

IRF7842TR Datasheet



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DiGi Electronics Part Number	IRF7842TR-DG
Manufacturer	Infineon Technologies
Manufacturer Product Number	IRF7842TR
Description	MOSFET N-CH 40V 18A 8SO
Detailed Description	N-Channel 40 V 18A (Ta) 2.5W (Ta) Surface Mount 8-SO



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DiGi is a global authorized distributor of electronic components.

Purchase and inquiry

Manufacturer Product Number:

IRF7842TR

Series:

HEXFET®

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

40 V

Drive Voltage (Max Rds On, Min Rds On):

4.5V, 10V

Vgs(th) (Max) @ Id:

2.25V @ 250µA

Vgs (Max):

±20V

FET Feature:

-

Operating Temperature:

-55°C ~ 150°C (Tj)

Supplier Device Package:

8-SO

Manufacturer:

Infineon Technologies

Product Status:

Obsolete

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

18A (Ta)

Rds On (Max) @ Id, Vgs:

5mOhm @ 17A, 10V

Gate Charge (Qg) (Max) @ Vgs:

50 nC @ 4.5 V

Input Capacitance (Ciss) (Max) @ Vds:

4500 pF @ 20 V

Power Dissipation (Max):

2.5W (Ta)

Mounting Type:

Surface Mount

Package / Case:

8-SOIC (0.154", 3.90mm Width)

Environmental & Export classification

RoHS Status:

RoHS non-compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

International Rectifier

IRF7842PbF

Applications

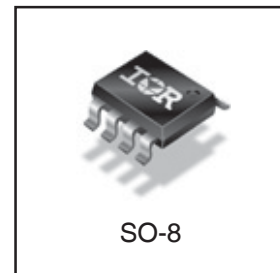
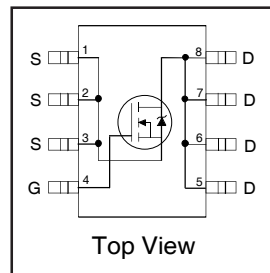
- Synchronous MOSFET for Notebook Processor Power
- Secondary Synchronous Rectification for Isolated DC-DC Converters
- Synchronous Fet for Non-Isolated DC-DC Converters
- Lead-Free

Benefits

- Very Low $R_{DS(on)}$ at 4.5V V_{GS}
- Low Gate Charge
- Fully Characterized Avalanche Voltage and Current

HEXFET® Power MOSFET

V_{DSS}	$R_{DS(on)}$ max	Q_g (typ.)
40V	5.0m Ω @ $V_{GS} = 10V$	33nC



Base Part Number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRF7842PbF	SO-8	Tube/Bulk	95	IRF7842PbF
		Tape and Reel	4000	IRF7842TRPbF

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	40	V
V_{GS}	Gate-to-Source Voltage	± 20	
I_D @ $T_A = 25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	18	A
I_D @ $T_A = 70^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	14	
I_{DM}	Pulsed Drain Current ①	140	
P_D @ $T_A = 25^\circ\text{C}$	Power Dissipation ④	2.5	W
P_D @ $T_A = 70^\circ\text{C}$	Power Dissipation ④	1.6	
	Linear Derating Factor	0.02	W/ $^\circ\text{C}$
T_J	Operating Junction and	-55 to + 150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range		

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead ⑤	—	20	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Junction-to-Ambient ④⑤	—	50	

