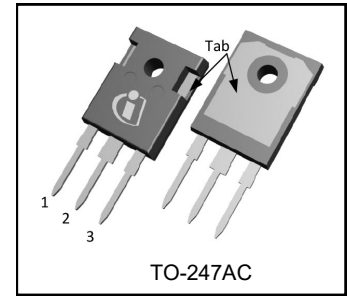
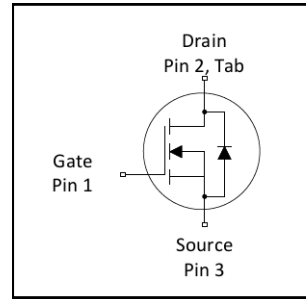


$V_{(BR)DSS}$	<b>150V</b>
$R_{DS(on)}$ max.	<b>0.042Ω</b>
$I_D$	<b>43A</b>



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

## Features

- Advanced Process Technology
- 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.

Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRFP3415PbF	TO-247AC	Tube	25	IRFP3415PbF

Symbol	Parameter	Max.	Units
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	43	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	30	
$I_{DM}$	Pulsed Drain Current ①	150	
$P_D @ T_C = 25^\circ\text{C}$	Maximum Power Dissipation	200	W
	Linear Derating Factor	1.3	W/°C
$V_{GS}$	Gate-to-Source Voltage	± 20	V
$E_{AS}$	Single Pulse Avalanche Energy ②	590	mJ
$I_{AR}$	Avalanche Current ①	22	A
$E_{AR}$	Repetitive Avalanche Energy ①	20	mJ
dv/dt	Peak Diode Recovery dv/dt③	5.0	V/ns
$T_J$	Operating Junction and	-55 to + 175	°C
$T_{STG}$	Storage Temperature Range		
	Soldering Temperature, for 10 seconds (1.6mm from case)	300	
	Mounting torque, 6-32 or M3 screw	10 lbf•in (1.1N•m)	

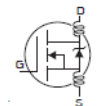
## Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	0.75	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	0.24	—	
$R_{\theta JA}$	Junction-to-Ambient	—	40	

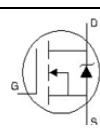
Static @  $T_J = 25^\circ\text{C}$  (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	150	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.17	—	V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}, I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.042	$\Omega$	$V_{GS} = 10V, I_D = 22A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
$g_{fs}$	Forward Trans conductance	19	—	—	S	$V_{DS} = 50V, I_D = 22A$
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	25	$\mu A$	$V_{DS} = 150V, V_{GS} = 0V$
		—	—	250		$V_{DS} = 120V, V_{GS} = 0V, T_J = 150^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -20V$

