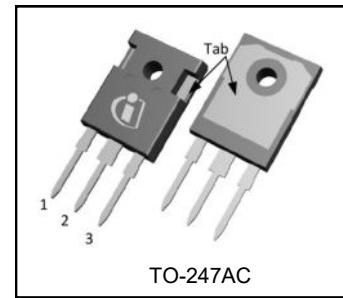
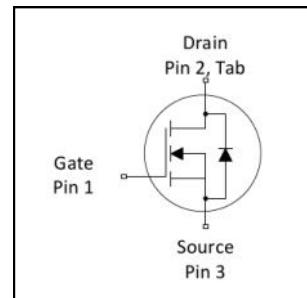


<b>V<sub>(BR)DSS</sub></b>	<b>55V</b>
<b>R<sub>DS(on)</sub> max.</b>	<b>0.008Ω</b>
<b>I<sub>D</sub></b>	<b>110A⑥</b>



<b>G</b>	<b>D</b>	<b>S</b>
Gate	Drain	Source

## Features

- Advanced Process Technology
- Ultra Low On-Resistance
- Dynamic dv/dt Rating
- 175°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated
- Lead-Free

## Description

Fifth Generation HEXFET Power MOSFETs utilizes advanced processing techniques to achieve extremely low on-resistance per silicon area. This benefit combined with the fast switching speed and ruggedized device design that HEXFET power MOSFETs are well known for, provides the designer with an extremely efficient and reliable device for use in a wide variety of other applications.

The TO-247AC package is preferred for commercial-industrial applications where higher power levels preclude the use of TO-220 devices. The TO-247AC is similar but superior to the earlier TO-218 package because of its isolated mounting hole.

<b>Base part number</b>	<b>Package Type</b>	<b>Standard Pack</b>		<b>Orderable Part Number</b>
		<b>Form</b>	<b>Quantity</b>	
IRFP064NPbF	TO-247AC	Tube	25	IRFP064NPbF

<b>Symbol</b>	<b>Parameter</b>	<b>Max.</b>	<b>Units</b>
I <sub>D</sub> @ T <sub>C</sub> = 25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V	110⑥	A
I <sub>D</sub> @ T <sub>C</sub> = 100°C	Continuous Drain Current, V <sub>GS</sub> @ 10V	80⑥	
I <sub>DM</sub>	Pulsed Drain Current ①⑤	390	
P <sub>D</sub> @ T <sub>C</sub> = 25°C	Maximum Power Dissipation	200	W
	Linear Derating Factor	1.3	W/°C
V <sub>GS</sub>	Gate-to-Source Voltage	± 20	V
E <sub>AS</sub>	Single Pulse Avalanche Energy ②⑤	480	mJ
I <sub>AR</sub>	Avalanche Current ①	59	A
E <sub>AR</sub>	Repetitive Avalanche Energy ①	20	mJ
dv/dt	Peak Diode Recovery dv/dt③⑤	5.0	V/ns
T <sub>J</sub>	Operating Junction and	-55 to + 175	°C
T <sub>STG</sub>	Storage Temperature Range		
	Soldering Temperature, for 10 seconds (1.6mm from case)		
	Mounting torque, 6-32 or M3 screw	10 lbf·in (1.1N·m)	

## Thermal Resistance

<b>Symbol</b>	<b>Parameter</b>	<b>Typ.</b>	<b>Max.</b>	<b>Units</b>
R <sub>θJC</sub>	Junction-to-Case	—	0.75	°C/W
R <sub>θCS</sub>	Case-to-Sink, Flat, Greased Surface	0.24	—	
R <sub>θJA</sub>	Junction-to-Ambient	—	40	

Static @  $T_J = 25^\circ\text{C}$  (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(\text{BR})\text{DSS}}$	Drain-to-Source Breakdown Voltage	55	—	—	V	$V_{\text{GS}} = 0\text{V}$ , $I_D = 250\mu\text{A}$
$\Delta V_{(\text{BR})\text{DSS}}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.057	—	V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}$ , $I_D = 1\text{mA}$
$R_{\text{DS}(\text{on})}$	Static Drain-to-Source On-Resistance	—	—	0.008	$\Omega$	$V_{\text{GS}} = 10\text{V}$ , $I_D = 59\text{A}$ ④
$V_{\text{GS}(\text{th})}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{\text{DS}} = V_{\text{GS}}$ , $I_D = 250\mu\text{A}$
$g_{\text{fs}}$	Forward Trans conductance	42	—	—	S	$V_{\text{DS}} = 25\text{V}$ , $I_D = 59\text{A}$ ⑤
$I_{\text{DSS}}$	Drain-to-Source Leakage Current	—	—	25	$\mu\text{A}$	$V_{\text{DS}} = 55\text{V}$ , $V_{\text{GS}} = 0\text{V}$
		—	—	250		$V_{\text{DS}} = 44\text{V}$ , $V_{\text{GS}} = 0\text{V}$ , $T_J = 150^\circ\text{C}$
$I_{\text{GSS}}$	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{\text{GS}} = 20\text{V}$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{\text{GS}} = -20\text{V}$