Notes ① through ⑤ are on page 10



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

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	40	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.037	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	4.0	5.0	m Ω	$V_{GS} = 10V, I_D = 17A$ ③
		—	4.7	5.9		$V_{GS} = 4.5V, I_D = 14A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	1.35	—	2.25	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
$\Delta V_{GS(th)}$	Gate Threshold Voltage Coefficient	—	- 5.6	—	mV/ $^\circ\text{C}$	
I_{DSS}	Drain-to-Source Leakage Current	—	—	1.0	μA	$V_{DS} = 32V, V_{GS} = 0V$
		—	—	150		$V_{DS} = 32V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -20V$
gfs	Forward Transconductance	81	—	—	S	$V_{DS} = 20V, I_D = 14A$
Q_g	Total Gate Charge	—	33	50	nC	$V_{DS} = 20V$ $V_{GS} = 4.5V$ $I_D = 14A$
Q_{gs1}	Pre-Vth Gate-to-Source Charge	—	9.6	—		
Q_{gs2}	Post-Vth Gate-to-Source Charge	—	2.8	—		
Q_{gd}	Gate-to-Drain Charge	—	10	—		
Q_{godr}	Gate Charge Overdrive	—	10.6	—		
Q_{sw}	Switch Charge ($Q_{gs2} + Q_{gd}$)	—	12.8	—		
Q_{oss}	Output Charge	—	18	—	nC	$V_{DS} = 16V, V_{GS} = 0V$
R_G	Gate Resistance	—	1.3	2.6	Ω	
$t_{d(on)}$	Turn-On Delay Time	—	14	—	ns	$V_{DD} = 20V, V_{GS} = 4.5V$ ③ $I_D = 14A$ Clamped Inductive Load
t_r	Rise Time	—	12	—		
$t_{d(off)}$	Turn-Off Delay Time	—	21	—		
t_f	Fall Time	—	5.0	—		
C_{iss}	Input Capacitance	—	4500	—	pF	$V_{GS} = 0V$ $V_{DS} = 20V$ $f = 1.0MHz$
C_{oss}	Output Capacitance	—	680	—		
C_{riss}	Reverse Transfer Capacitance	—	310	—		

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy ②	—	50	mJ
I_{AR}	Avalanche Current ①	—	14	A

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	3.1	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	140		
V_{SD}	Diode Forward Voltage	—	—	1.0	V	$T_J = 25^\circ\text{C}, I_S = 14A, V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time	—	99	150	ns	$T_J = 25^\circ\text{C}, I_F = 14A, V_{DD} = 20V$
Q_{rr}	Reverse Recovery Charge	—	11	17	nC	$di/dt = 100A/\mu s$ ③



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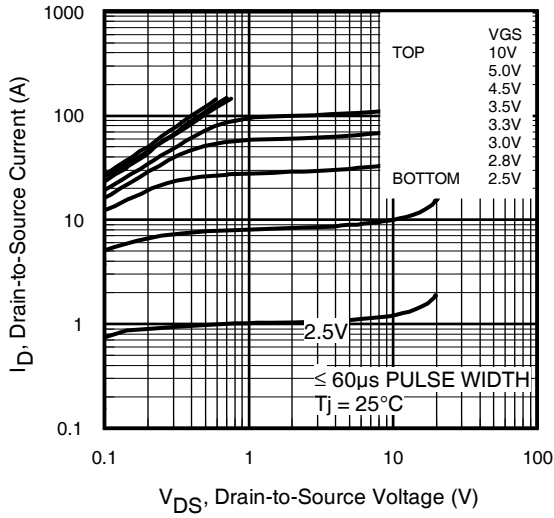


