

IRFF9130 (JANS2N6849)

PD-90550H

Repetitive Avalanche and dv/dt Rated Power MOSFET Thru-Hole (TO-205AF / TO-39) -100V, -6.5A, P-channel

Features

- Repetitive avalanche ratings
- Dynamic dv/dt rating
- Hermetically sealed
- Simple drive requirements
- ESD rating: Class 1C per MIL-STD-750, Method 1020

Potential Applications

- DC-DC converter
- Motor drives

Product Validation

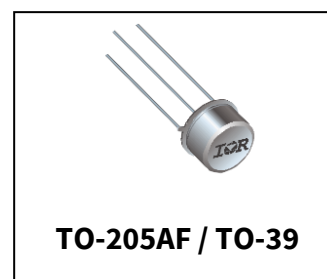
Qualified to JANS screening flow according to MIL-PRF-19500 for space applications

Description

HEXFET POWER MOSFET technology is the key to IR HiRel's advanced line of power MOSFET transistors. The efficient geometry and unique processing of this latest "State of the Art" design achieves: very low on-state resistance combined with high transconductance. The HEXFET transistors also feature all of the well-established advantages of MOSFETs such as voltage control, very fast switching and temperature stability of the electrical parameters. They are well suited for applications such as switching power supplies, motor controls, inverters, choppers, audio amplifiers and high energy pulse circuits.

Product Summary

- BV_{DSS} : -100V
- I_D : -6.5A
- $R_{DS(on),max}$: 0.30 Ω
- Q_G, max : 34.8nC
- REF: MIL-PRF-19500/564



Ordering Information

Table 1 Ordering options

Part number	Package	Screening Level
IRFF9130	TO-205AF / TO-39	COTS
JANS2N6849	TO-205AF / TO-39	JANS
JANTX2N6849	TO-205AF / TO-39	JANTX
JANTXV2N6849	TO-205AF / TO-39	JANTXV

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Absolute Maximum Ratings

1 Absolute Maximum Ratings

Table 2 Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
$I_{D1} @ V_{GS} = -10V, T_C = 25^\circ C$	Continuous Drain Current	-6.5	A
$I_{D2} @ V_{GS} = -10V, T_C = 100^\circ C$	Continuous Drain Current	-4.1	A
$I_{DM} @ T_C = 25^\circ C$	Pulsed Drain Current ¹	-25	A
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	25	W
	Linear Derating Factor	0.20	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy ²	92	mJ
I_{AR}	Avalanche Current ¹	-6.5	A
E_{AR}	Repetitive Avalanche Energy ¹	2.5	mJ
dv/dt	Peak Diode Reverse Recovery ³	-5.5	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C
	Lead Temperature	300 (0.063 in. (1.6mm) from case for 10s)	
	Weight	0.98 (Typical)	

¹ Repetitive Rating; Pulse width limited by maximum junction temperature.

² $V_{DD} = -25V$, starting $T_J = 25^\circ C$, , Peak $I_L = -6.5A$, $V_{GS} = -10V$

³ $I_{SD} \leq -6.5A$, $di/dt \leq -140A/\mu s$, $V_{DD} \leq -100V$, $T_J \leq 150^\circ C$

Device Characteristics

2 Device Characteristics

2.1 Electrical Characteristics

Table 3 Static and Dynamic Electrical Characteristics @ T_j = 25°C (Unless Otherwise Specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV _{DSS}	Drain-to-Source Breakdown Voltage	-100	—	—	V	V _{GS} = 0V, I _D = -1.0mA
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temp. Coefficient	—	-0.10	—	V/°C	Reference to 25°C, I _D = -1.0mA
R _{DS(on)}	Static Drain-to-Source On-State Resistance	—	—	0.30	Ω	V _{GS} = -10 V, I _{D2} = -4.1A ¹
		—	—	0.32		V _{GS} = -10V, I _{D1} = -6.5A ¹
V _{GS(th)}	Gate Threshold Voltage	-2.0	—	-4.0	V	V _{DS} = V _{GS} , I _D = -250μA
I _{DSS}	Zero Gate Voltage Drain Current	—	—	-25	μA	V _{DS} = -80V, V _{GS} = 0V
		—	—	-250		V _{DS} = -80V, V _{GS} = 0V, T _J = 125°C
I _{GSS}	Gate-to-Source Leakage Forward	—	—	-100	nA	V _{GS} = -20V
	Gate-to-Source Leakage Reverse	—	—	100		V _{GS} = 20V
Q _G	Total Gate Charge	14.7	—	34.8	nC	I _{D1} = -6.5A
Q _{GS}	Gate-to-Source Charge	1.0	—	6.8		V _{DS} = -50V
Q _{GD}	Gate-to-Drain ('Miller') Charge	2.0	—	23.1		V _{GS} = -10V
t _{d(on)}	Turn-On Delay Time	—	—	60	ns	I _{D1} = -6.5A **
t _r	Rise Time	—	—	140		V _{DD} = -40V
t _{d(off)}	Turn-Off Delay Time	—	—	140		R _G = 7.5Ω
t _f	Fall Time	—	—	140		V _{GS} = -10V
L _s + L _D	Total Inductance	—	7.0	—	nH	Measured from Drain lead (6mm / 0.25 in from package) to Source lead (6mm/ 0.25 in from package) with Source wire internally bonded from Source pin to Drain pin
C _{iss}	Input Capacitance	—	800	—	pF	V _{GS} = 0V
C _{oss}	Output Capacitance	—	350	—		V _{DS} = -25V
C _{rss}	Reverse Transfer Capacitance	—	125	—		f = 1.0MHz