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

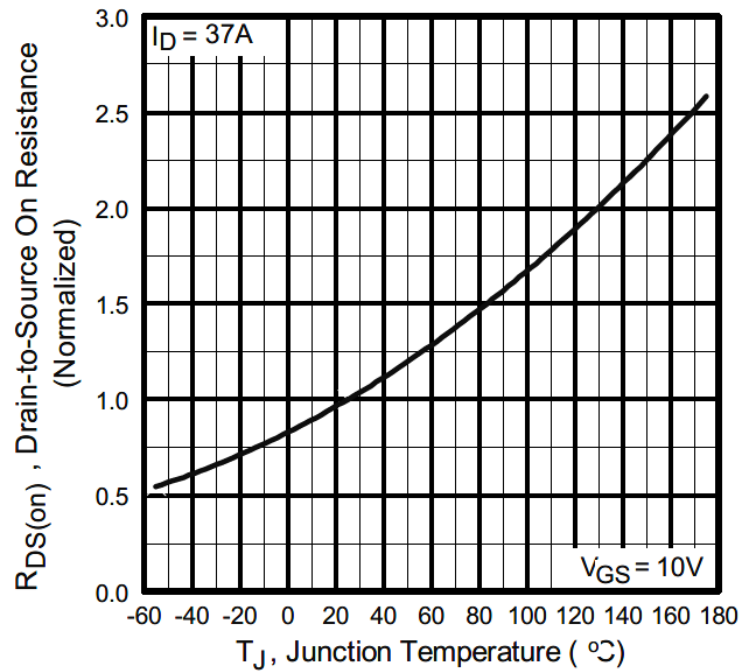
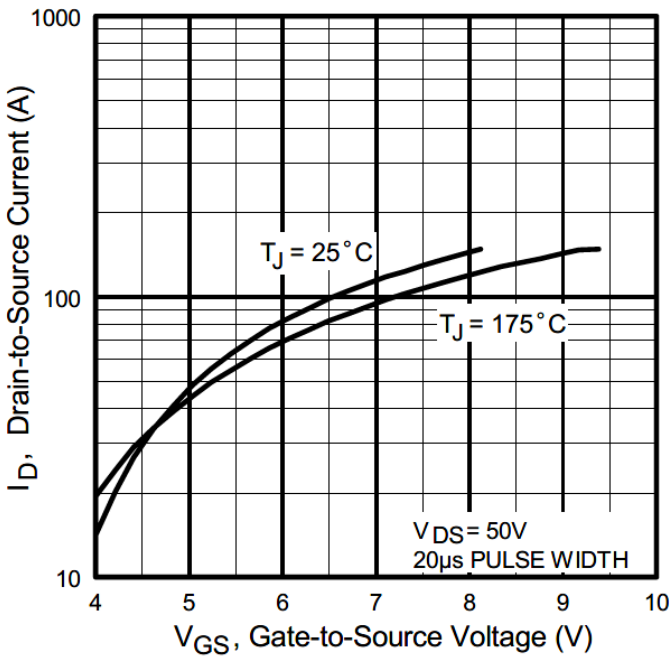
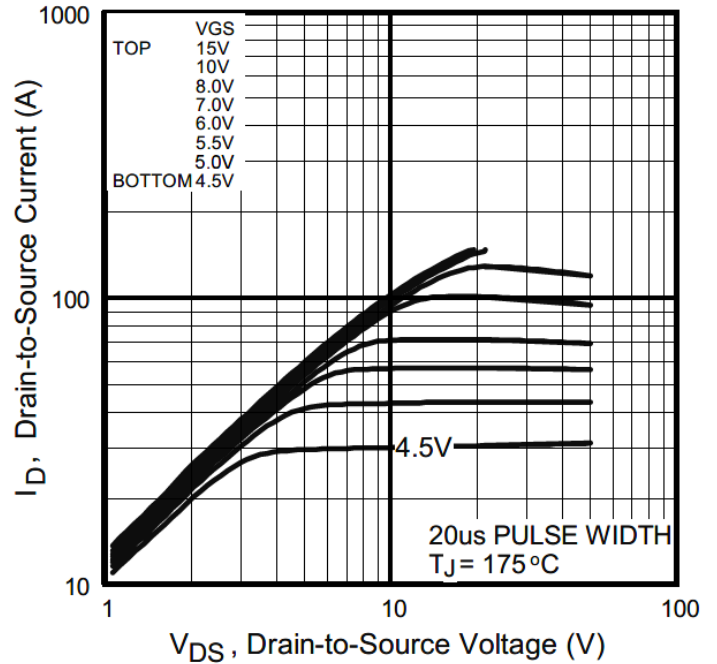
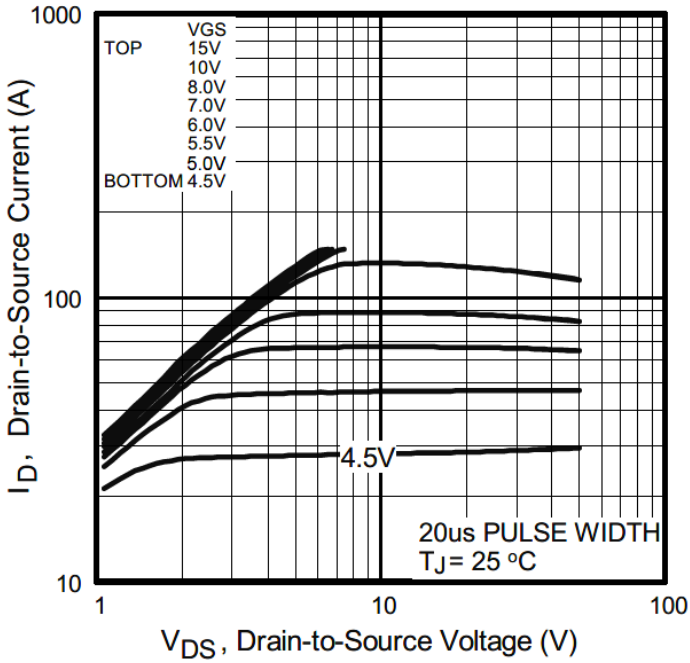
$Q_g$	Total Gate Charge	—	—	200	nC	$I_D = 22A$ $V_{DS} = 120V$ $V_{GS} = 10V$ , See Fig.6 and 13 ④
$Q_{gs}$	Gate-to-Source Charge	—	—	17		
$Q_{gd}$	Gate-to-Drain Charge	—	—	98		
$t_{d(on)}$	Turn-On Delay Time	—	12	—	ns	$V_{DD} = 75V$ $I_D = 22A$ $R_G = 2.5\Omega$ $R_D = 3.3\Omega$ , See Fig.10 ④
$t_r$	Rise Time	—	55	—		
$t_{d(off)}$	Turn-Off Delay Time	—	71	—		
$t_f$	Fall Time	—	69	—		
$L_D$	Internal Drain Inductance	—	5.0	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact 
$L_S$	Internal Source Inductance	—	13	—		
$C_{iss}$	Input Capacitance	—	2400	—	pF	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1.0\text{MHz}$ , See Fig.5
$C_{oss}$	Output Capacitance	—	640	—		
$C_{rss}$	Reverse Transfer Capacitance	—	340	—		