Fig 1. Typical Output Characteristics

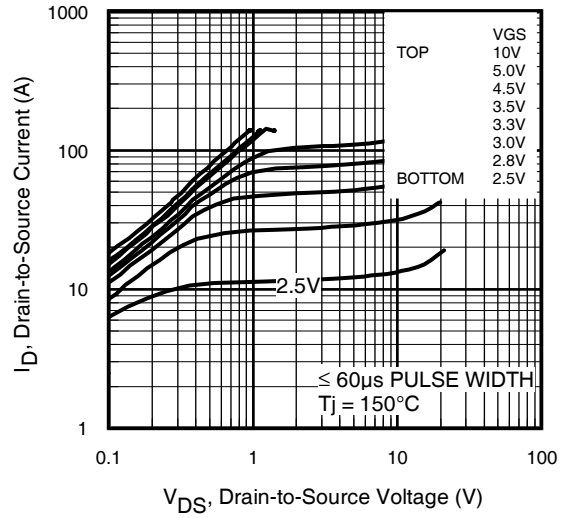


Fig 2. Typical Output Characteristics

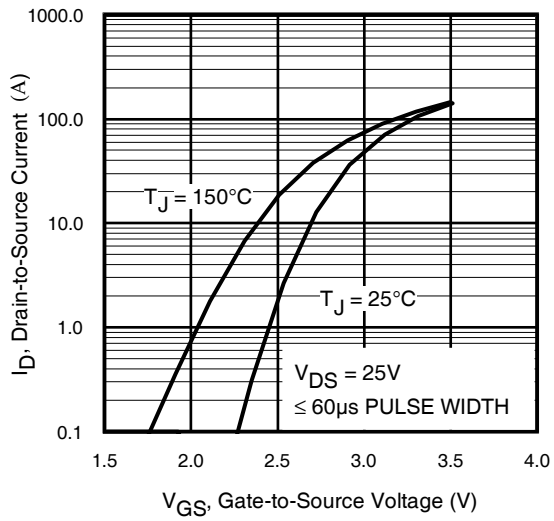


Fig 3. Typical Transfer Characteristics

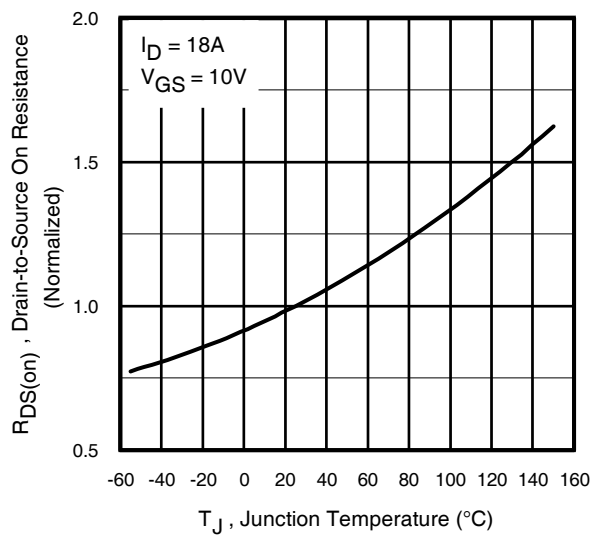


Fig 4. Normalized On-Resistance Vs. Temperature

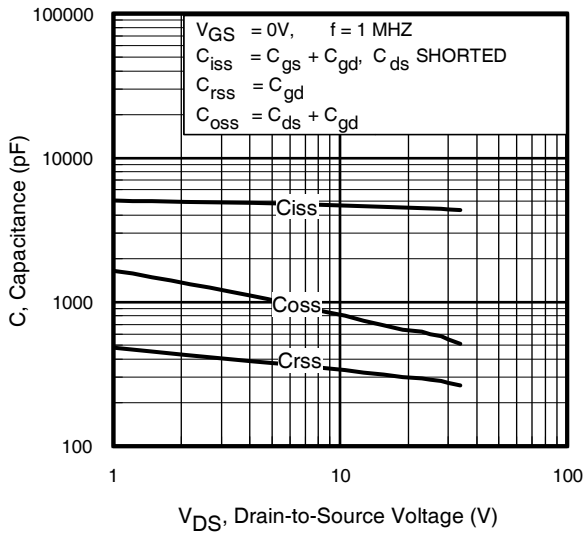


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

