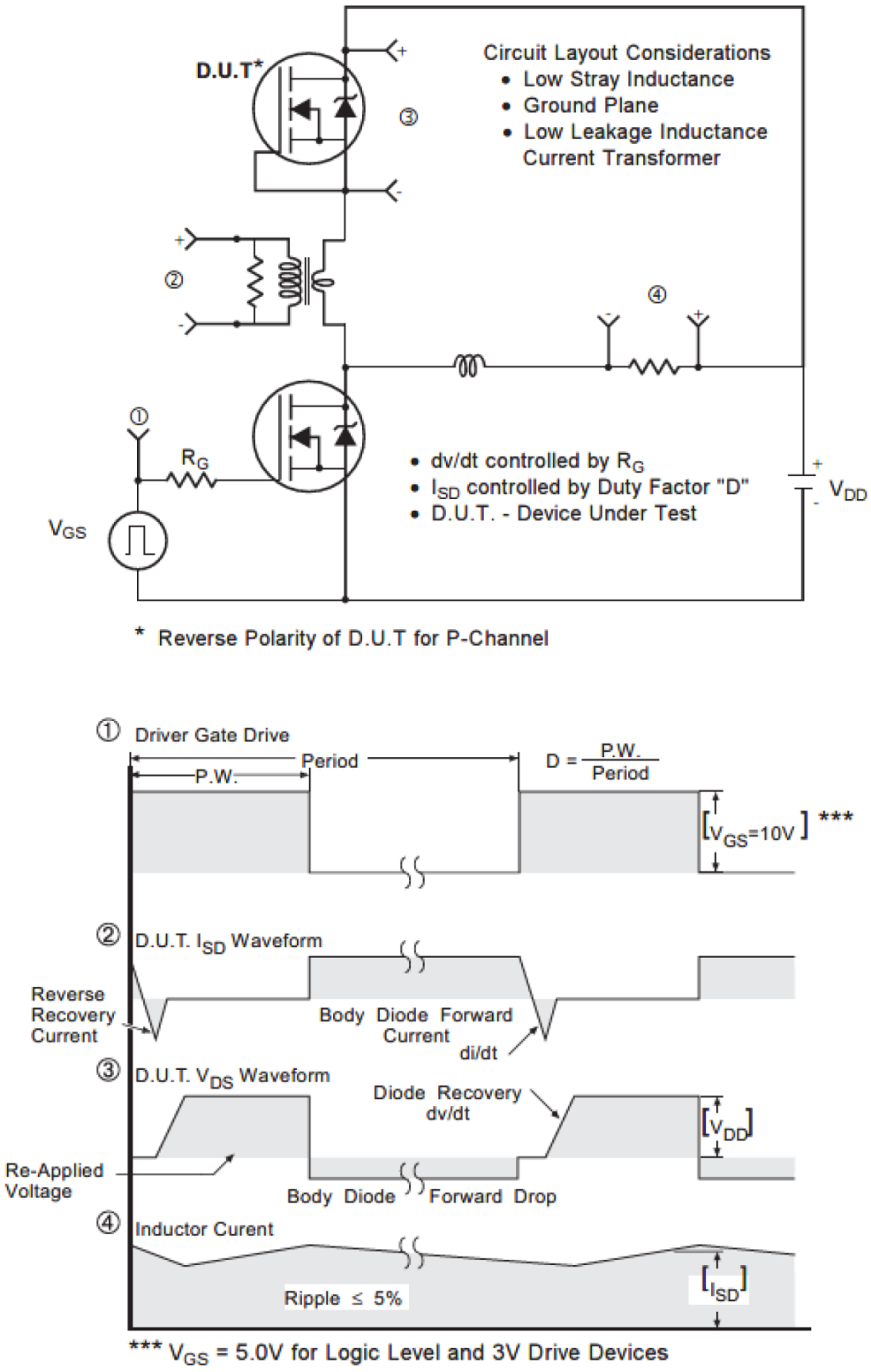
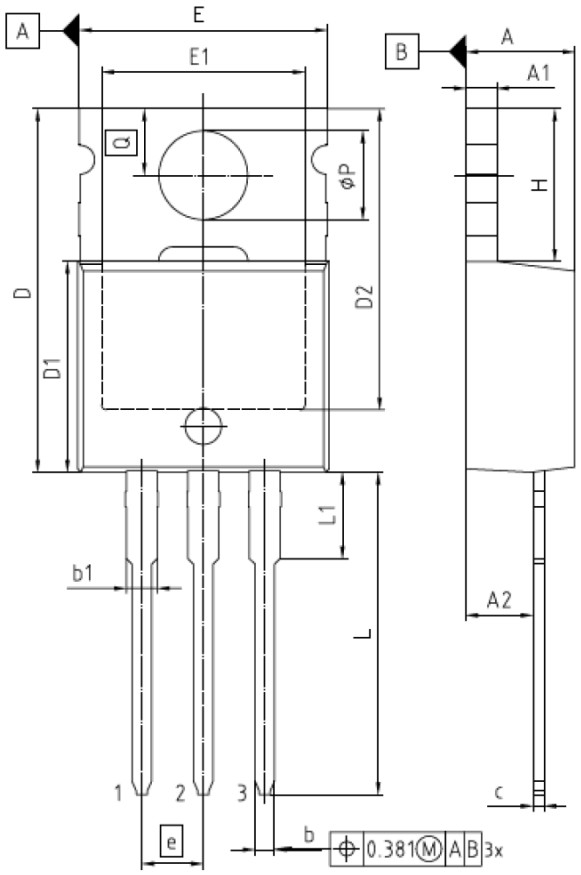