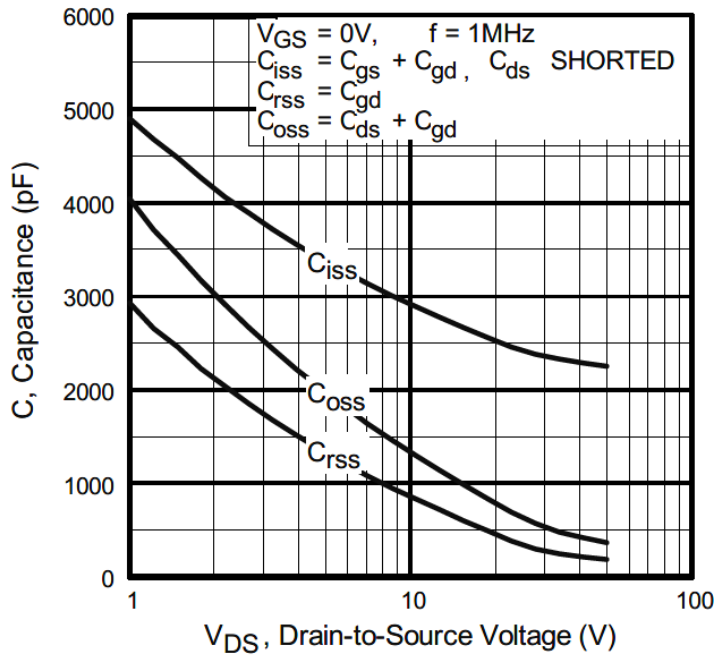
## Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	43	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode) ①	—	—	150		
$V_{SD}$	Diode Forward Voltage	—	—	1.3	V	$T_J = 25^\circ\text{C}, I_S = 22A, V_{GS} = 0V$ ④
$t_{rr}$	Reverse Recovery Time	—	260	390	ns	$T_J = 25^\circ\text{C}, I_F = 22A$
$Q_{rr}$	Reverse Recovery Charge	—	2.2	3.3	$\mu C$	$di/dt = 100A/\mu s$ ④

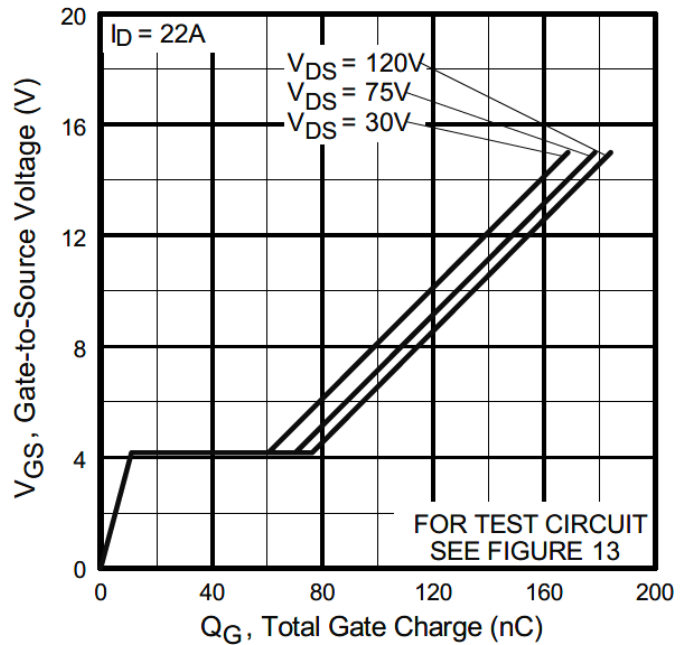
## Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11).
- ②  $V_{DD} = 25V, T_J = 25^\circ\text{C}, L = 2.4\text{mH}, R_G = 25\Omega, I_{AS} = 22A$ . (See fig. 12).
- ③  $I_{SD} \leq 22A, di/dt \leq 820A/\mu s, V_{DD} \leq V_{(BR)DSS}, T_J \leq 175^\circ\text{C}$ .
- ④ Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .

