International
IOR Rectifier

SMPS MOSFET

PD- 95906

IRFPS30N60KPbF

HEXFET® Power MOSFET

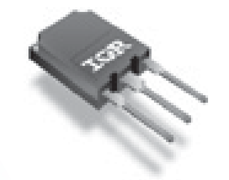
Applications

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply
- High Speed Power Switching
- Lead-Free

V_{DSS}	$R_{DS(on)}$ typ.	I_D
600V	**160mΩ**	**30A**

Benefits

- Low Gate Charge Qg results in Simple Drive Requirement
- Improved Gate, Avalanche and Dynamic dv/dt Ruggedness
- Fully Characterized Capacitance and Avalanche Voltage and Current



Super-247™

Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V	30	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	19	
I_{DM}	Pulsed Drain Current ①	120	
P_D @T_C = 25°C	Power Dissipation	450	W
	Linear Derating Factor	3.6	W/°C
V_{GS}	Gate-to-Source Voltage	± 30	V
dv/dt	Peak Diode Recovery dv/dt ③	13	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C
	Soldering Temperature, for 10 seconds (1.6mm from case)	300	

Avalanche Characteristics

Symbol	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②	—	520	mJ
I_{AR}	Avalanche Current①	—	30	A
E_{AR}	Repetitive Avalanche Energy①	—	45	mJ

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case⑥	—	0.28	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	0.24	—	
$R_{\theta JA}$	Junction-to-Ambient⑥	—	40	

09/15/04

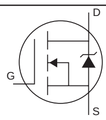
Static @ T_J = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	600	——	——	V	V_{GS} = 0V, I_D = 250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	——	0.66	——	V/°C	Reference to 25°C, I_D = 1mA ⑥
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	——	160	190	mΩ	V_{GS} = 10V, I_D = 18A ④
$V_{GS(th)}$	Gate Threshold Voltage	3.0	——	5.0	V	V_{DS} = V_{GS}, I_D = 250µA
I_{DSS}	Drain-to-Source Leakage Current	——	——	50	µA	V_{DS} = 600V, V_{GS} = 0V
		——	——	250		V_{DS} = 480V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	——	——	100	nA	V_{GS} = 30V
	Gate-to-Source Reverse Leakage	——	——	-100		V_{GS} = -30V

Dynamic @ T_J = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	16	——	——	S	V_{DS} = 50V, I_D = 18A
Q_g	Total Gate Charge	——	——	220		I_D = 30A
Q_{gs}	Gate-to-Source Charge	——	——	64	nC	V_{DS} = 480V
Q_{gd}	Gate-to-Drain ("Miller") Charge	——	——	110		V_{GS} = 10V ④
$t_{d(on)}$	Turn-On Delay Time	——	29	——		V_{DD} = 300V
t_r	Rise Time	——	120	——	ns	I_D = 30A
$t_{d(off)}$	Turn-Off Delay Time	——	56	——		R_G = 3.9 Ω
t_f	Fall Time	——	50	——		V_{GS} = 10V ④
C_{iss}	Input Capacitance	——	5870	——		V_{GS} = 0V
C_{oss}	Output Capacitance	——	530	——		V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	——	54	——	pF	f = 1.0MHz
C_{oss}	Output Capacitance	——	6920	——		V_{GS} = 0V, V_{DS} = 1.0V, f = 1.0MHz
C_{oss}	Output Capacitance	——	140	——		V_{GS} = 0V, V_{DS} = 480V, f = 1.0MHz
C_{oss} eff.	Effective Output Capacitance	——	270	——		V_{GS} = 0V, V_{DS} = 0V to 480V ⑤

Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	——	——	30	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	——	——	120		
V_{SD}	Diode Forward Voltage	——	——	1.5	V	T_J = 25°C, I_S = 30A, V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	——	640	960	ns	T_J = 25°C, I_F = 30A
Q_{rr}	Reverse RecoveryCharge	——	11	16	µC	di/dt = 100A/µs ④
I_{RRM}	Reverse RecoveryCurrent	——	31	——	A	
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

Notes:

① Repetitive rating; pulse width limited by max. junction temperature.