** Switching speed maximum limits are based on manufacturing test equipment and capability.

¹ Pulse width ≤ 300 μs; Duty Cycle ≤ 2%

Device Characteristics

2.2 Source-Drain Diode Ratings and Characteristics

Table 4 Source-Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-6.5	A	
I_{SM}	Pulsed Source Current (Body Diode) ¹	—	—	-25	A	
V_{SD}	Diode Forward Voltage	—	—	-4.3	V	$T_J = 25^\circ\text{C}$, $I_S = -6.5\text{A}$, $V_{GS} = 0\text{V}$ ²
t_{rr}	Reverse Recovery Time	—	—	250	ns	$T_J = 25^\circ\text{C}$, $I_F = -6.5\text{A}$, $V_{DD} \leq -50\text{V}$ $di/dt = -100\text{A}/\mu\text{s}$
Q_{rr}	Reverse Recovery Charge	—	2.0	—	μC	
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

2.3 Thermal Characteristics

Table 5 Thermal Resistance

Symbol	Parameter	Min.	Typ.	Max.	Unit
$R_{\theta JC}$	Junction-to-Case	—	—	5.0	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Junction-to-Ambient (Typical socket mount)	—	—	175	

¹ Repetitive Rating; Pulse width limited by maximum junction temperature.² Pulse width $\leq 300 \mu\text{s}$; Duty Cycle $\leq 2\%$

