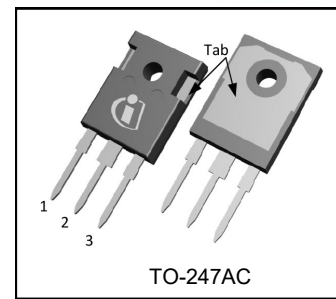
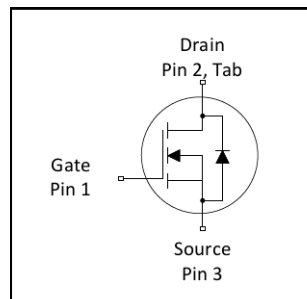


$V_{(BR)DSS}$	30V
$R_{DS(on)}$ max.	2.8m Ω
I_D	210A [Ⓔ]



Applications

- Synchronous Rectification
- Active ORing
- Lead-Free

Benefits

- Ultra Low On-Resistance
- Low Gate Impedance to Reduce Switching Losses
- 175°C Operating Temperature
- Fully Avalanche Rated

Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRFP3703PbF	TO-247AC	Tube	25	IRFP3703PbF

Symbol	Parameter	Max.	Units
I_D @ $T_C = 25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	210 [Ⓔ]	A
I_D @ $T_C = 100^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	100 [Ⓔ]	
I_{DM}	Pulsed Drain Current ^①	1000	
P_D @ $T_C = 25^\circ\text{C}$	Power Dissipation	230	W
P_D @ $T_A = 25^\circ\text{C}$	Power Dissipation	3.8	
	Linear Derating Factor	1.5	W/ $^\circ\text{C}$
V_{GS}	Gate-to-Source Voltage	± 20	V
dv/dt	Peak Diode Recovery dv/dt ^③	5.0	V/ns
T_J	Operating Junction and	-55 to + 175	$^\circ\text{C}$
T_{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds (1.6mm from case)		
	Mounting torque, 6-32 or M3 screw	300	
		10 lbf•in (1.1N•m)	

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	0.65	$^\circ\text{C/W}$
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	0.24	—	
$R_{\theta JA}$	Junction-to-Ambient	—	40	

Typical SMPS Topologies

- Forward and Bridge Converters with Synchronous Rectification for Telecom and Industrial Applications
- Offline High Power AC/DC Convertors using Synchronous Rectification

Notes ① through ⑥ are on page 2

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.028	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	2.3	2.8	$m\Omega$	$V_{GS} = 10V, I_D = 76A$ ④
		—	2.8	3.9		$V_{GS} = 7.0V, I_D = 76A$ 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	150	—	—	S	$V_{DS} = 24V, I_D = 76A$ ④
I_{DSS}	Drain-to-Source Leakage Current	—	—	20	μA	$V_{DS} = 24V, V_{GS} = 0V$
		—	—	250		$V_{DS} = 24V, V_{GS} = 0V, T_J = 150^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	200	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-200		$V_{GS} = -20V$

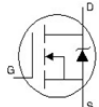
Dynamic Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Q_g	Total Gate Charge	—	209	—	nC	$I_D = 76A$
Q_{gs}	Gate-to-Source Charge	—	62	—		$V_{DS} = 24V$
Q_{gd}	Gate-to-Drain Charge	—	42	—		$V_{GS} = 10V, \text{④}$
$t_{d(on)}$	Turn-On Delay Time	—	18	—	ns	$V_{DD} = 15V$
t_r	Rise Time	—	123	—		$I_D = 76A$
$t_{d(off)}$	Turn-Off Delay Time	—	53	—		$R_G = 1.8\Omega$
t_f	Fall Time	—	24	—		$V_{GS} = 10V$ ④
C_{iss}	Input Capacitance	—	8250	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	3000	—		$V_{DS} = 25V$
C_{rss}	Reverse Transfer Capacitance	—	290	—		$f = 1.0MHz$
C_{oss}	Output Capacitance	—	10360	—		$V_{GS} = 0V, V_{DS} = 1.0V, f = 1.0MHz,$
C_{oss}	Output Capacitance	—	3060	—		$V_{GS} = 0V, V_{DS} = 24V, f = 1.0MHz,$
$C_{oss\ eff.}$	Effective Output Capacitance	—	2590	—		$V_{GS} = 0V, V_{DS} = 0V \text{ to } 24V$ ⑤