② Starting T_J = 25°C, L = 1.1mH, R_G = 25Ω, I_{AS} = 30A

③ I_{SD} ≤ 30A, di/dt ≤ 630A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 150°C

④ Pulse width ≤ 300µs; duty cycle ≤ 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 R_θ is measured at T_J approximately 90°C

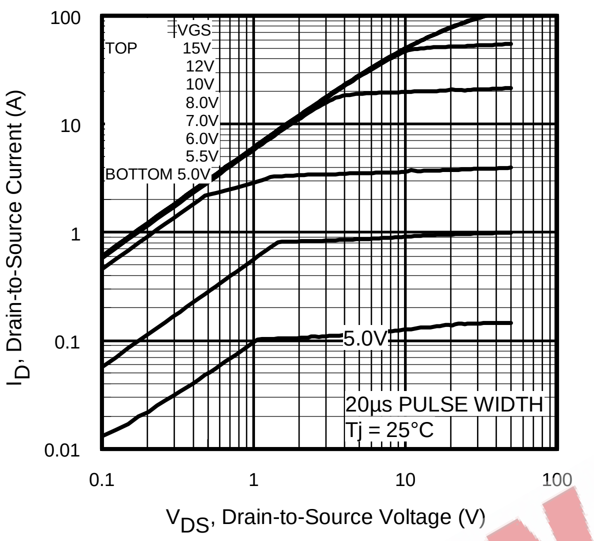


Fig 1. Typical Output Characteristics

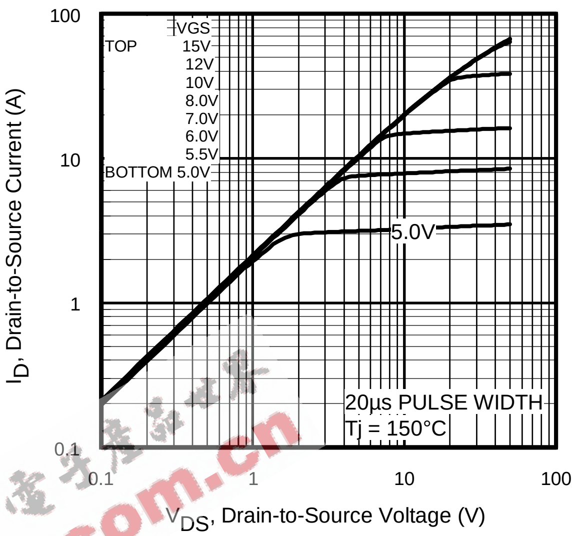


Fig 2. Typical Output Characteristics