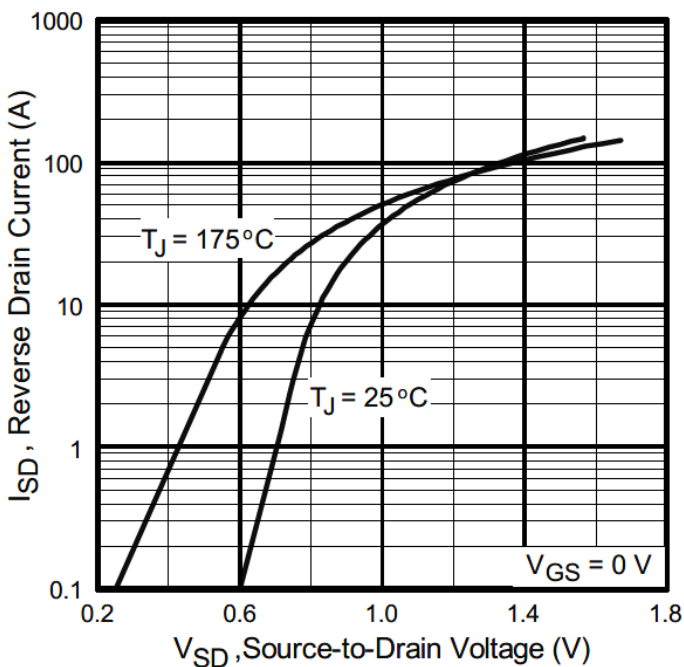




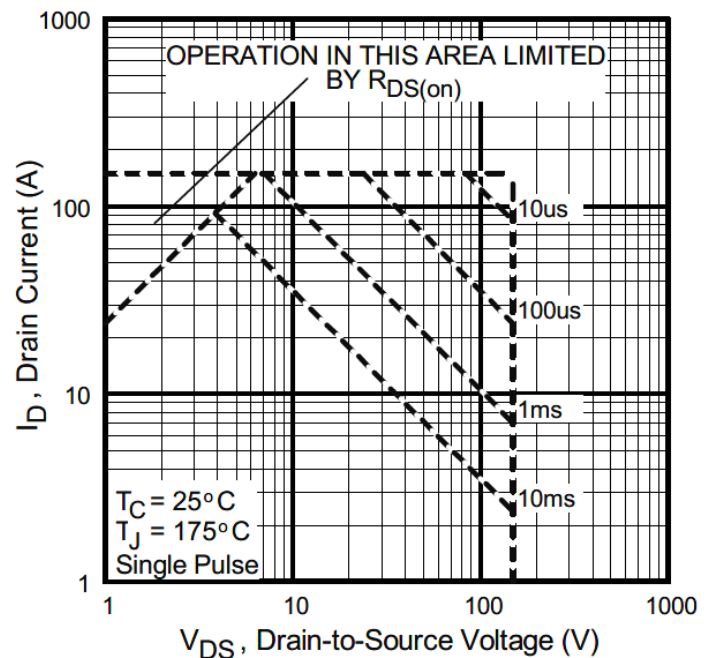
**Fig 5.** Typical Capacitance vs. Drain-to-Source Voltage