Dynamic Electrical Characteristics @  $T_J = 25^\circ\text{C}$  (unless otherwise specified)

$Q_g$	Total Gate Charge	—	—	170	nC	$I_D = 59\text{A}$ $V_{\text{DS}} = 44\text{V}$ $V_{\text{GS}} = 10\text{V}$ , See Fig.6 and 13 ④⑤
$Q_{\text{gs}}$	Gate-to-Source Charge	—	—	32		
$Q_{\text{gd}}$	Gate-to-Drain Charge	—	—	74		
$t_{\text{d}(\text{on})}$	Turn-On Delay Time	—	14	—	ns	$V_{\text{DD}} = 28\text{V}$ $I_D = 59\text{A}$ $R_G = 2.5\Omega$ $R_D = 0.39\Omega$ , See Fig.10 ④⑤
$t_r$	Rise Time	—	100	—		
$t_{\text{d}(\text{off})}$	Turn-Off Delay Time	—	43	—		
$t_f$	Fall Time	—	70	—		
$L_D$	Internal Drain Inductance	—	5.0	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact
$L_S$	Internal Source Inductance	—	13	—		
$C_{\text{iss}}$	Input Capacitance	—	4000	—	pF	$V_{\text{GS}} = 0\text{V}$ $V_{\text{DS}} = 25\text{V}$
$C_{\text{oss}}$	Output Capacitance	—	1300	—		$f = 1.0\text{MHz}$ , See Fig.5 ⑤
$C_{\text{rss}}$	Reverse Transfer Capacitance	—	480	—		

## Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_s$	Continuous Source Current (Body Diode)	—	—	110⑤	A	MOSFET symbol showing the integral reverse p-n junction diode.
$I_{\text{SM}}$	Pulsed Source Current (Body Diode) ①	—	—	390		
$V_{\text{SD}}$	Diode Forward Voltage	—	—	1.3		$T_J = 25^\circ\text{C}$ , $I_s = 59\text{A}$ , $V_{\text{GS}} = 0\text{V}$ ④
$t_{\text{rr}}$	Reverse Recovery Time	—	110	170	ns	$T_J = 25^\circ\text{C}$ , $I_F = 59\text{A}$
$Q_{\text{rr}}$	Reverse Recovery Charge	—	450	680		$di/dt = 100\text{A}/\mu\text{s}$ ④⑤

## Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11).
- ②  $V_{\text{DD}} = 25\text{V}$ ,  $T_J = 25^\circ\text{C}$ ,  $L = 190\mu\text{H}$ ,  $R_G = 25\Omega$ ,  $I_{\text{AS}} = 59\text{A}$ . (See fig. 12).
- ③  $I_{\text{SD}} \leq 59\text{A}$ ,  $di/dt \leq 290\text{A}/\mu\text{s}$ ,  $V_{\text{DD}} \leq V_{(\text{BR})\text{DSS}}$ ,  $T_J \leq 175^\circ\text{C}$ .
- ④ Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .
- ⑤ Uses IRF3205 data and test conditions
- ⑥ Calculated continuous current based on maximum allowable junction temperature; for recommended current-handling of the package refer to Design Tip # 93-4