Avalanche Characteristics

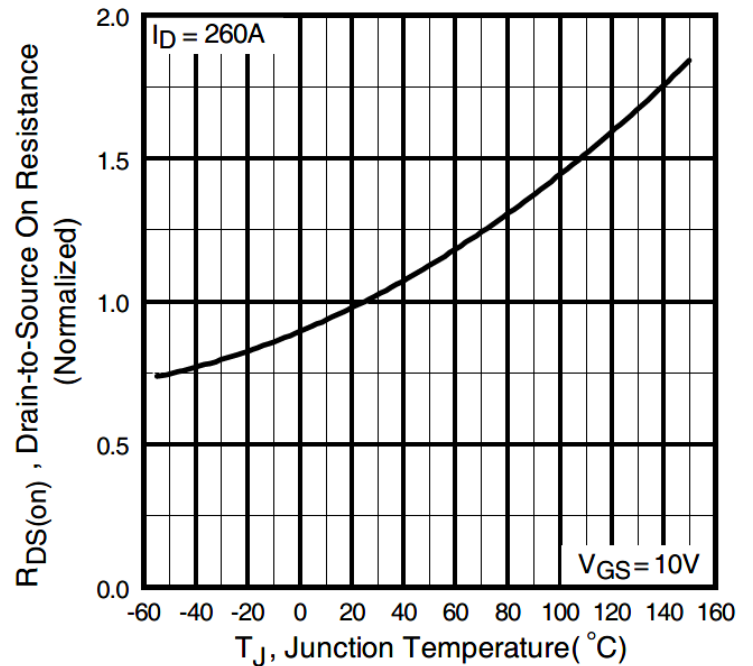
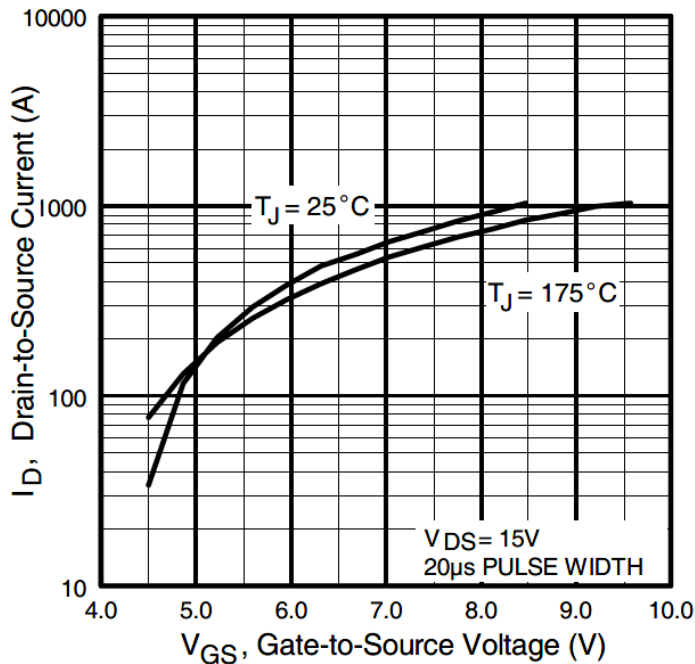
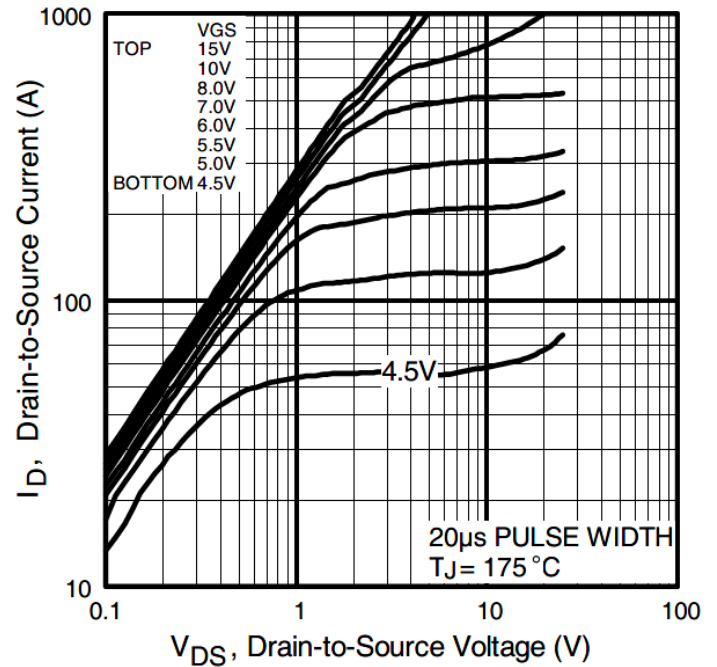
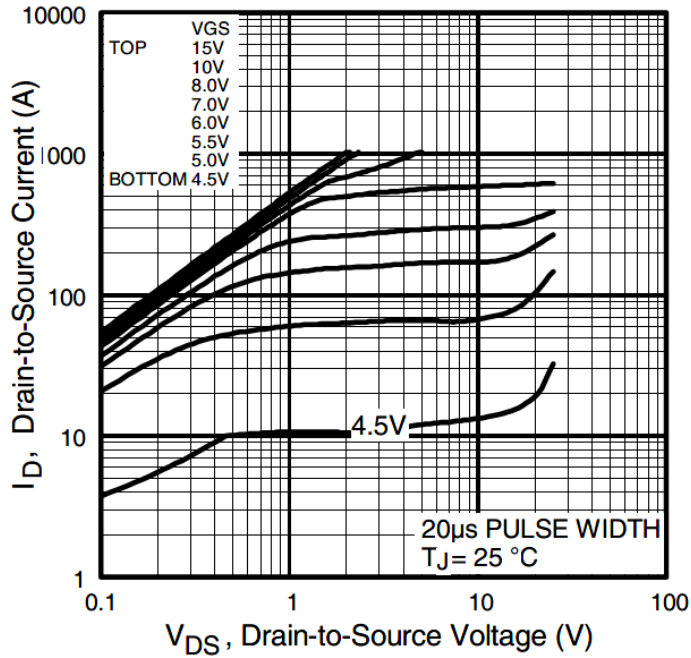
	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy ②	—	1700	mJ
I_{AR}	Avalanche Current ①	—	76	A
E_{AR}	Repetitive Avalanche Energy ①	—	23	mJ