**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

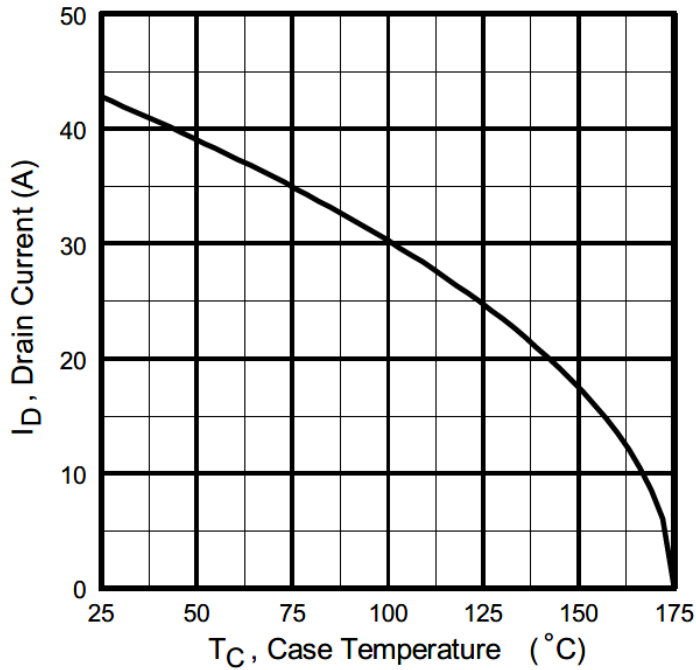


Fig 9. Maximum Drain Current vs. Case Temperature

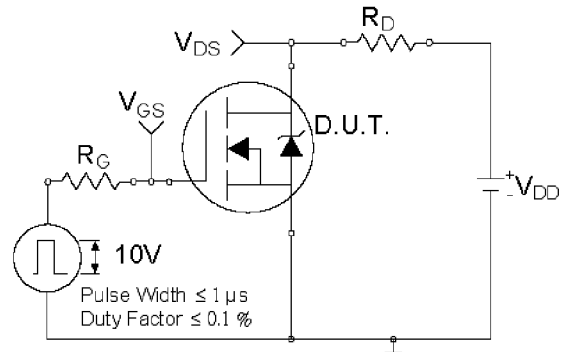


Fig 10a. Switching Time Test Circuit

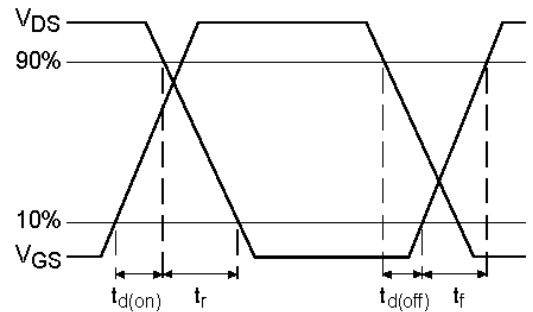


Fig 10a. Switching Time Waveforms