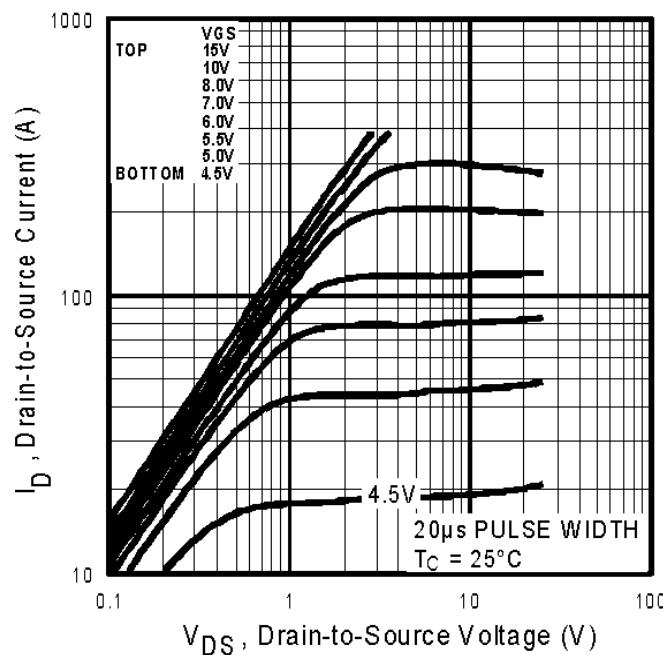


Fig. 1 Typical Output Characteristics

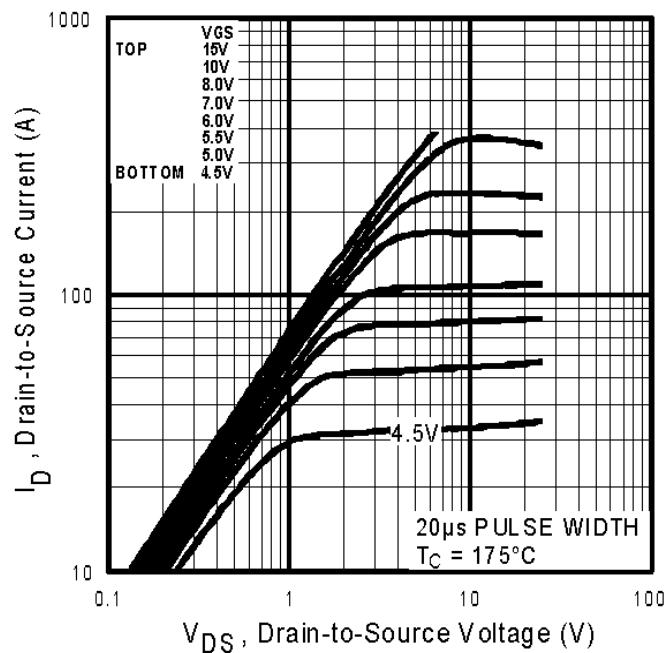


Fig. 2 Typical Output Characteristics

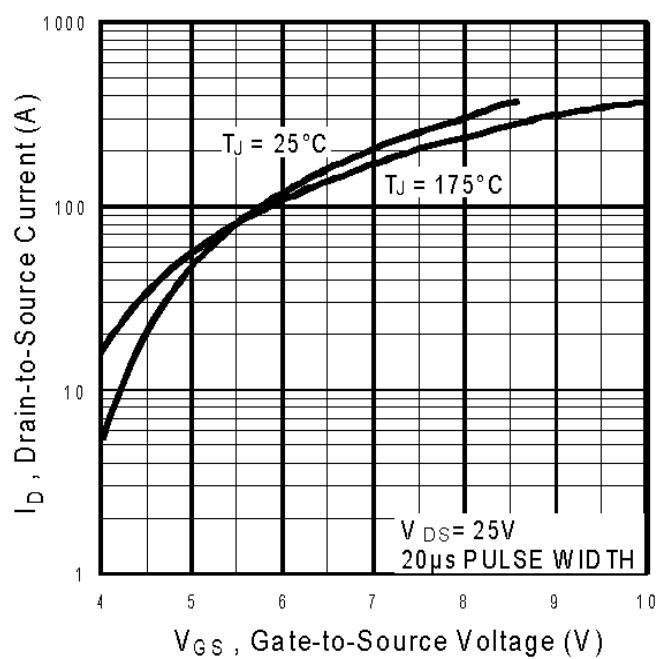


Fig. 3 Typical Transfer Characteristics

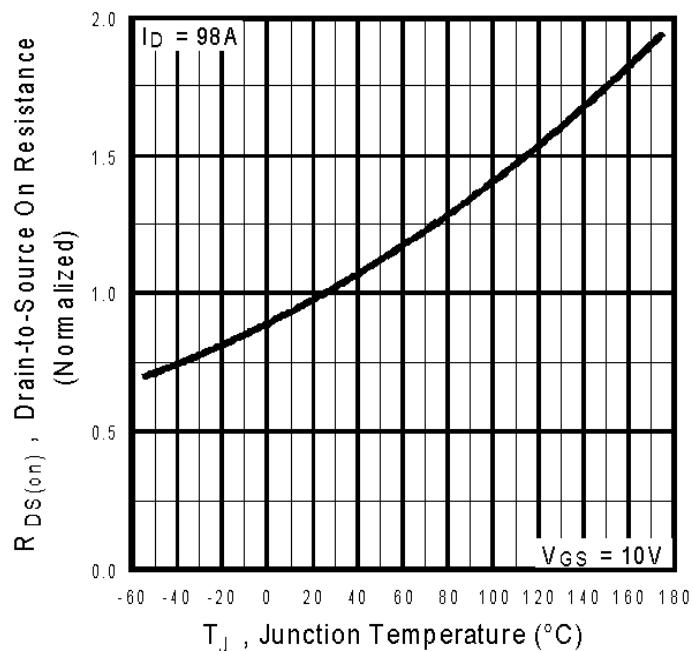