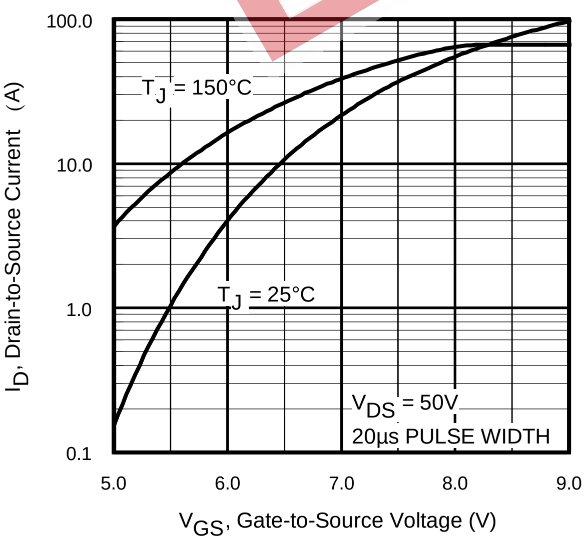


Fig 3. Typical Transfer Characteristics

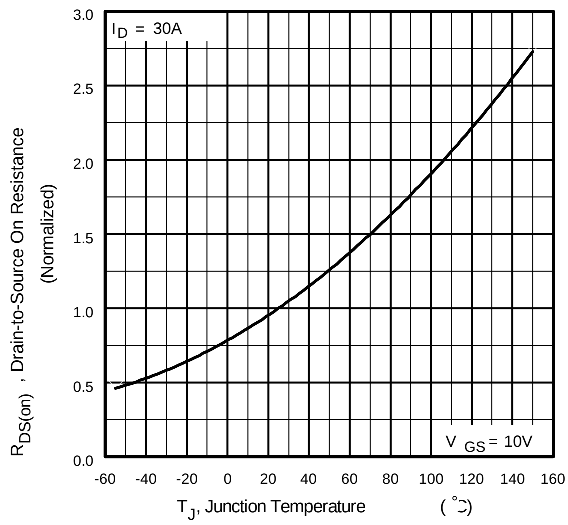


Fig 4. Normalized On-Resistance Vs. Temperature

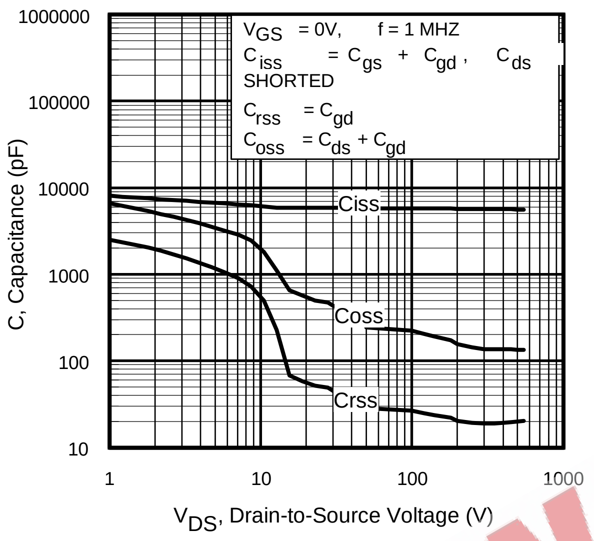


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

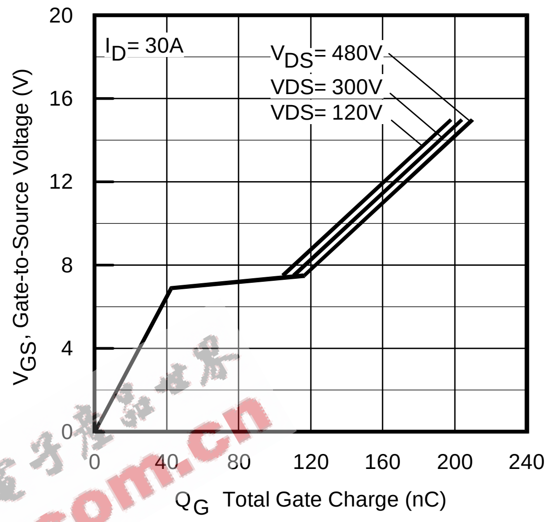


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

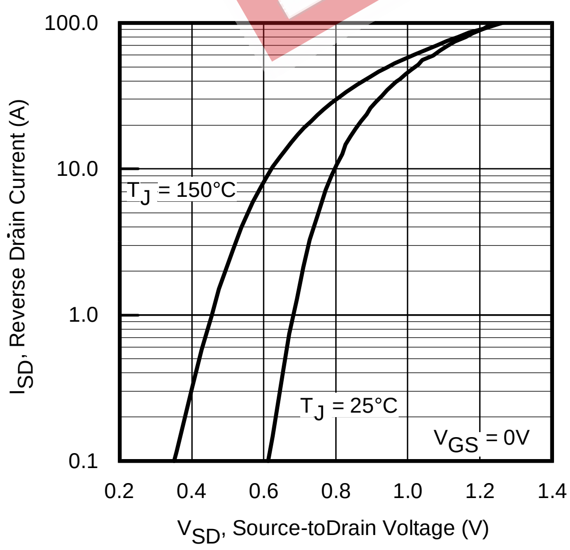


Fig 7. Typical Source-Drain Diode Forward Voltage