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	210⑥	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	1000		
V_{SD}	Diode Forward Voltage	—	0.8	1.3	V	$T_J = 25^\circ\text{C}, I_S = 76A, V_{GS} = 0V$ ④
t_{rr}	Reverse Recovery Time	—	80	120	ns	$T_J = 25^\circ\text{C}, I_F = 76A, V_{DS} = 16V$
Q_{rr}	Reverse Recovery Charge	—	185	275	nC	$di/dt = 100A/\mu s$ ④

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting $T_J = 25^\circ\text{C}$, $L = 0.6mH$, $R_G = 25\Omega$, $I_{AS} = 76A$.
- ③ $I_{SD} \leq 76A$, $di/dt \leq 100A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 175^\circ\text{C}$.
- ④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.
- ⑤ $C_{oss\ eff.}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 80% V_{DSS}
- ⑥ Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 90A



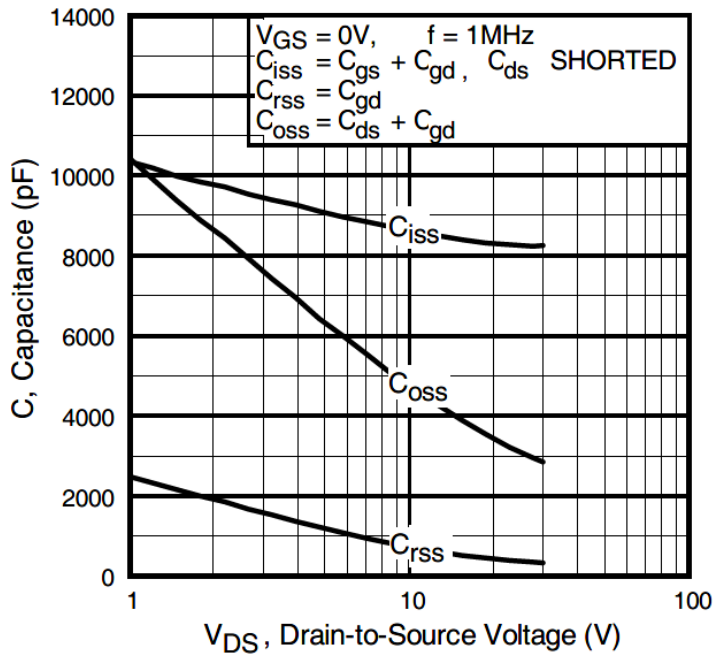


Fig 5. Typical Capacitance vs.