Fig. 4 Normalized On-Resistance vs. Temperature

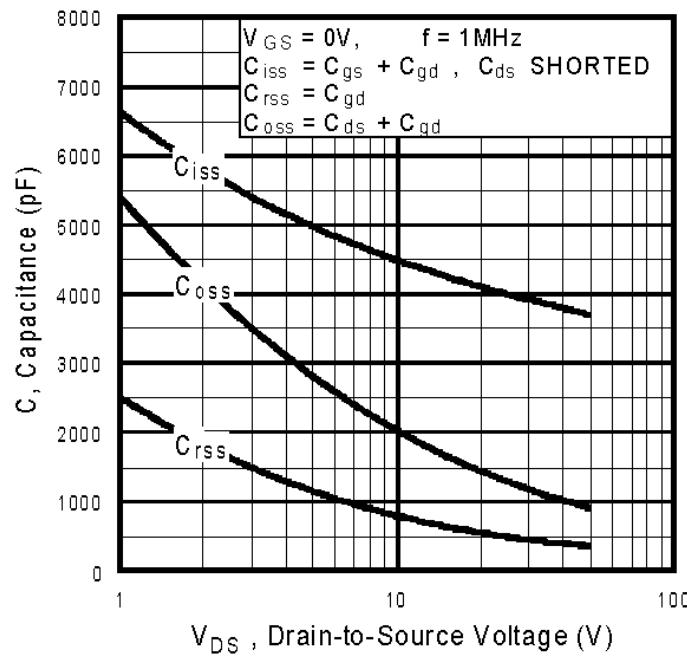


Fig 5. Typical Capacitance vs.  
Drain-to-Source Voltage

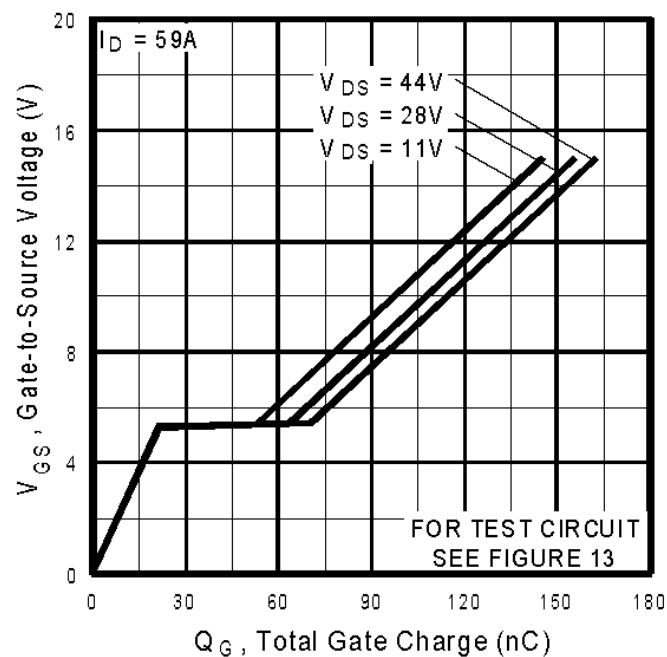


Fig 6. Typical Gate Charge vs.  
Gate-to-Source Voltage

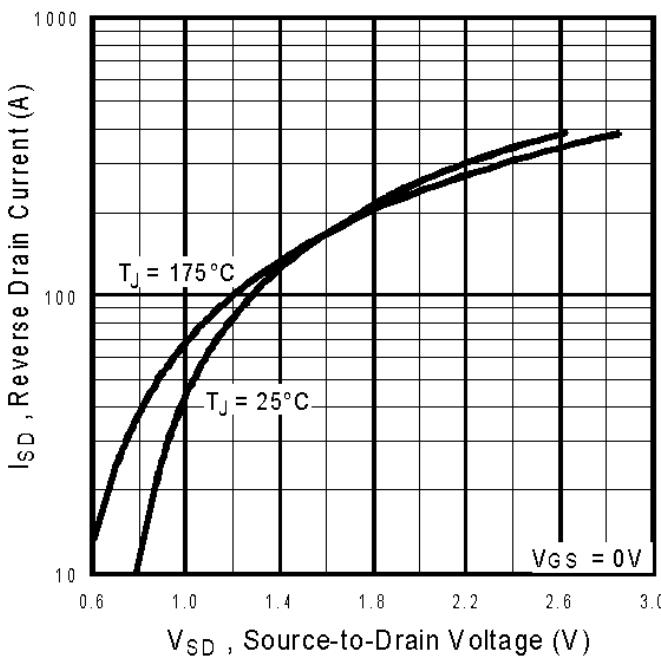


Fig. 7 Typical Source-to-Drain Diode  