Electrical Characteristics Curves

3 Electrical Characteristics Curves

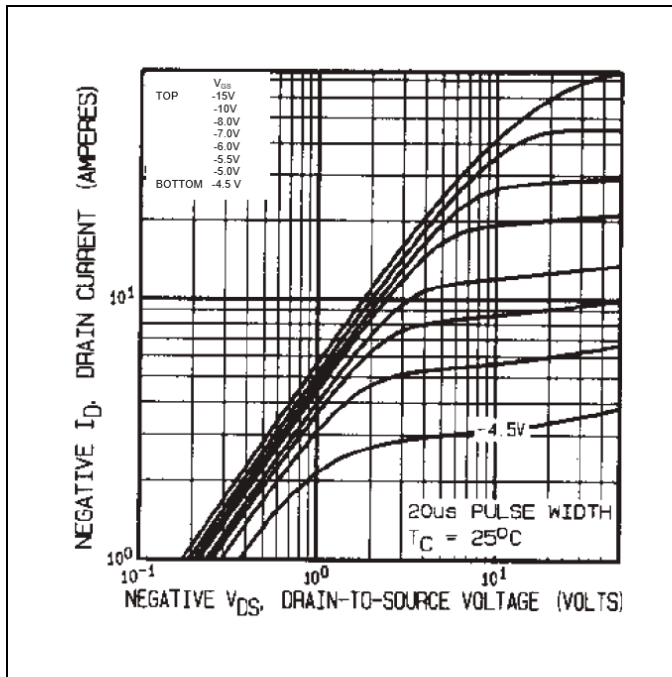


Figure 1 Typical Output Characteristics

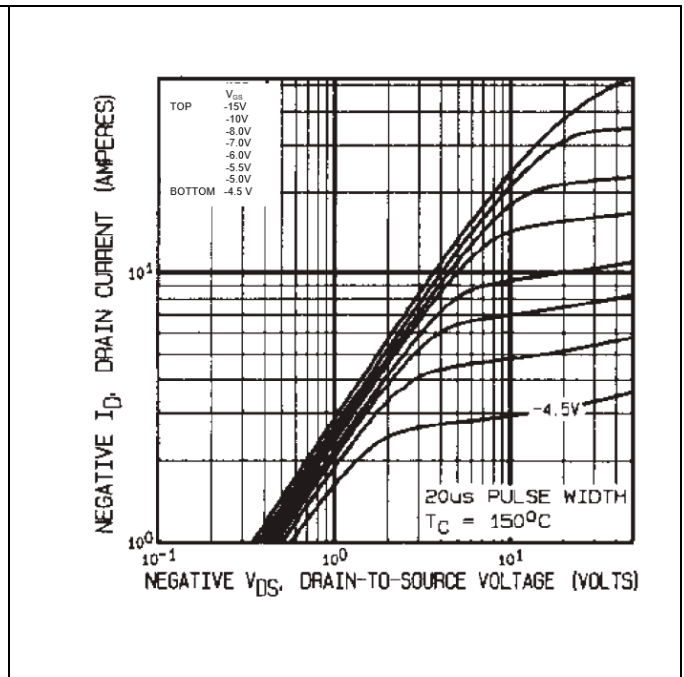


Figure 2 Typical Output Characteristics

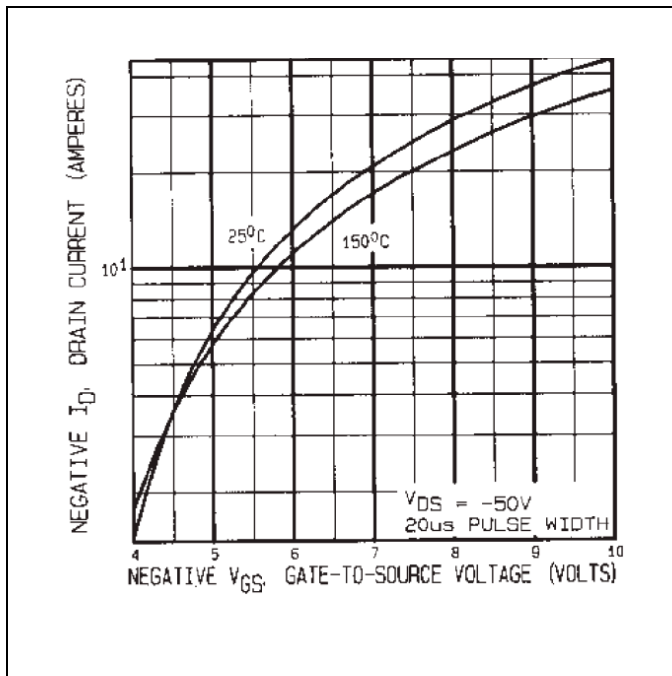


Figure 3 Typical Transfer Characteristics

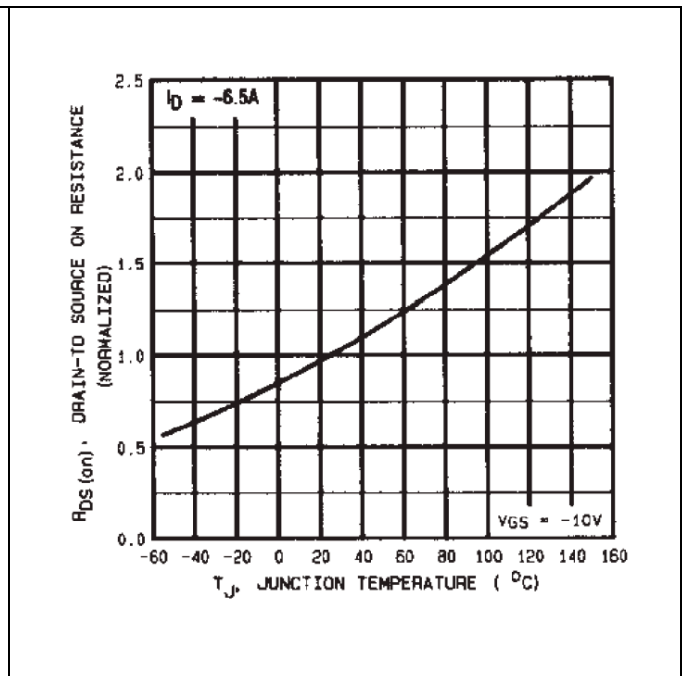


Figure 4 Normalized On-Resistance Vs. Temperature

IRFF9130 (JANS2N6849)
Power MOSFET Thru-Hole (TO-205AF / TO-39)