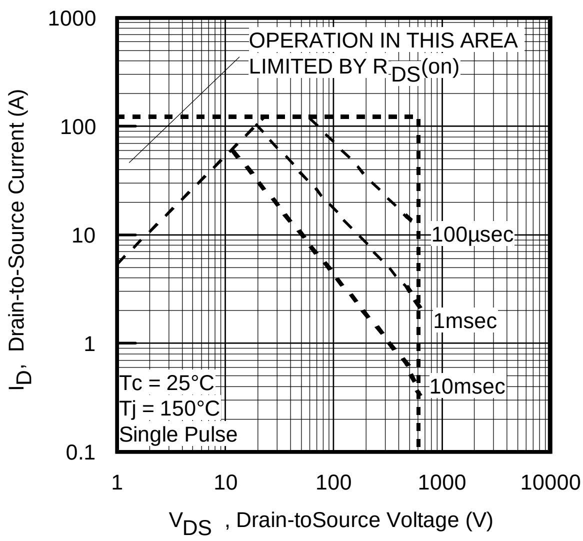


Fig 8. Maximum Safe Operating Area

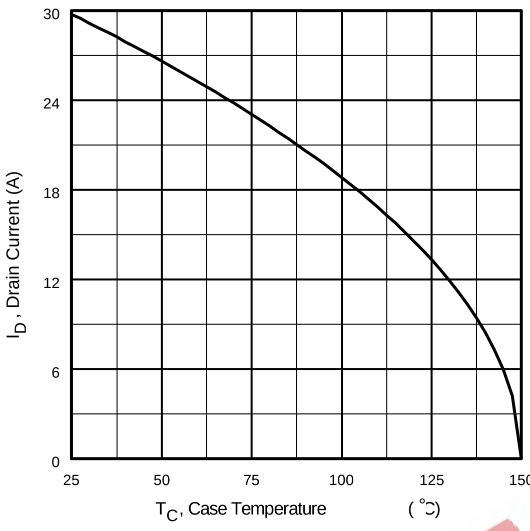


Fig 9. Maximum Drain Current Vs. Case Temperature

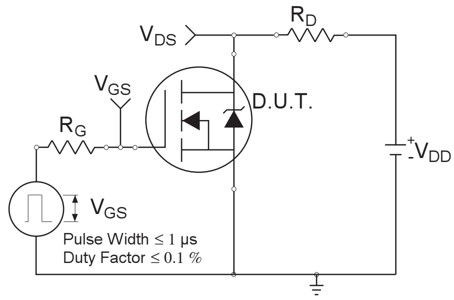


Fig 10a. Switching Time Test Circuit

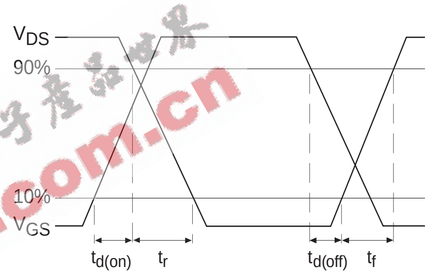


Fig 10b. Switching Time Waveforms

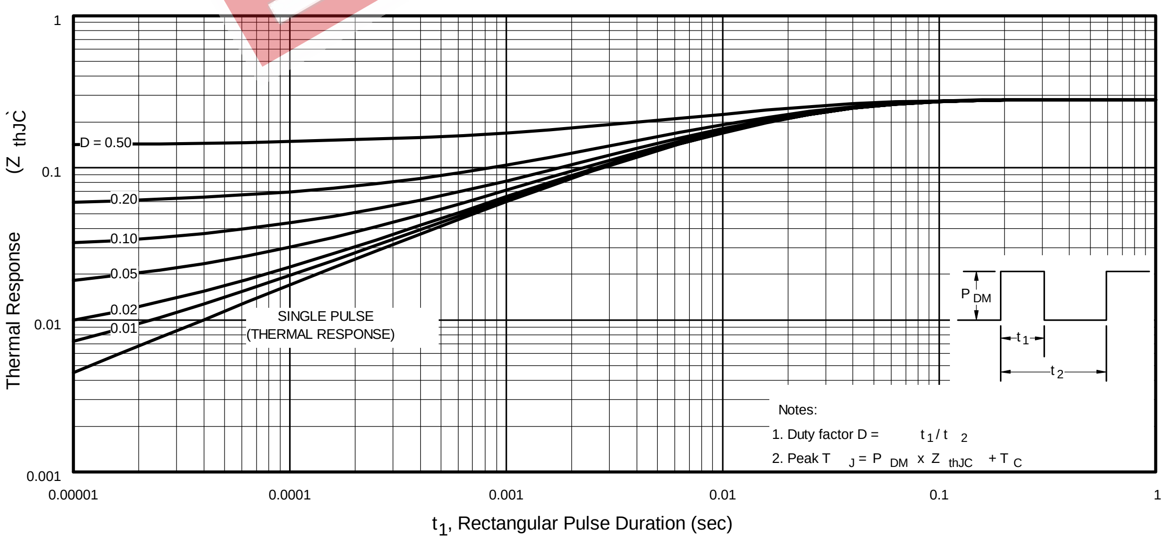


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