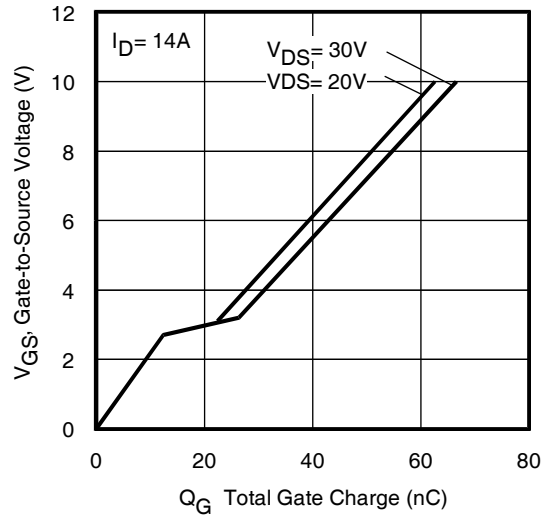


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

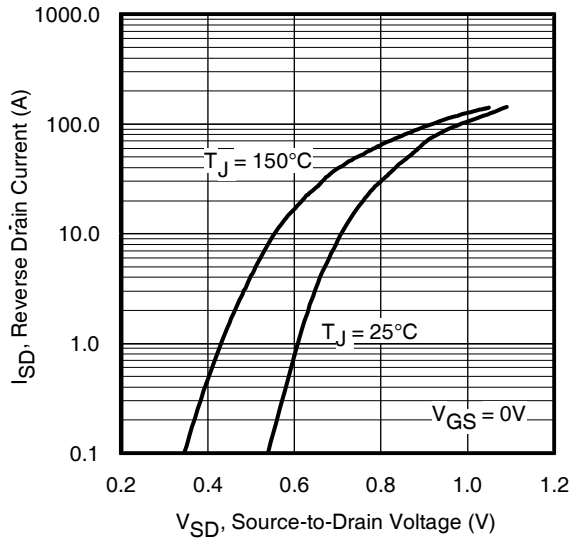


Fig 7. Typical Source-Drain Diode Forward Voltage

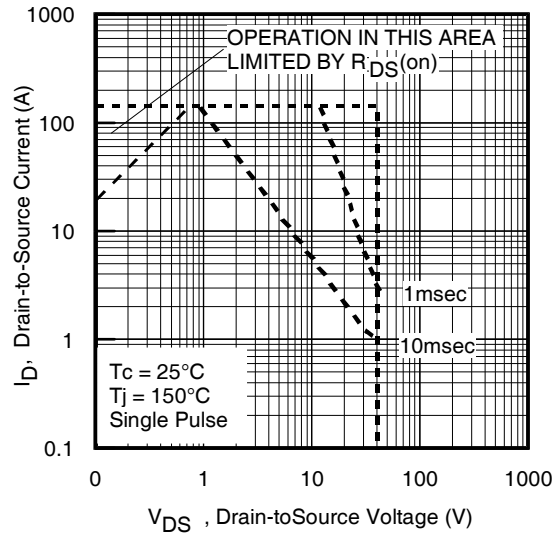


Fig 8. Maximum Safe Operating Area



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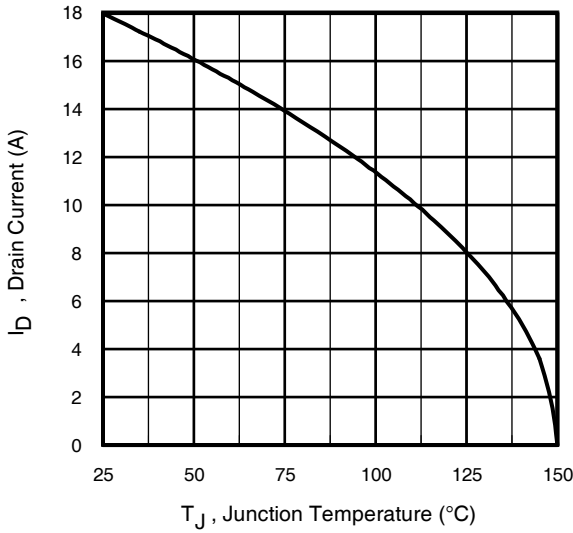