Electrical Characteristics Curves

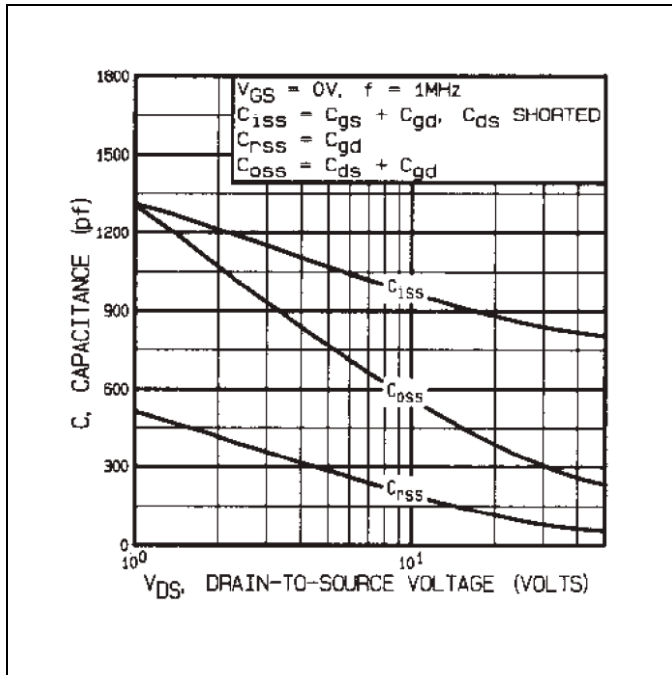


Figure 5 Typical Capacitance vs. Drain-to-Source Voltage

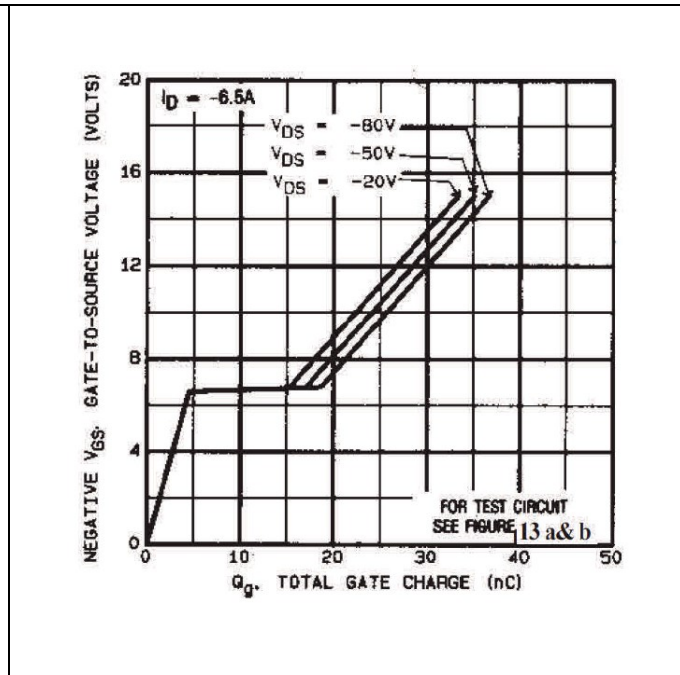


Figure 6 Typical Gate Charge vs. Gate-to-Source Voltage

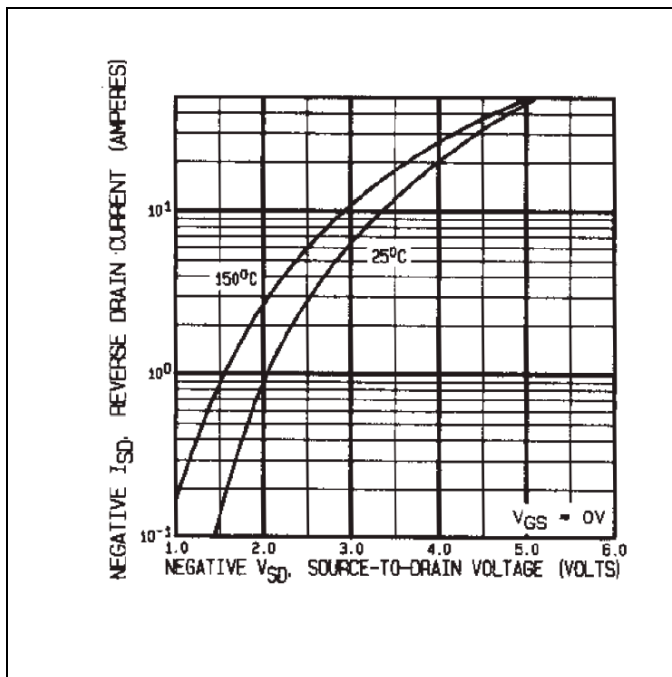


Figure 7 Typical Source-Drain Diode Forward Voltage

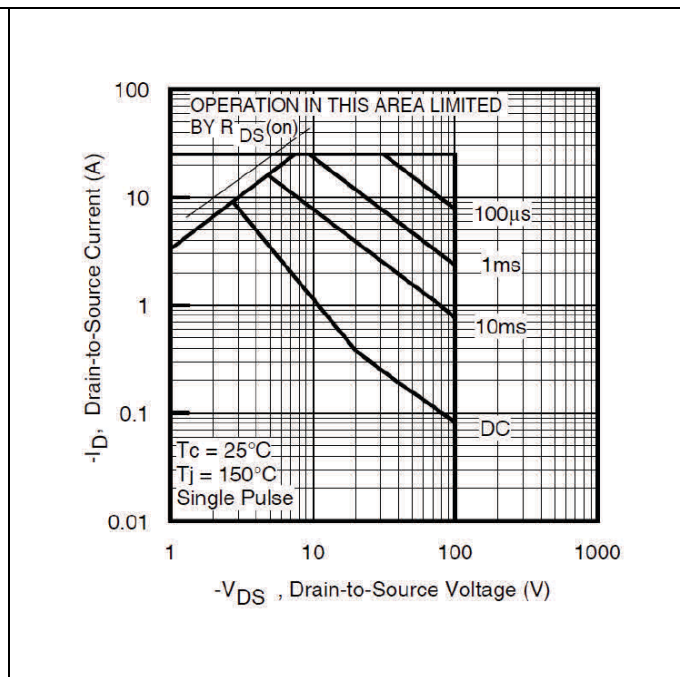


Figure 8 Maximum Safe Operating Area

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Electrical Characteristics Curves