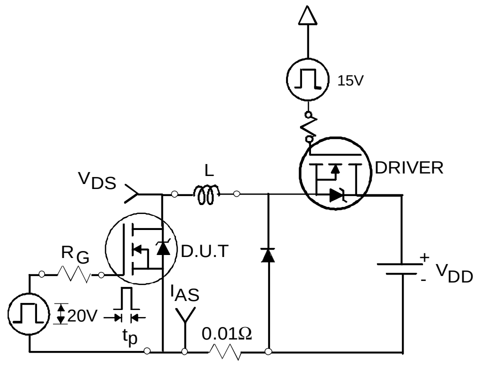


Fig 12a. Unclamped Inductive Test Circuit

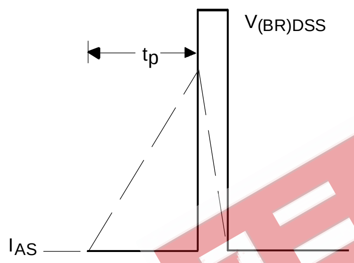


Fig 12b. Unclamped Inductive Waveforms

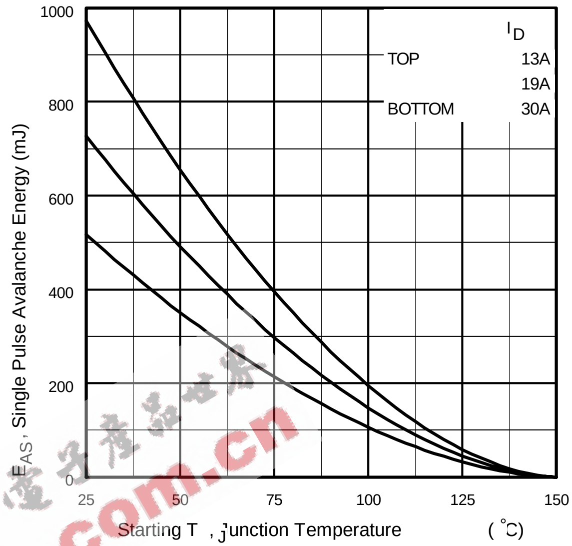


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

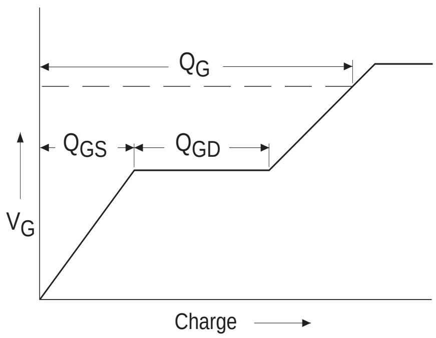


Fig 13a. Basic Gate Charge Waveform

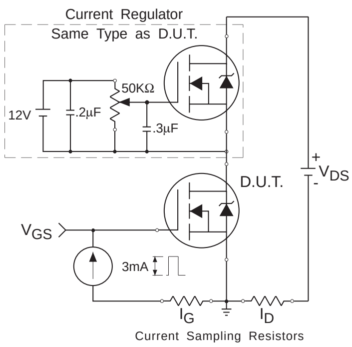
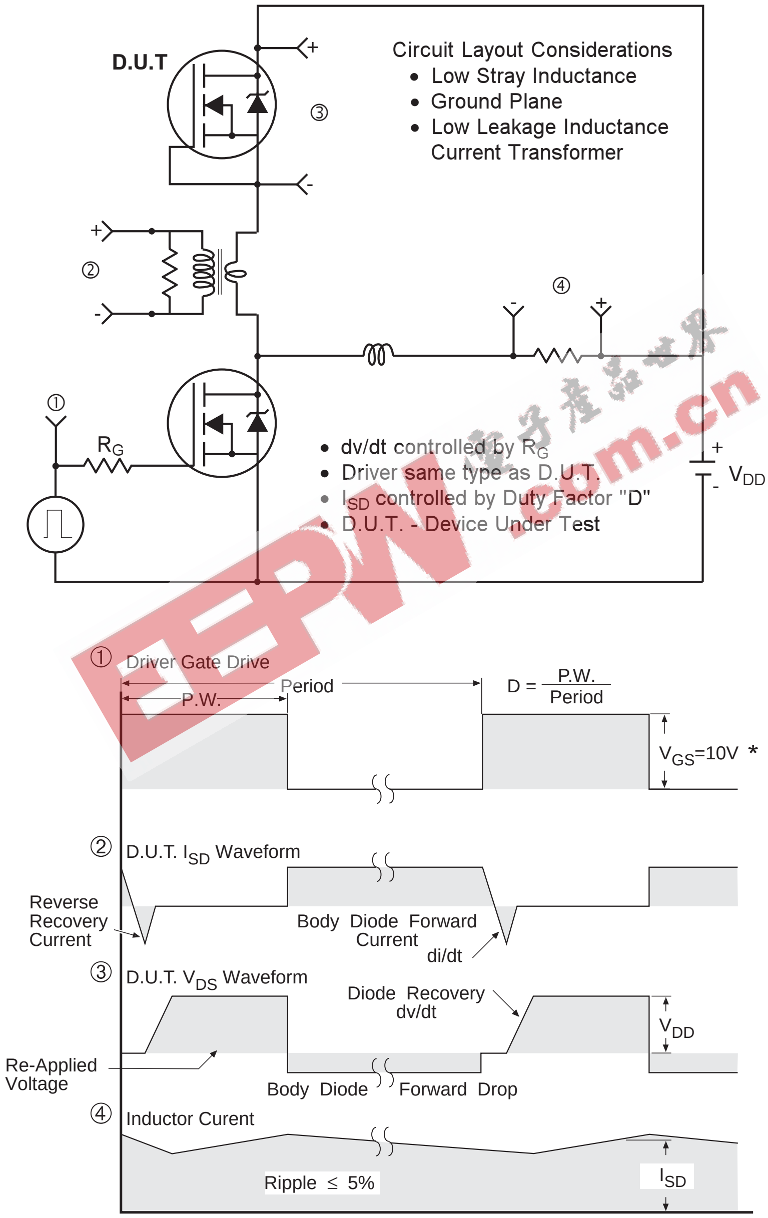