Fig 9. Maximum Drain Current Vs. Case Temperature

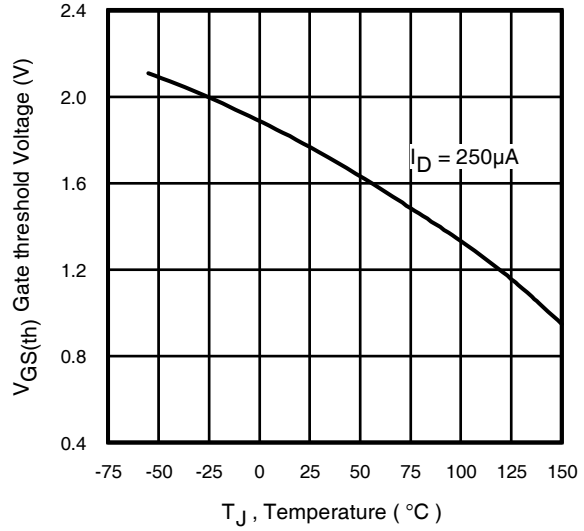


Fig 10. Threshold Voltage Vs. Temperature

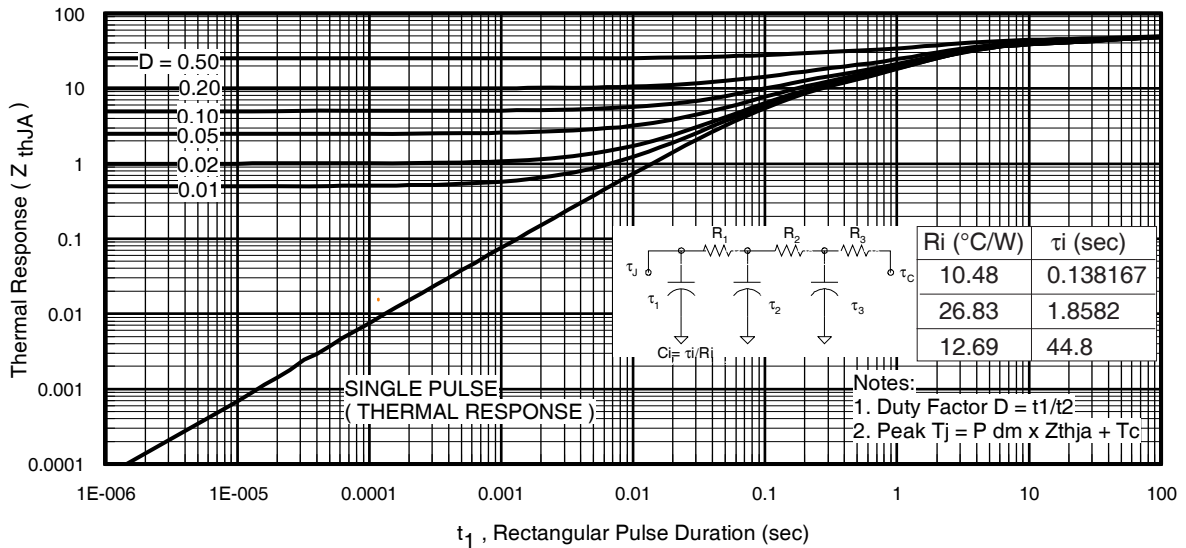


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



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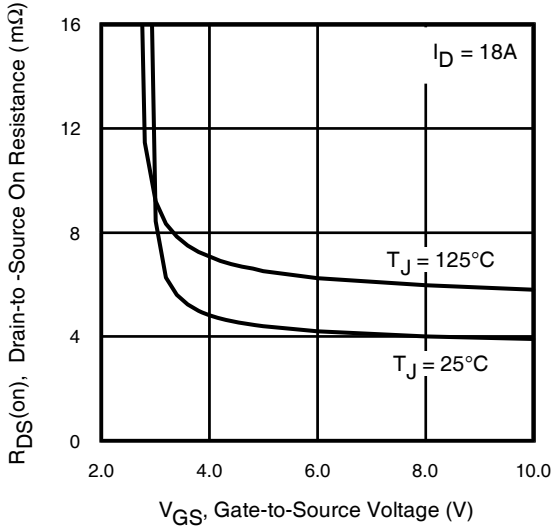