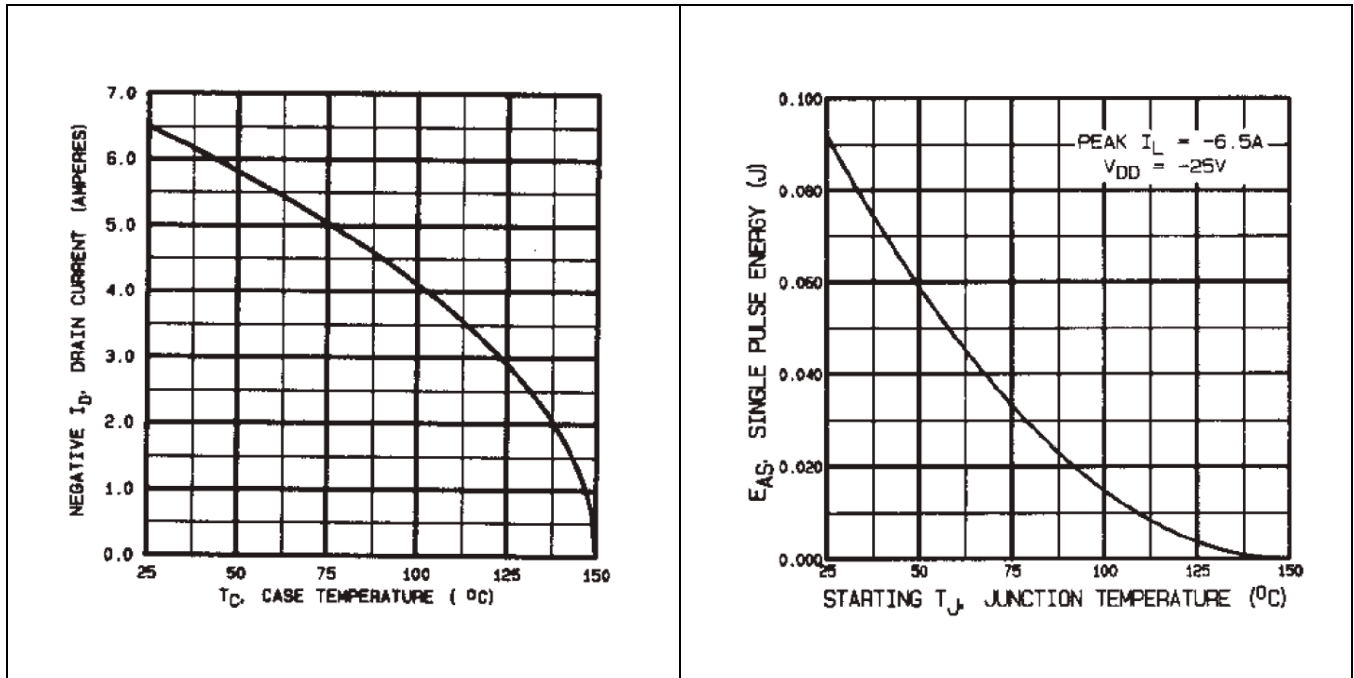


Figure 9 Maximum Drain Current Vs. Case Temperature

Figure 10 Maximum Avalanche Energy Vs. Junction Temperature

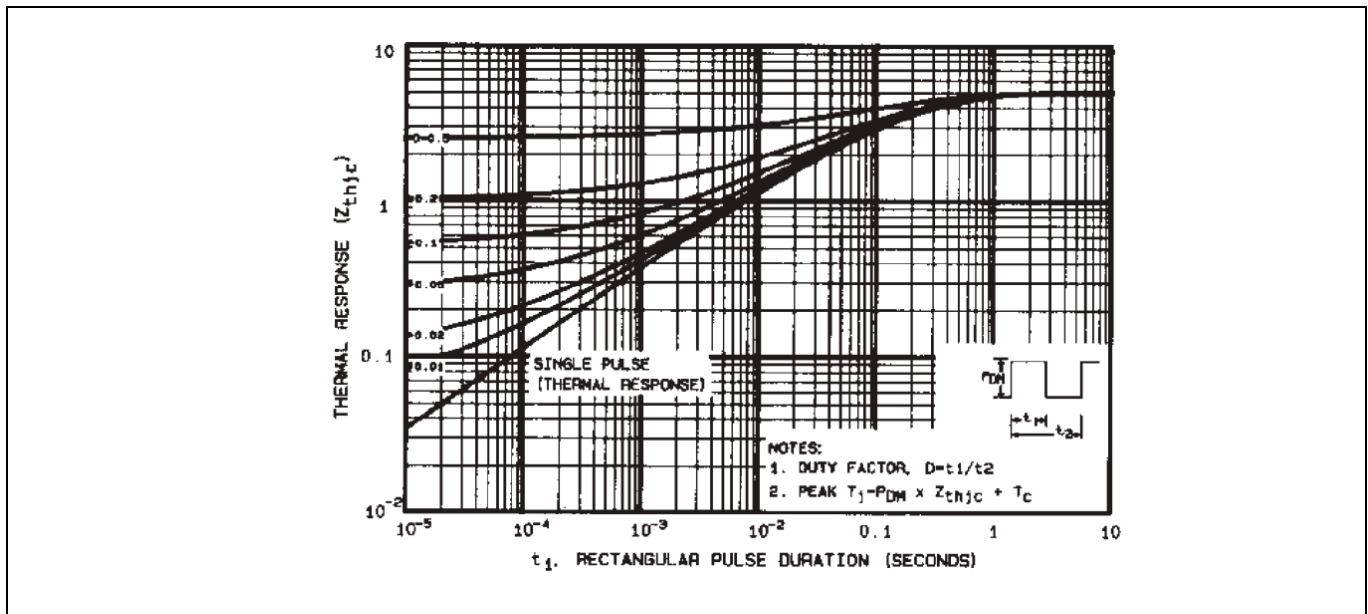


Figure 11 Maximum Effective Transient Thermal Impedance, Junction-to-Case

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Test Circuits

4 Test Circuits

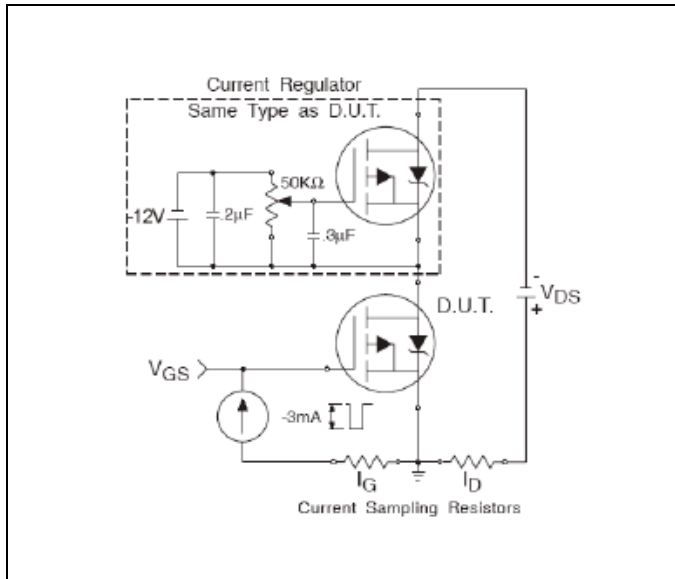