Forward Voltage

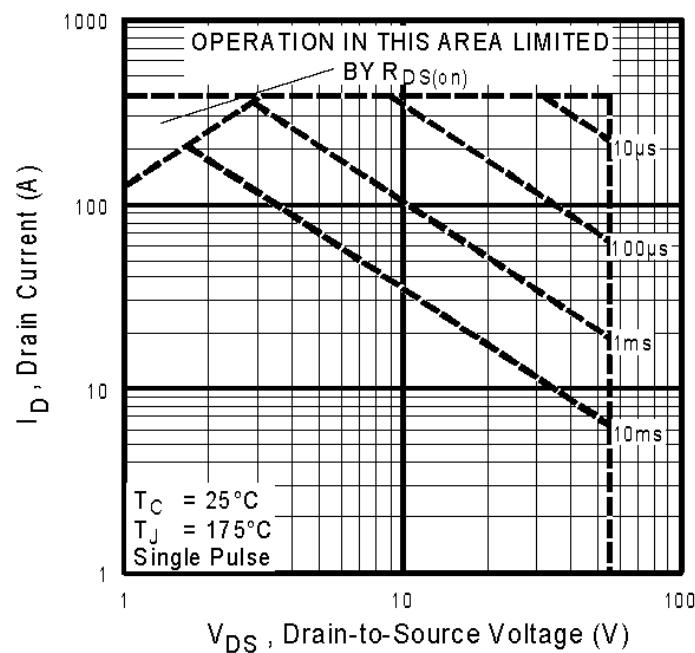


Fig 8. Maximum Safe Operating Area

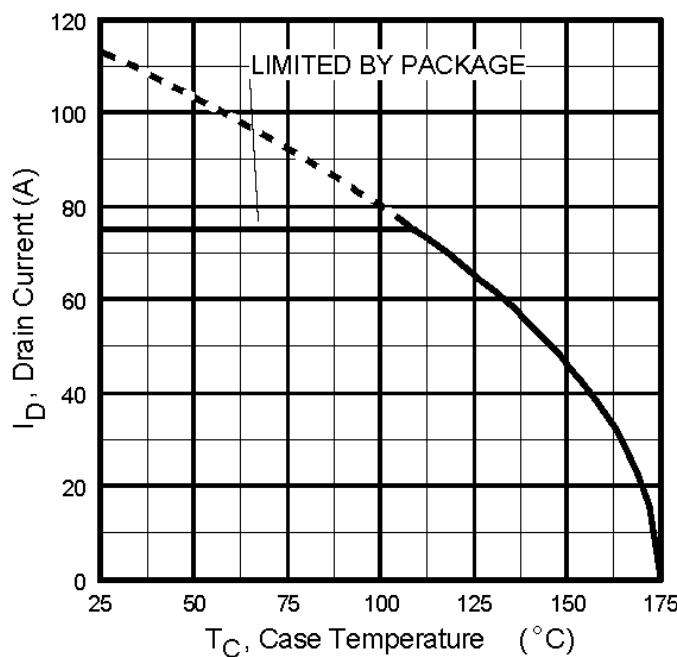


Fig 9. Maximum Drain Current vs. Case Temperature

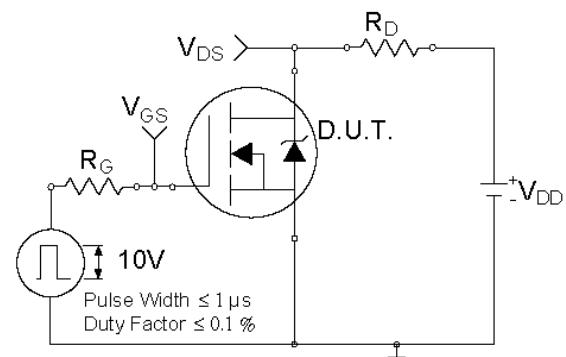


Fig 10a. Switching Time Test Circuit

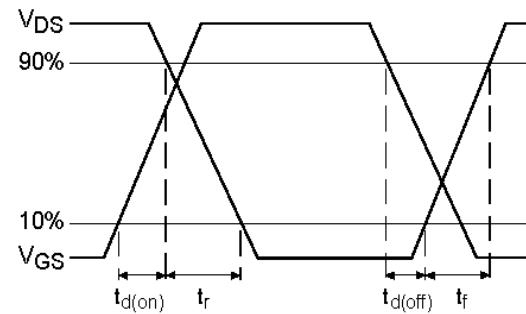