Fig 12. On-Resistance Vs. Gate Voltage

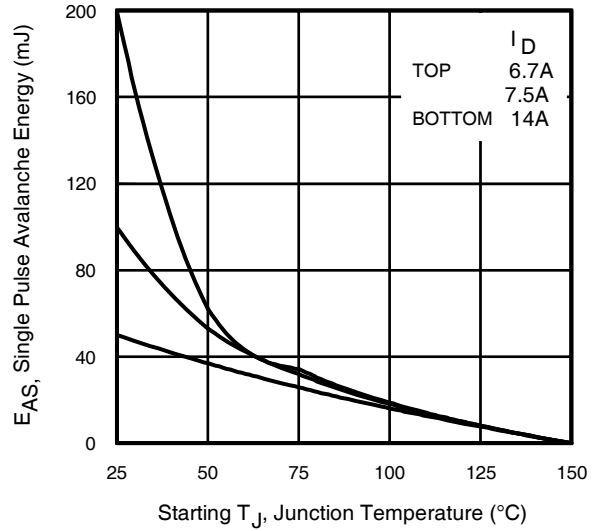


Fig 13c. Maximum Avalanche Energy Vs. Drain Current

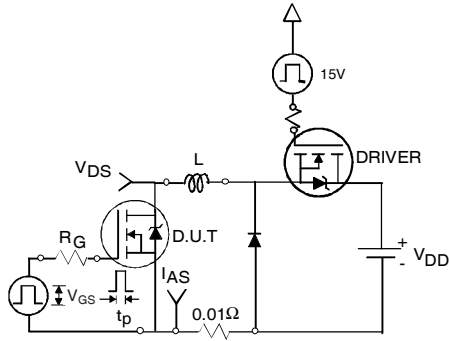


Fig 13a. Unclamped Inductive Test Circuit

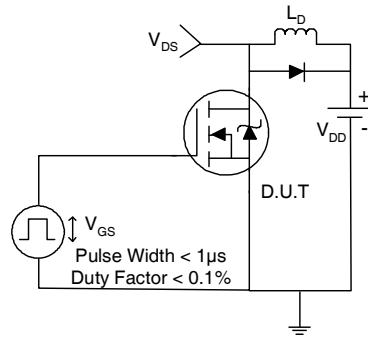


Fig 14a. Switching Time Test Circuit

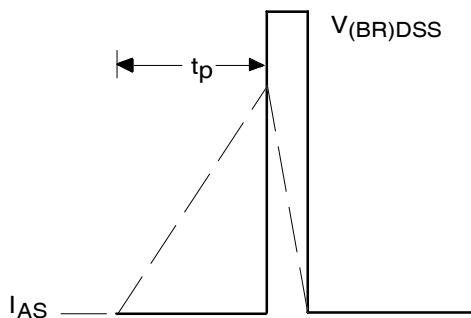


Fig 13b. Unclamped Inductive Waveforms

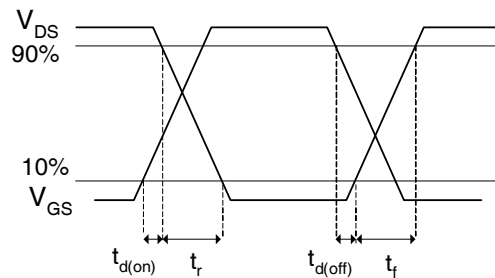


Fig 14b. Switching Time Waveforms



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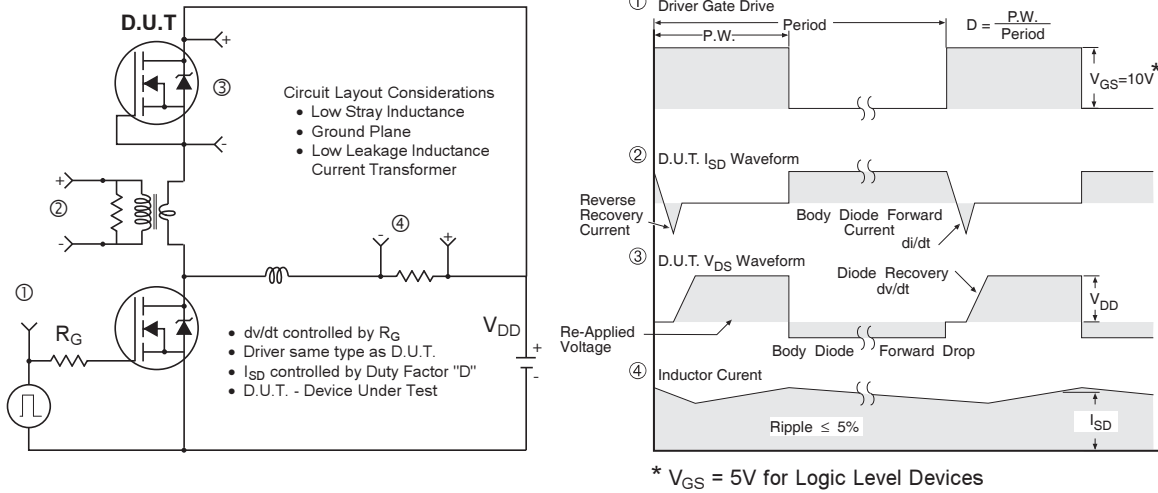