Figure 12 Gate Charge Test Circuit

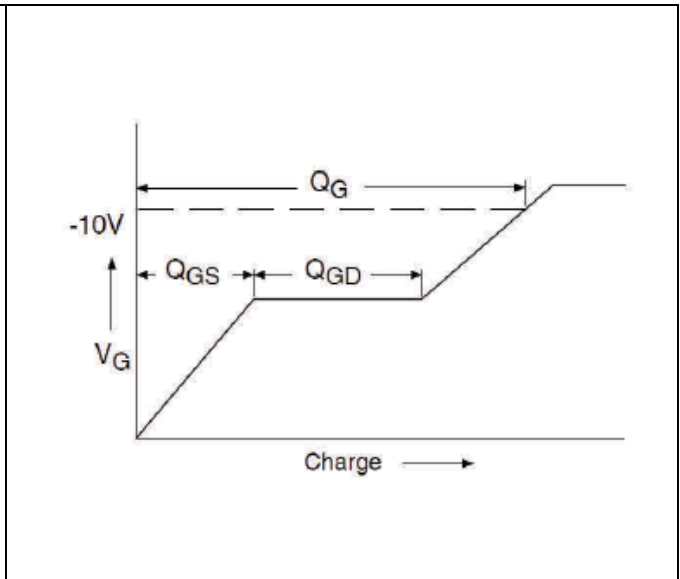


Figure 13 Gate Charge Waveform

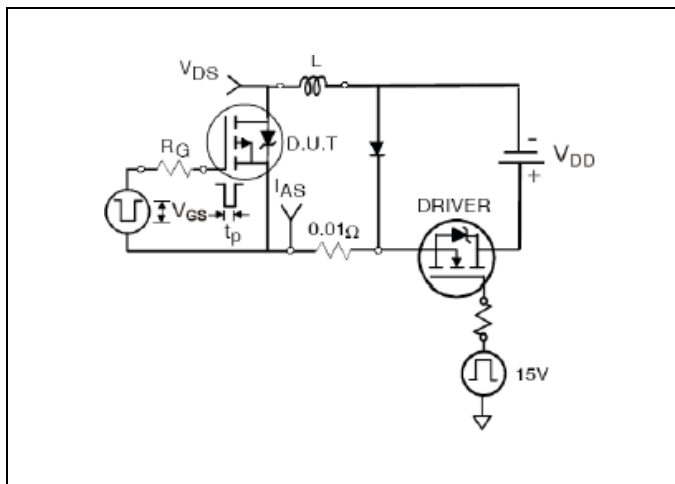


Figure 14 Unclamped Inductive Test Circuit

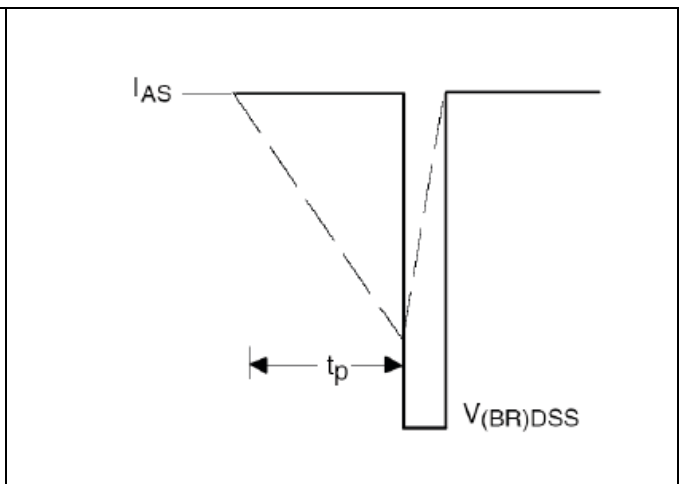


Figure 15 Unclamped Inductive Waveform

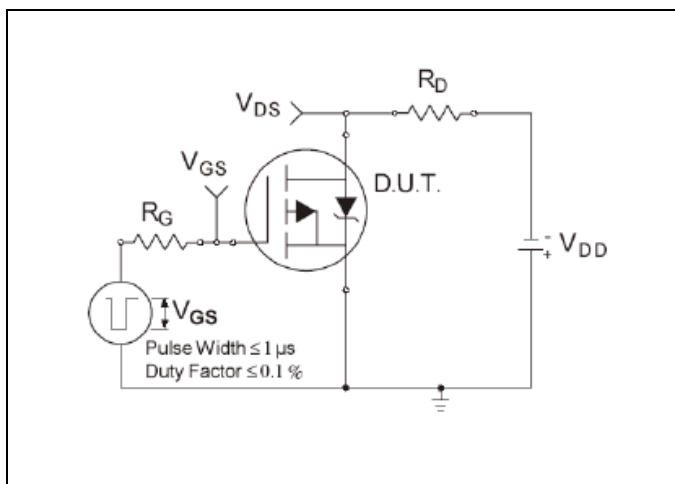


Figure 16 Switching Time Test Circuit

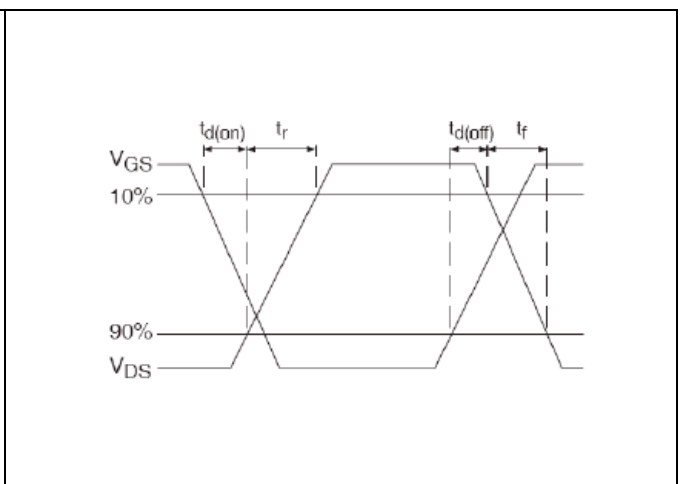