Drain-to-Source Voltage

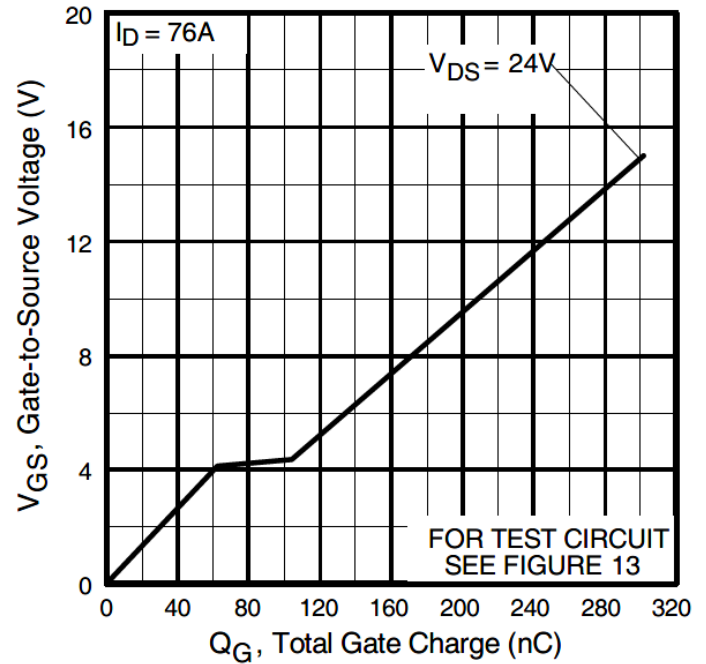


Fig 6. Typical Gate Charge vs.
Gate-to-Source Voltage

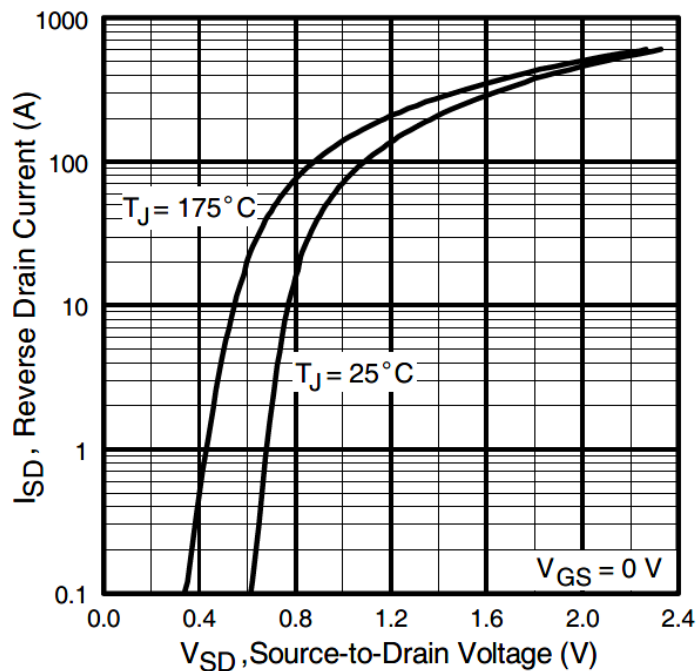


Fig. 7 Typical Source-to-Drain Diode
Forward Voltage

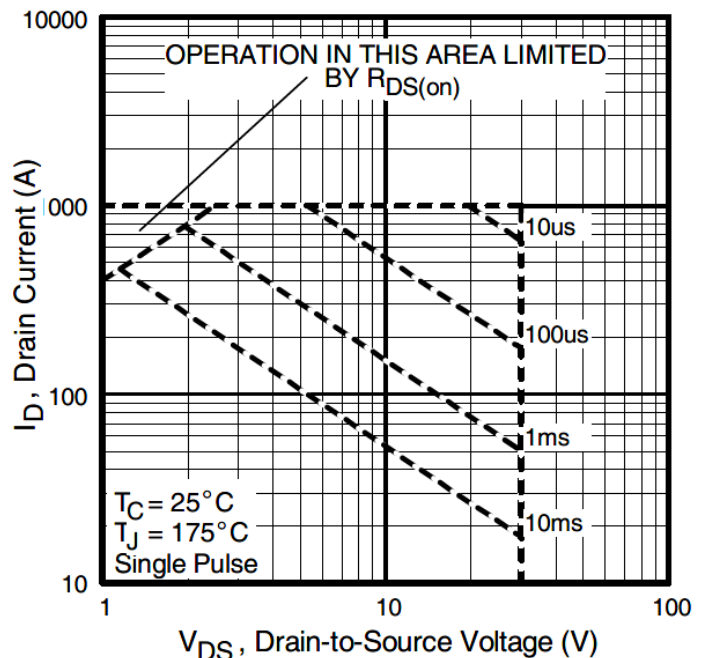


Fig 8. Maximum Safe Operating Area

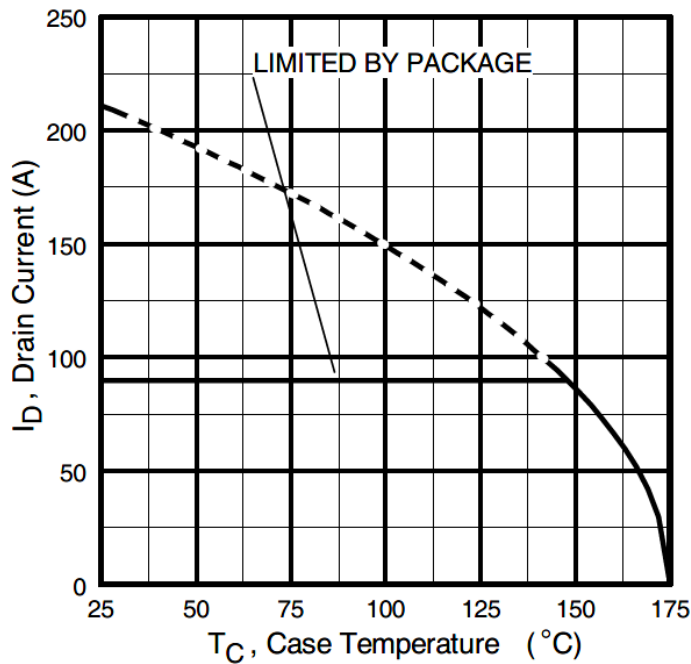


Fig 9. Maximum Drain Current vs. Case Temperature

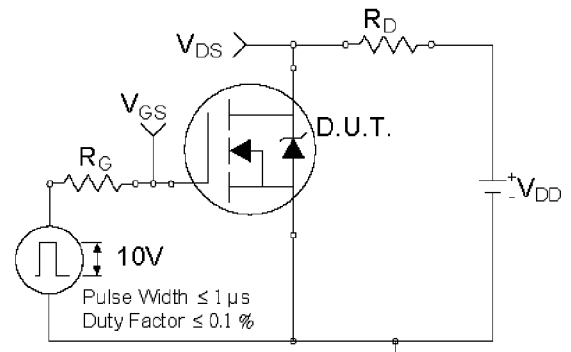