Fig 14. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

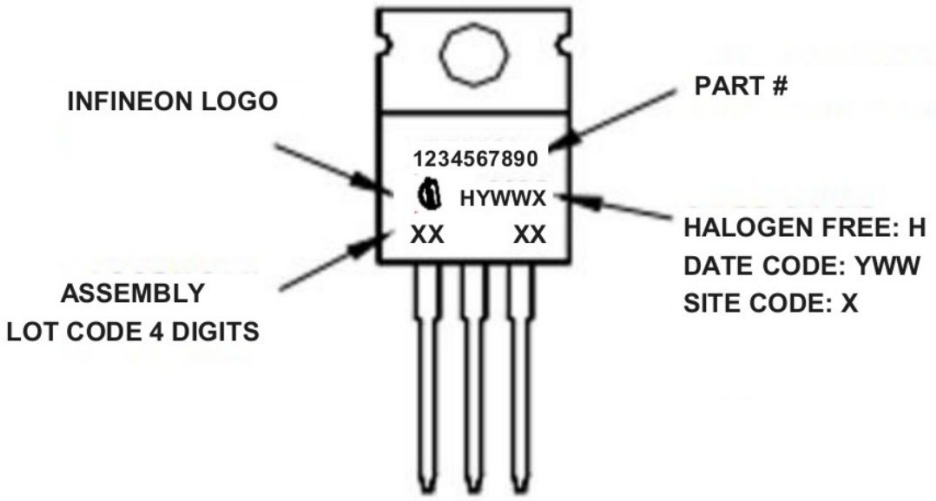
TO-220 封装外形（尺寸以毫米（英寸）为单位）



NOTES:
DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSION OR GATE BURRS
GATE BURRS ARE LESS THAN 0.5 mm

PACKAGE - GROUP NUMBER:	PG-TO220-3-U05	
DIMENSIONS	MILLIMETERS	
	MIN.	MAX.
A	3.56	4.83
A1	1.14	1.40
A2	2.03	2.92
b	0.38	1.01
b1	1.14	1.78
c	0.36	0.61
D	14.22	16.51
D1	8.38	9.20
D2	11.68	12.88
E	9.65	10.67
E1	6.86	8.89
e	2.54	
N	3	
H	5.84	6.86
L	12.70	14.73
L1	3.56	4.06
øP	3.54	4.08
Q	2.54	3.42

TO-220 Part Marking Information



TO-220 packages are not recommended for Surface Mount Application.

修订记录

Date	Rev.	Comments
2026-07-17	2.1	• Update datasheet to Infineon format • Updated Package Outline and Part marking –page 8 • Added disclaimer on last page.

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版本 **2026-11-04**

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