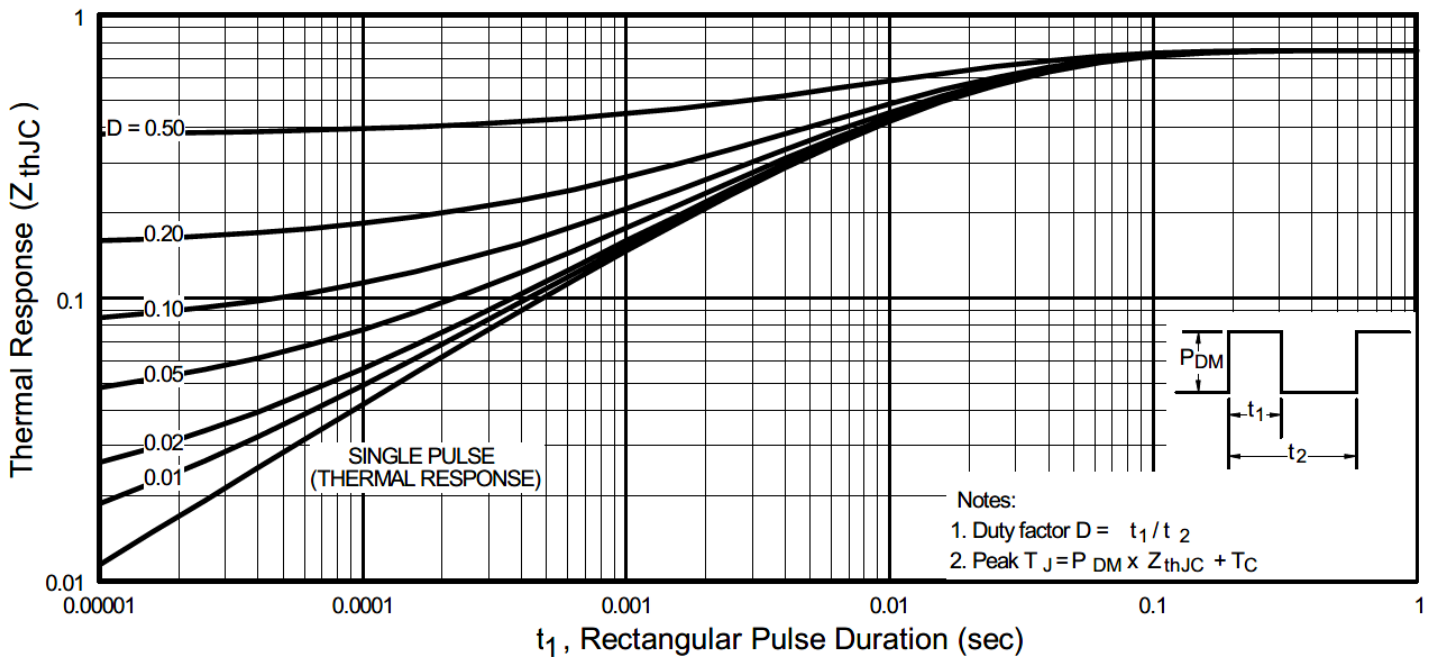


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

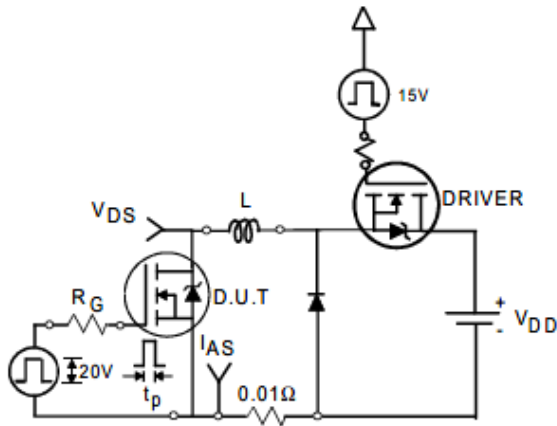


Fig. 12a. Unclamped Inductive Test Circuit

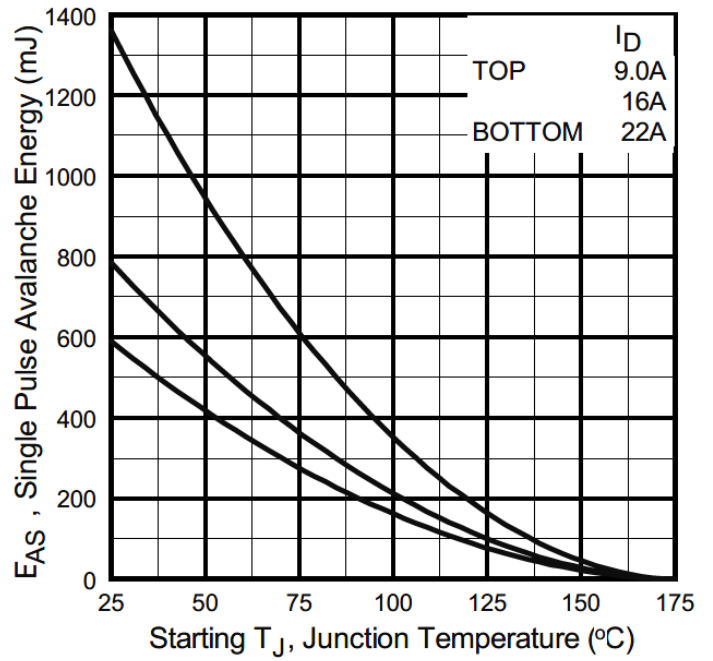


Fig 12c. Maximum Avalanche Energy vs. Drain Current