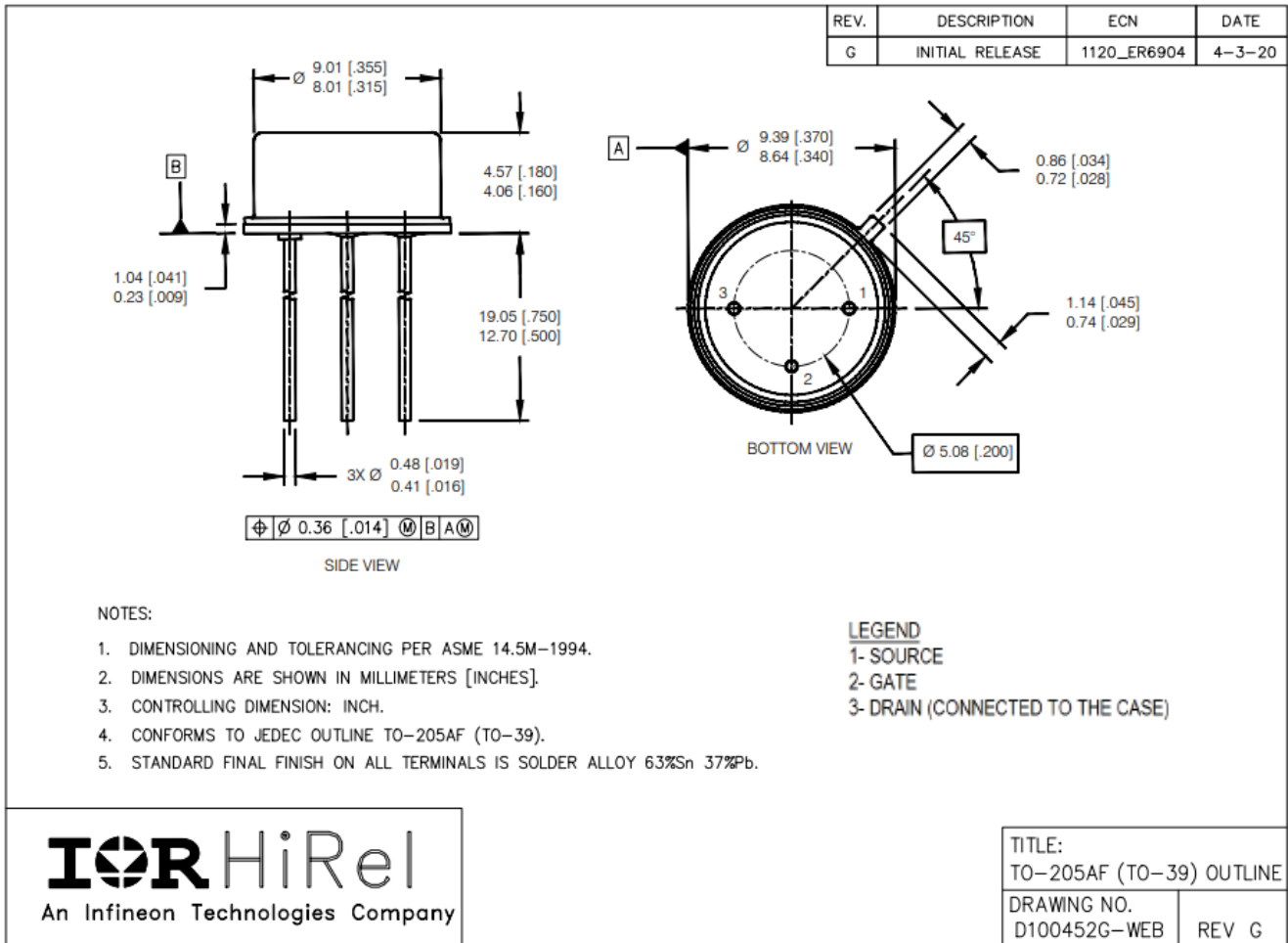
Figure 17 Switching Time Waveforms

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Power MOSFET Thru-Hole (TO-205AF / TO-39)

Package Outline

5 Package Outline

Note: For the most updated package outline, please see the website: [TO-205AF / TO-39](http://www.infineon.com/products/power/mosfet/to-205af-to-39)



Revision history**Revision history**

Document version	Date of release	Description of changes
	01/26/2001	Datasheet (PD-90550C)
Rev D	04/20/2001	Added switch time test condition $V_{GS} = -10V$
Rev E	07/28/2015	Updated based on ECN-1120_03204
Rev F	11/20/2018	Updated based on ECN-1120_06256
Rev G	02/16/2019	Updated based on ECN-1120_06822
Rev H	12/06/2024	Updated based on ECN-1120_10116

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