Fig 10a. Switching Time Test Circuit

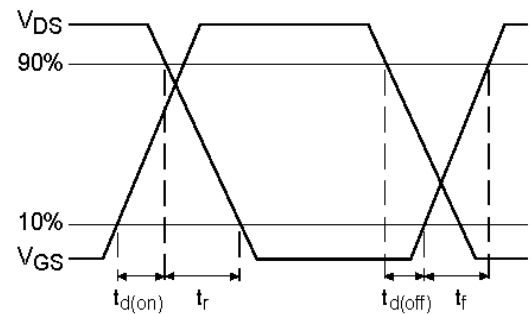


Fig 10a. Switching Time Waveforms

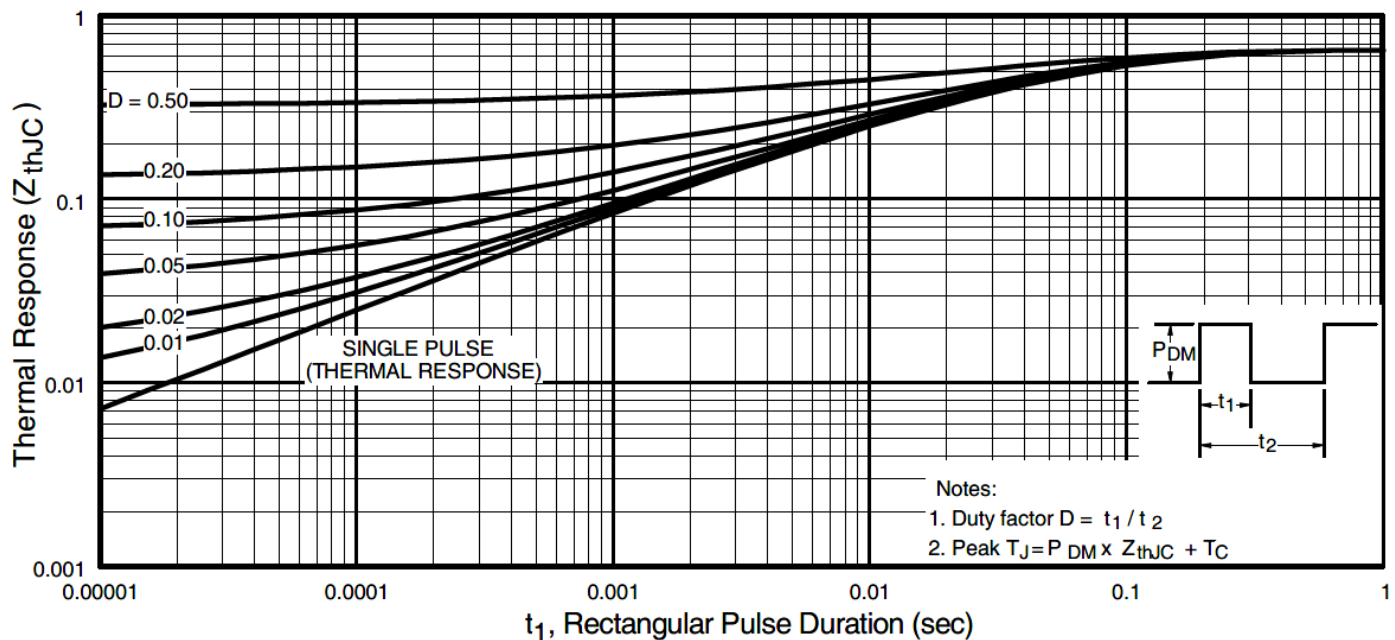


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

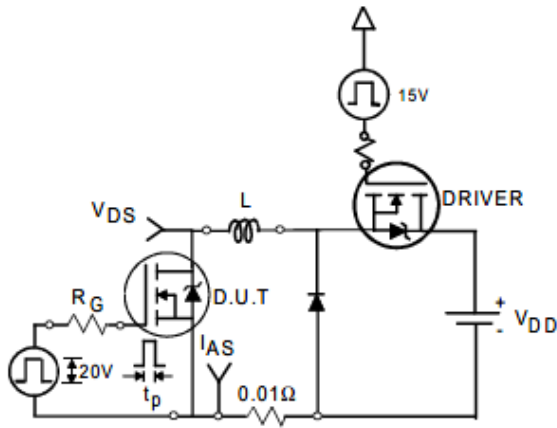


Fig. 12a. Unclamped Inductive Test Circuit

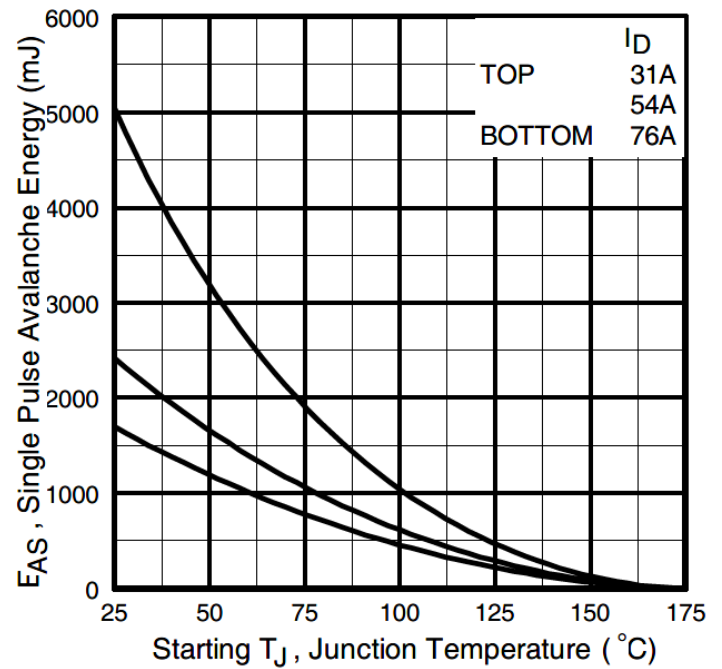


Fig 12c. Maximum Avalanche Energy vs. Drain Current

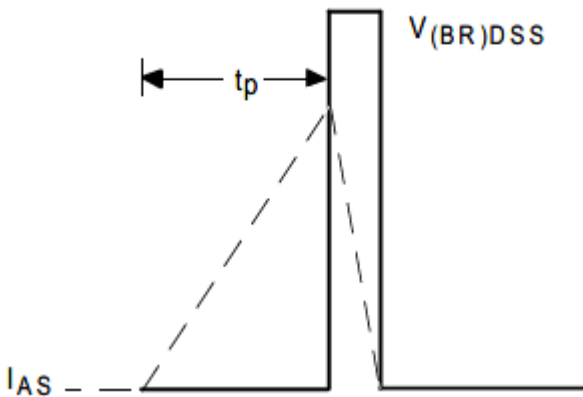