Fig 10a. Switching Time Waveforms

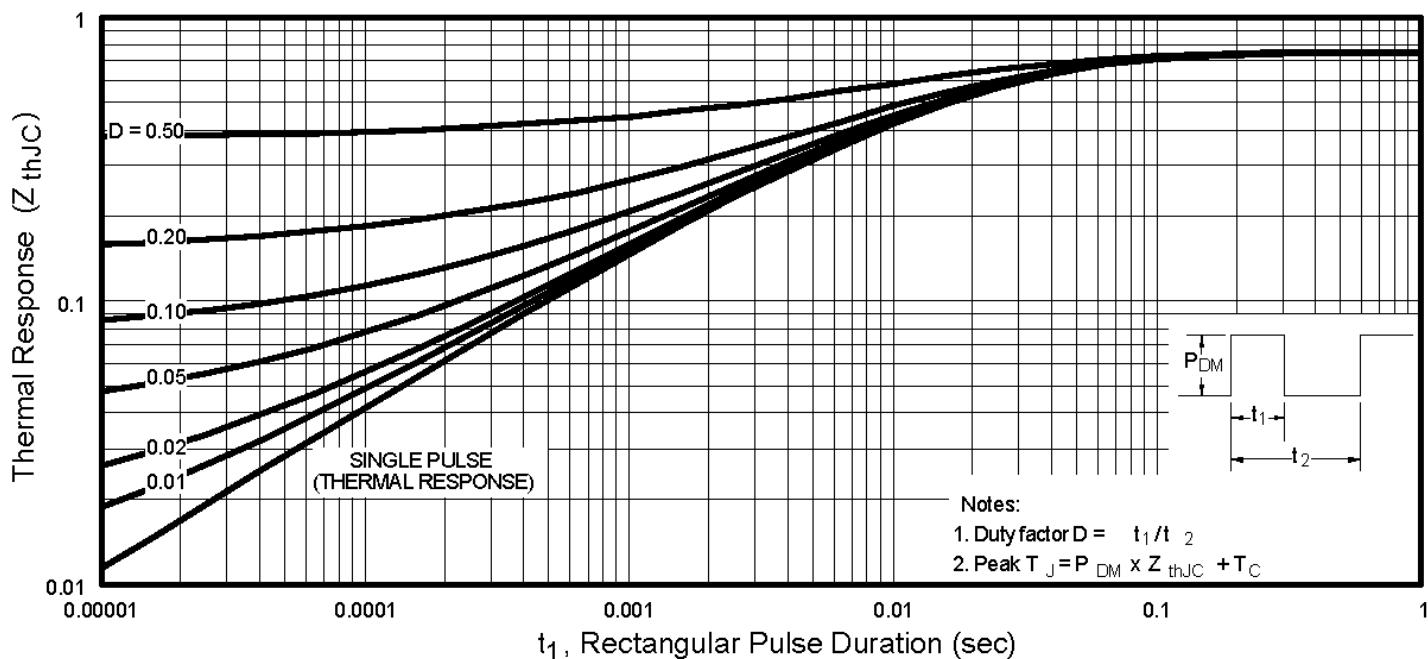


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

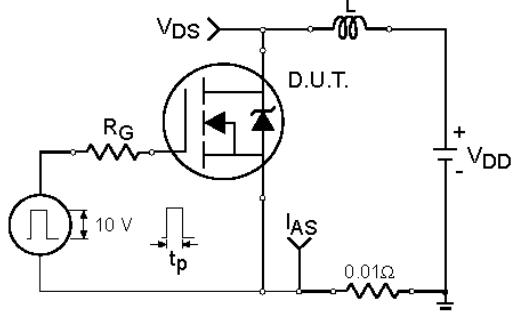


Fig. 12a. Unclamped Inductive Test Circuit

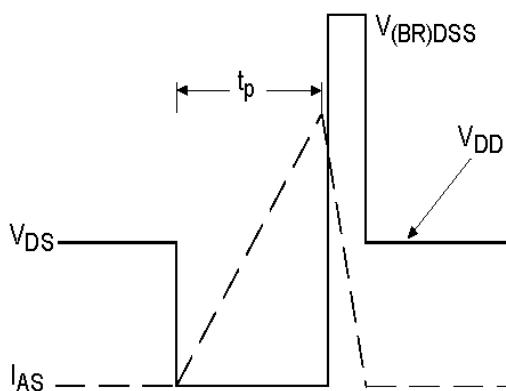


Fig. 12b. Unclamped Inductive Waveforms