Fig 15. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

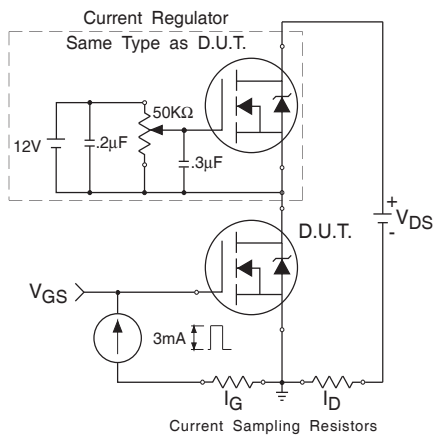


Fig 16. Gate Charge Test Circuit

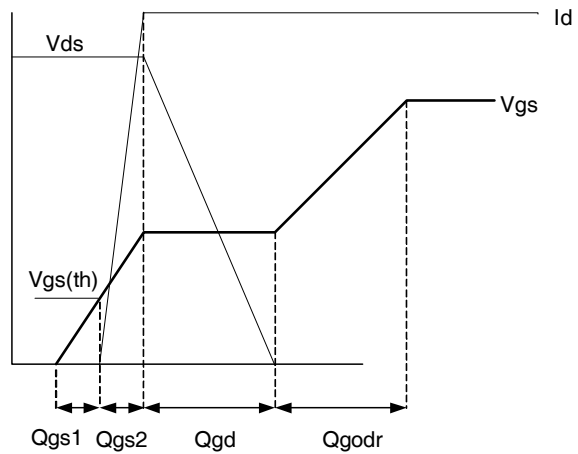


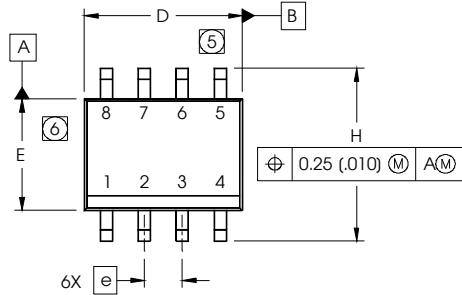
Fig 17. Gate Charge Waveform



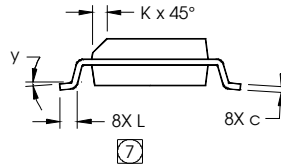
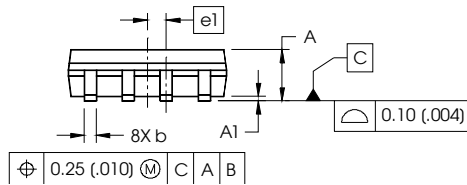
IRF7842PbF

SO-8 Package Outline

Dimensions are shown in millimeters (inches)



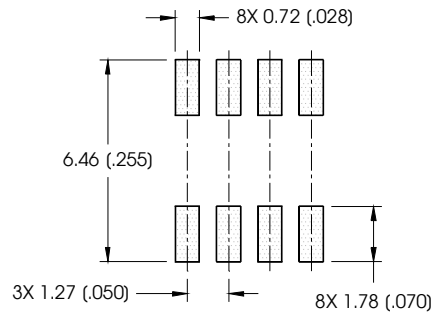
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40	1.27
y	0°	8°	0°	8°