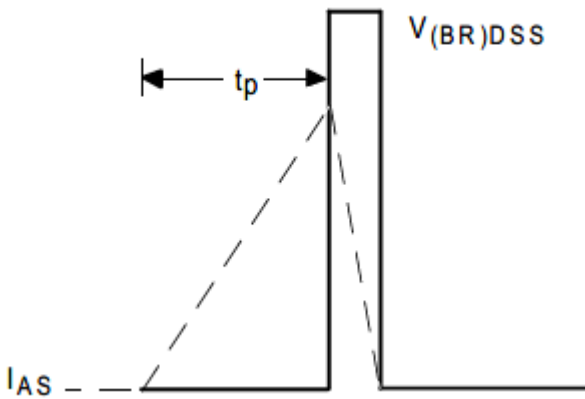


Fig. 12b. Unclamped Inductive Waveforms

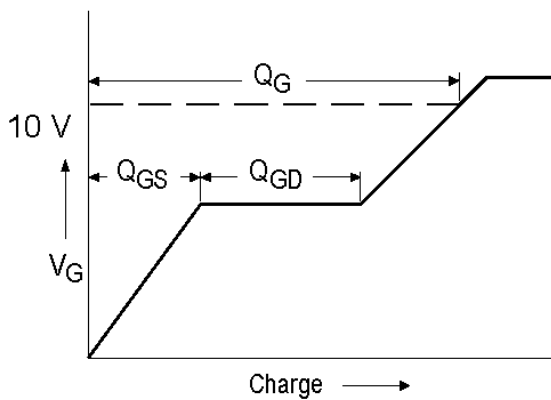


Fig 13a. Basic Gate Charge Waveform

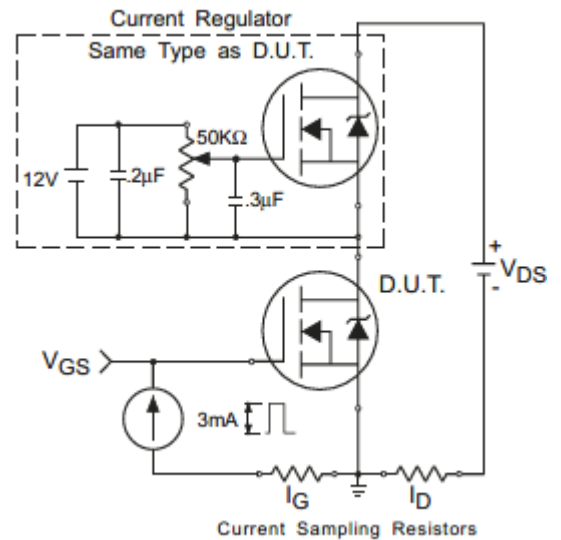
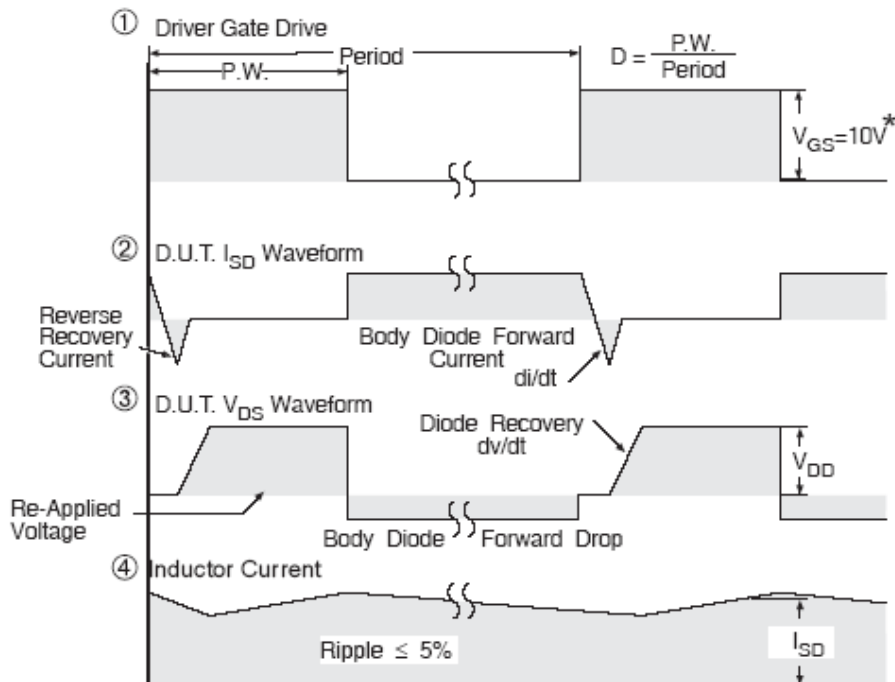
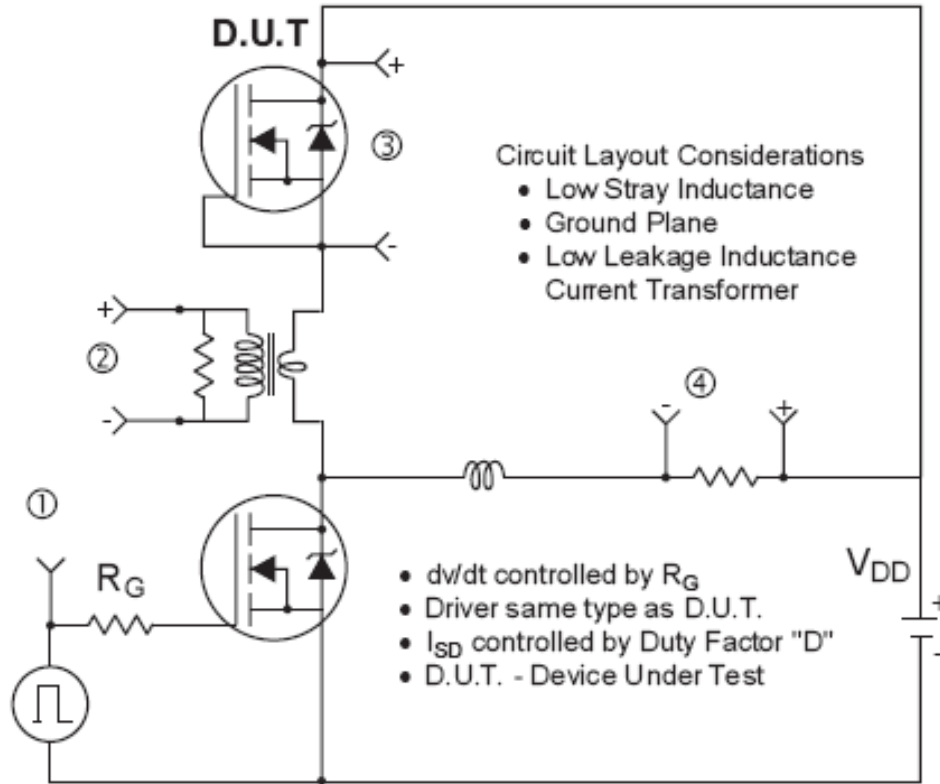