Fig. 12b. Unclamped Inductive Waveforms

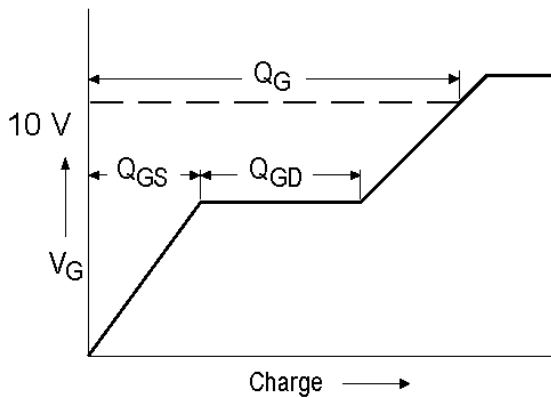


Fig 13a. Basic Gate Charge Waveform

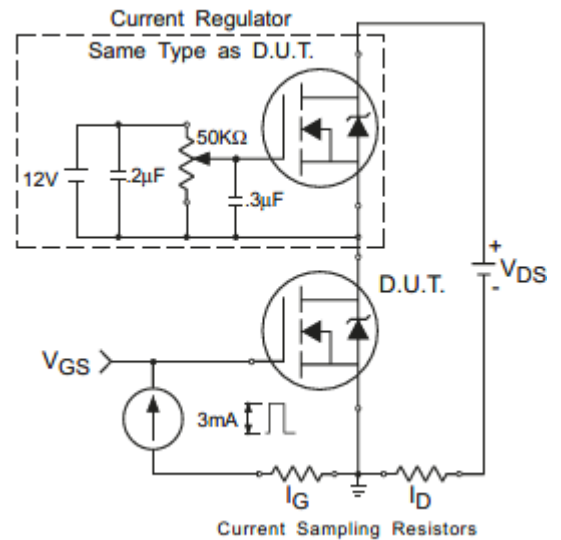


Fig 13b. Gate Charge Test Circuit

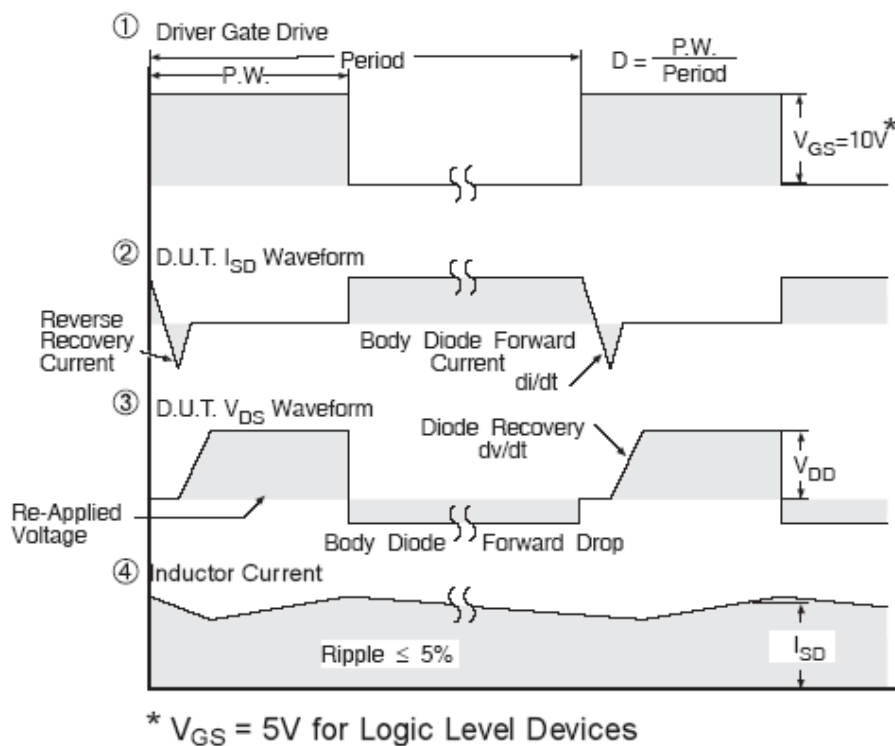
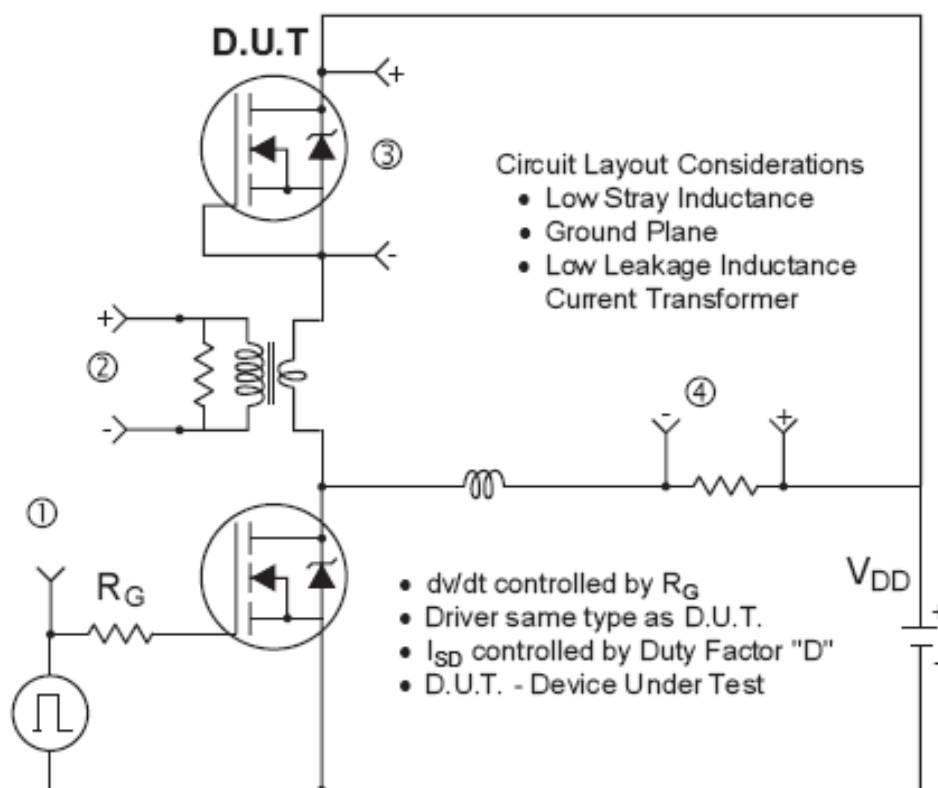
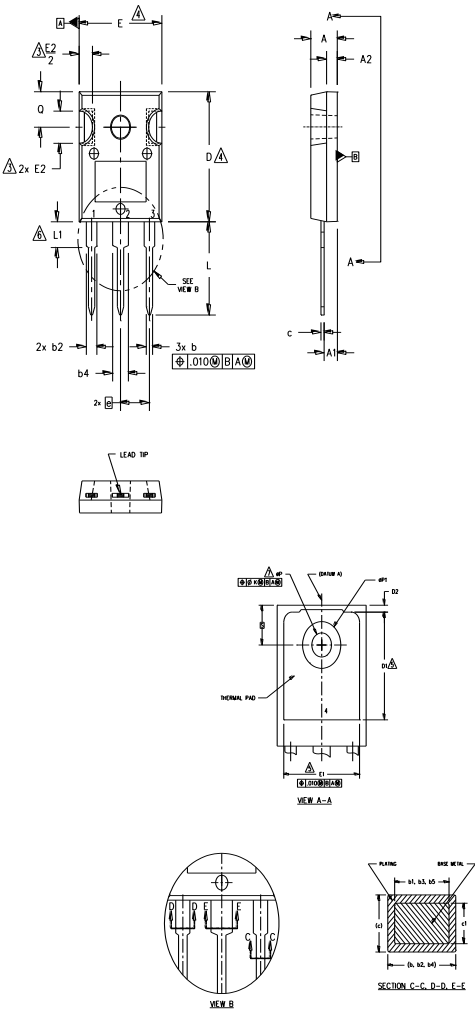


Fig 14. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

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	4 5 4
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	
D1	.515	—	13.08	—	
D2	.020	.053	0.51	1.35	
E	.602	.625	15.29	15.87	
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

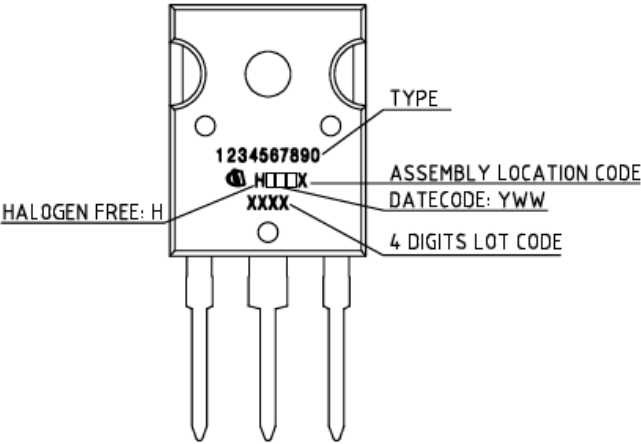
IGBTs, CoPACK

- 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
2024-10-08	2.1	• Update datasheet to Infineon format • Updated Part marking –page 8 • Added disclaimer on last page.

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