NOTES:

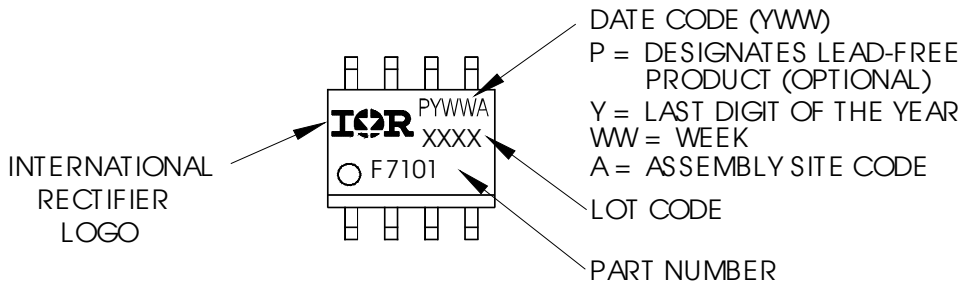
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA
- ⑤ DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
- ⑥ DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 (.010).
- ⑦ DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

FOOTPRINT



SO-8 Part Marking

EXAMPLE: THIS IS AN IRF7101 (MOSFET)

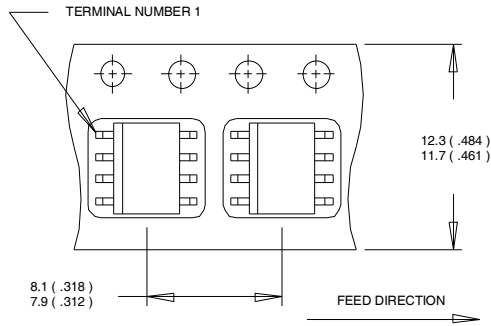


Note: For the most current drawing please refer to IR website at: <http://www.irf.com/package/>

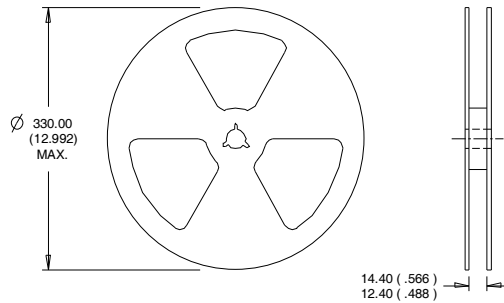


SO-8 Tape and Reel

Dimensions are shown in millimeters (inches)



- NOTES:
1. CONTROLLING DIMENSION : MILLIMETER.
 2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS(INCHES).
 3. OUTLINE CONFORMS TO EIA-481 & EIA-541.



- NOTES:
1. CONTROLLING DIMENSION : MILLIMETER.
 2. OUTLINE CONFORMS TO EIA-481 & EIA-541.

Note: For the most current drawing please refer to IR website at: <http://www.irf.com/package/>



IRF7842PbF

Qualification information[†]

Qualification level	Consumer (per JEDEC JESD47F ^{††} guidelines)	
Moisture Sensitivity Level	SO-8	MSL1 (per JEDEC J-STD-020D ^{††})
RoHS compliant	Yes	

[†] Qualification standards can be found at International Rectifier's web site: <http://www.irf.com/product-info/reliability>

^{††} Applicable version of JEDEC standard at the time of product release

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting $T_J = 25^\circ\text{C}$, $L = 0.5\text{mH}$
 $R_G = 25\Omega$, $I_{AS} = 14\text{A}$.
- ③ Pulse width $\leq 400\mu\text{s}$; duty cycle $\leq 2\%$.
- ④ When mounted on 1 inch square copper board
- ⑤ R_θ is measured at T_J approximately 90°C

Revision History

Date	Comment
7/8/2014	<ul style="list-style-type: none"> • Updated data sheet based on corporate template. • Added Qual level on page10. • Added ordering information on page1 • Updated Max RG from "TBD" to "2.6Ohm" on page2.

International
 Rectifier

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