Fig 13b. Gate Charge Test Circuit



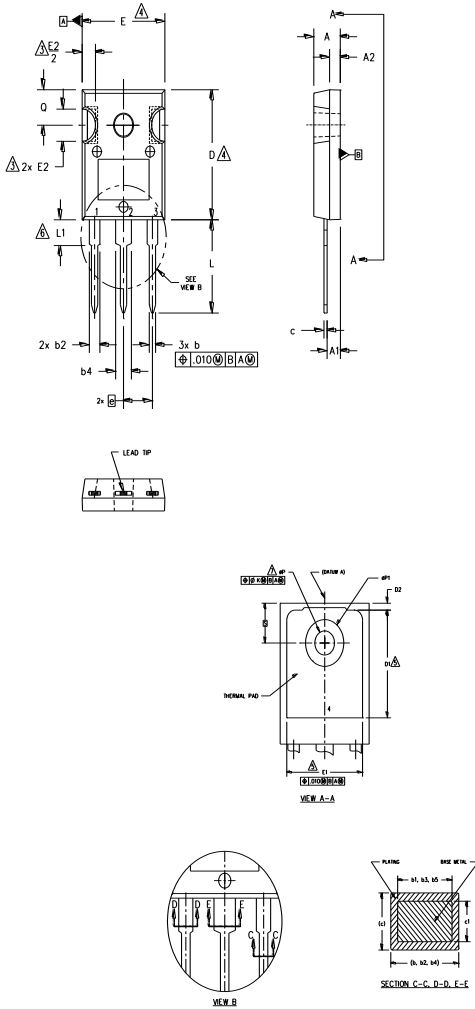
\*  $V_{GS} = 5V$  for Logic Level Devices

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. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS D1 & E1.
5. LEAD FINISH UNCONTROLLED IN L1.
6. 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 ASSIGNMENTS

HEXFET

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

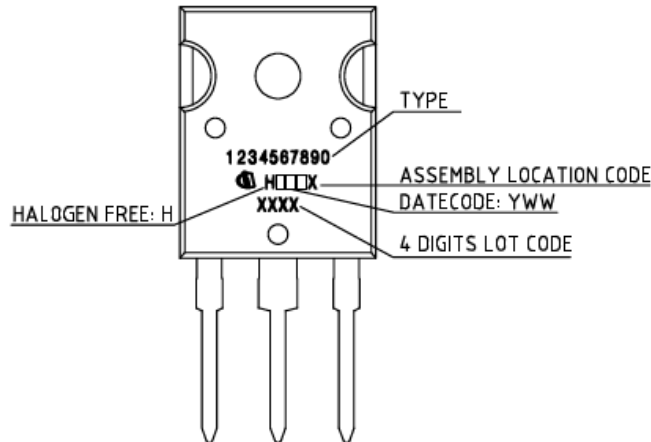
IGBTs, CoPACK

- 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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