Fig 13b. Gate Charge Test Circuit

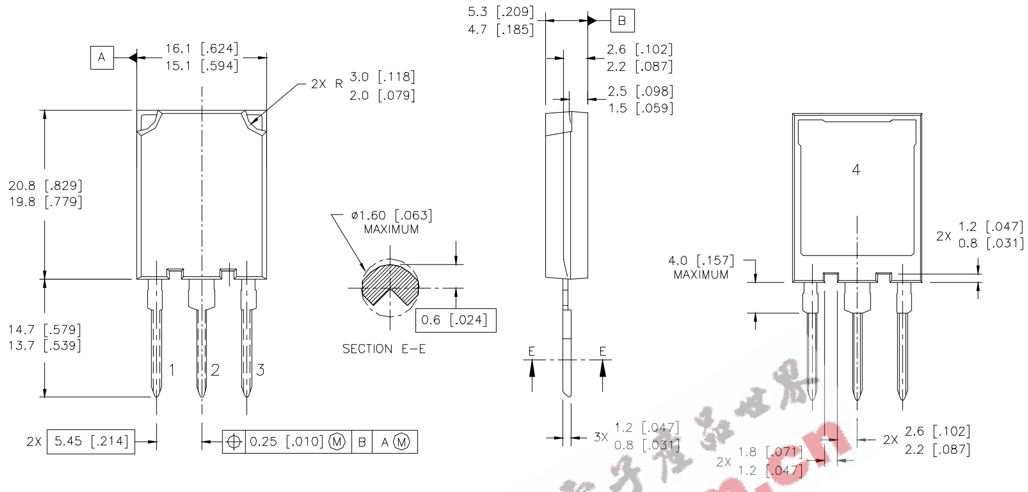
Peak Diode Recovery dv/dt Test Circuit



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

Fig 14. For N-Channel HEXFET® Power MOSFETs

Case Outline and Dimensions — Super-247



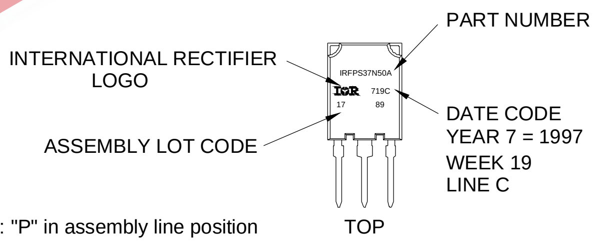
NOTES:
1. DIMENSIONS & TOLERANCING PER ASME Y14.5M-1994
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETRES [INCHES]

LEAD ASSIGNMENTS

MOSFET	IGBT
1 - GATE	1 - GATE
2 - DRAIN	2 - COLLECTOR
3 - SOURCE	3 - EMITTER
4 - DRAIN	4 - COLLECTOR

Super-247 (TO-274AA) Part Marking Information

EXAMPLE: THIS IS AN IRFPS37N50A WITH
ASSEMBLY LOT CODE 1789
ASSEMBLED ON WW 19, 1997
IN THE ASSEMBLY LINE "C"



Note: "P" in assembly line position
indicates "Lead-Free"

Data and specifications subject to change without notice.
This product has been designed and qualified for the Industrial market.
Qualification Standards can be found on IR's Web site.

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