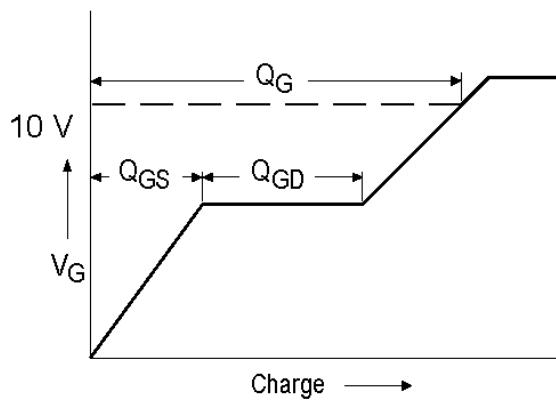


Fig 13a. Basic Gate Charge Waveform

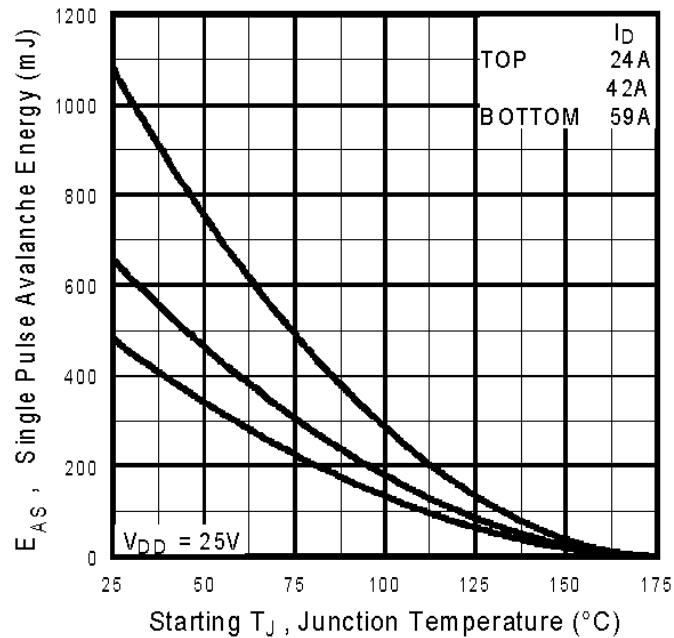


Fig 12c. Maximum Avalanche Energy vs. Drain Current

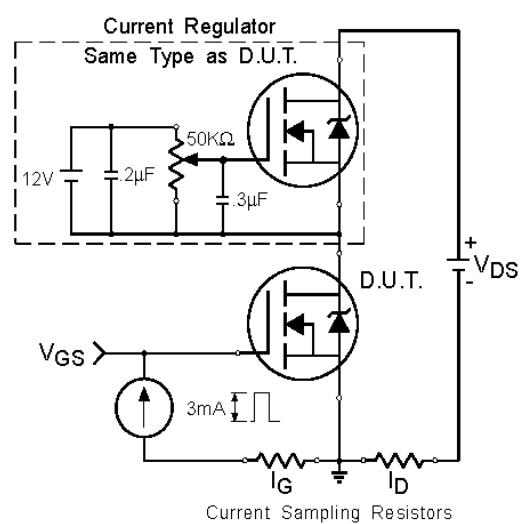
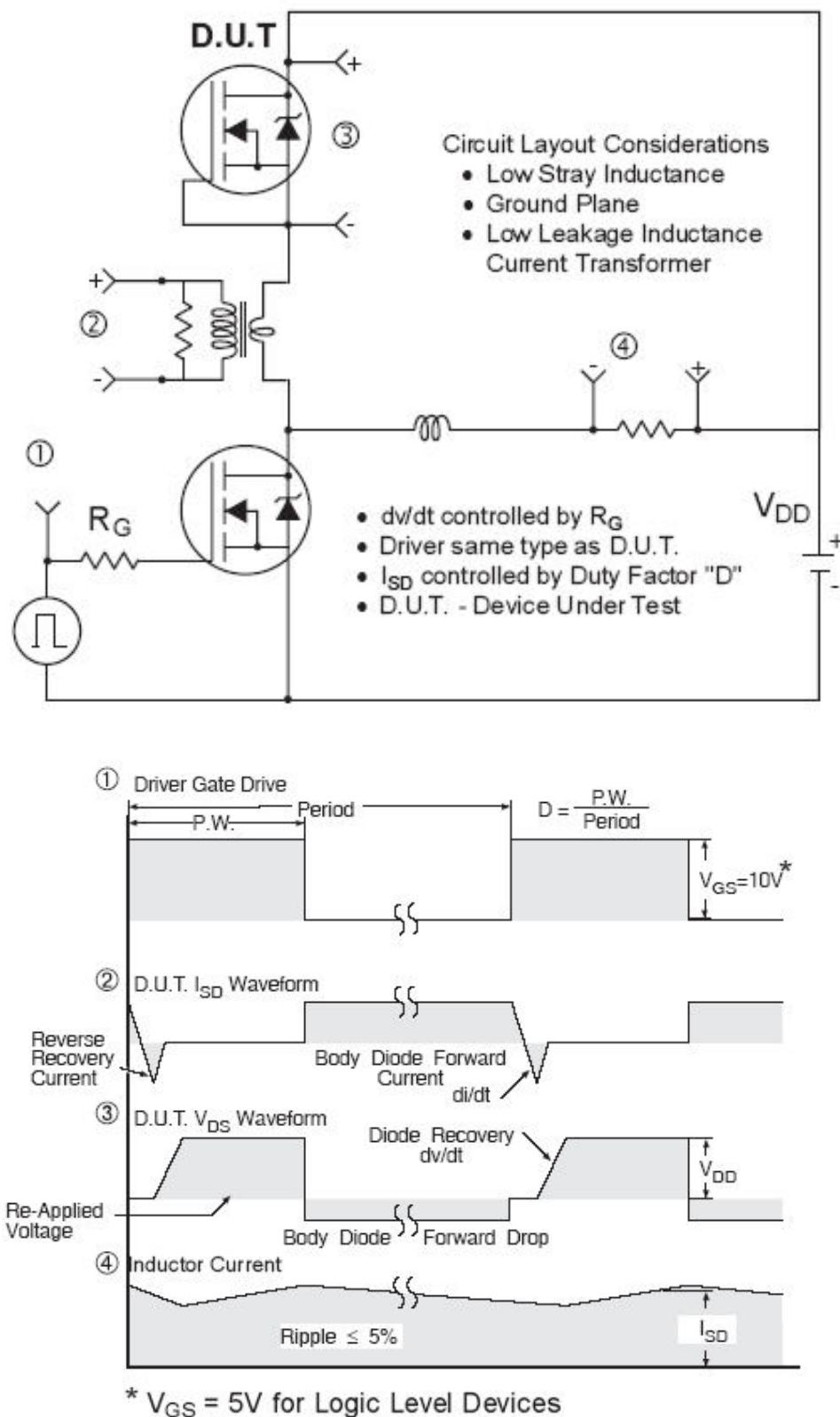
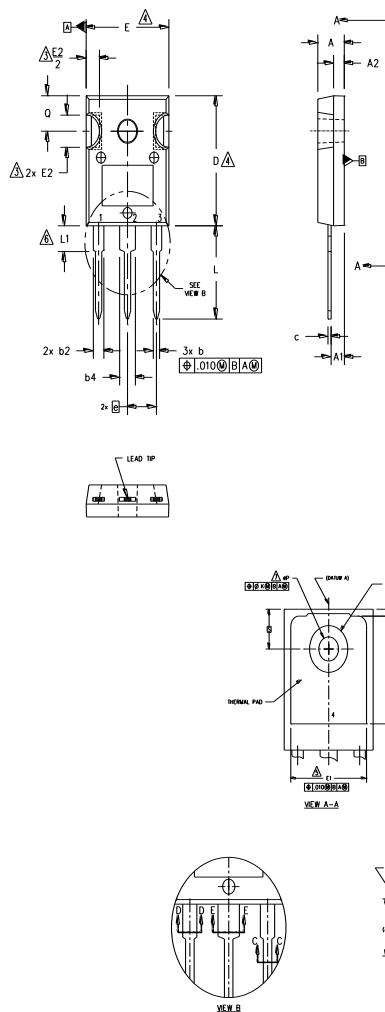


Fig 13b. Gate Charge Test Circuit



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

## TO-247AC Package Outline (Dimensions are



## NOTES:

1. DIMENSIONING AND TOLERANCING AS PER ASME Y14.5M 1994.
2. DIMENSIONS ARE SHOWN IN INCHES.
3. CONTOUR OF SLOT OPTIONAL.
4. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .005" (0.127) PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
5. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS D1 & E1.
6. LEAD FINISH UNCONTROLLED IN L1.
7. ØP TO HAVE A MAXIMUM DRAFT ANGLE OF 1.5° TO THE TOP OF THE PART WITH A MAXIMUM HOLE DIAMETER OF .154 INCH.
8. OUTLINE CONFORMS TO JEDEC OUTLINE TO-247AC .

SYMBOL	DIMENSIONS				NOTES	
	INCHES		MILLIMETERS			
	MIN.	MAX.	MIN.	MAX.		
A	.183	.209	4.65	5.31		
A1	.087	.102	2.21	2.59		
A2	.059	.098	1.50	2.49		
b	.039	.055	0.99	1.40		
b1	.039	.053	0.99	1.35		
b2	.065	.094	1.65	2.39		
b3	.065	.092	1.65	2.34		
b4	.102	.135	2.59	3.43		
b5	.102	.133	2.59	3.38		
c	.015	.035	0.38	0.89		
c1	.015	.033	0.38	0.84		
D	.776	.815	19.71	20.70	4	
D1	.515	—	13.08	—	5	
D2	.020	.053	0.51	1.35		
E	.602	.625	15.29	15.87	4	
E1	.530	—	13.46	—		
E2	.178	.216	4.52	5.49		
e	.215 BSC		5.46 BSC			
Øk	.010		0.25			
L	.559	.634	14.20	16.10		
L1	.146	.169	3.71	4.29		
ØP	.140	.144	3.56	3.66		
ØP1	—	.291	—	7.39		
Q	.209	.224	5.31	5.69		
S	.217 BSC		5.51 BSC			

LEAD ASSIGNMENTSHEXFET

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

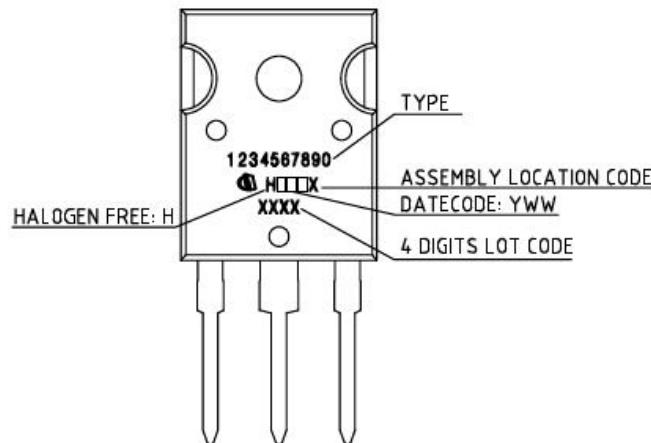
IGBTs, CoPACK

- 1.- GATE
- 2.- COLLECTOR
- 3.- Emitter
- 4.- COLLECTOR

DIODES

- 1.- ANODE/OPEN
- 2.- CATHODE
- 3.- ANODE

## TO-247AC Part Marking Information



TO-247AC package is not recommended for Surface Mount Application.

## Revision History

Date	Rev.	Comments
2024-10-03	2.1	<ul style="list-style-type: none"> <li>Update datasheet to Infineon format</li> <li>Updated Part marking –page 8</li> <li>Added disclaimer on last page.</li> </ul>

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