PD - 95862

International
IOR Rectifier

SMPS MOSFET

IRF6218

HEXFET® Power MOSFET

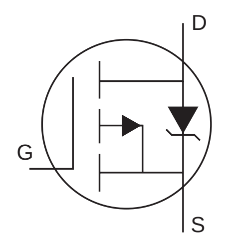
Applications

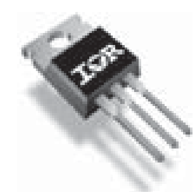
- Reset Switch for Active Clamp Reset DC-DC converters

V_{DSS}	$R_{DS(on)}$ max	I_D
-150V	150mΩ@V_{GS} = -10V	-27A

Benefits

- Low Gate to Drain Charge to Reduce Switching Losses
- Fully Characterized Capacitance Including Effective C_{OSS} to Simplify Design (See App. Note AN1001)
- Fully Characterized Avalanche Voltage and Current





TO-220AB

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	-150	V
V_{GS}	Gate-to-Source Voltage	± 20	
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V	-27	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	-19	
I_{DM}	Pulsed Drain Current ①	-110	
P_D @T_C = 25°C	Maximum Power Dissipation	250	W
	Linear Derating Factor	1.6	W/°C
dv/dt	Peak Diode Recovery dv/dt ⑥	8.2	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 175	°C
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	
	Mounting torque, 6-32 or M3 screw	10 lbf•in (1.1N•m)	

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case ⑤	——	0.61	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface ⑤	0.50	——	
$R_{\theta JA}$	Junction-to-Ambient ⑤	——	62	

Notes ① through ④ are on page 7

04/22/04

Static @ T_J = 25°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 = -250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	–––	-0.17	–––	V/°C	Reference to 25°C, I_D = -1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	–––	120	150	mΩ	V_{GS} = -10V, I_D = -16A 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	–––	–––	-25	µA	V_{DS} = -120V, V_{GS} = 0V
		–––	–––	-250		V_{DS} = -120V, V_{GS} = 0V, T_J = 150°C
I_{GSS}	Gate-to-Source Forward Leakage	–––	–––	-100	nA	V_{GS} = -20V
	Gate-to-Source Reverse Leakage	–––	–––	100		V_{GS} = 20V

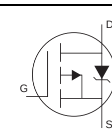
Dynamic @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
gfs	Forward Transconductance	11	–––	–––	S	V_{DS} = -50V, I_D = -16A
Q_g	Total Gate Charge	–––	71	110	nC	I_D = -16A
Q_{gs}	Gate-to-Source Charge	–––	21	–––		V_{DS} = -120V
Q_{gd}	Gate-to-Drain ("Miller") Charge	–––	32	–––		V_{GS} = -10V ④
$t_{d(on)}$	Turn-On Delay Time	–––	21	–––	ns	V_{DD} = -75V
t_r	Rise Time	–––	70	–––		I_D = -16A
$t_{d(off)}$	Turn-Off Delay Time	–––	35	–––		R_G = 3.9Ω
t_f	Fall Time	–––	30	–––		V_{GS} = -10V ④
C_{iss}	Input Capacitance	–––	2210	–––	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	–––	370	–––		V_{DS} = -25V
C_{rss}	Reverse Transfer Capacitance	–––	89	–––		f = 1.0MHz
C_{oss}	Output Capacitance	–––	2220	–––		V_{GS} = 0V, V_{DS} = -1.0V, f = 1.0MHz
C_{oss}	Output Capacitance	–––	170	–––		V_{GS} = 0V, V_{DS} = -120V, f = 1.0MHz
C_{oss} eff.	Effective Output Capacitance	–––	340	–––		V_{GS} = 0V, V_{DS} = 0V to -120V

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②	–––	210	mJ
I_{AR}	Avalanche Current ①	–––	-16	A

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	–––	–––	-27	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	–––	–––	-110		
V_{SD}	Diode Forward Voltage	–––	–––	-1.6	V	T_J = 25°C, I_S = -16A, V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	–––	150	–––	ns	T_J = 25°C, I_F = -16A, V_{DD} = -25V
Q_{rr}	Reverse Recovery Charge	–––	860	–––	nC	di/dt = -100A/µs ④

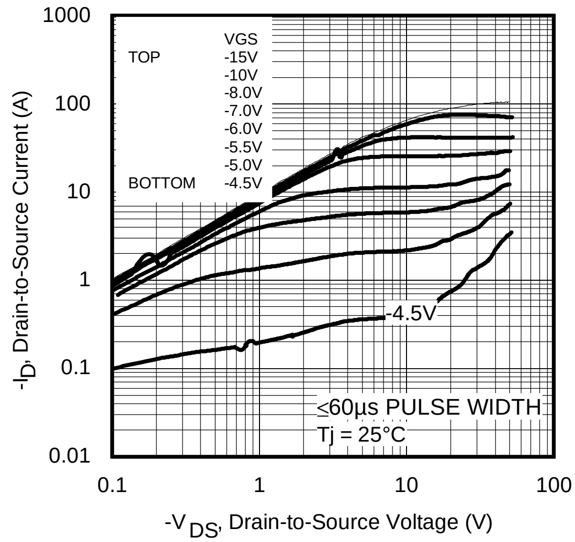


Fig 1. Typical Output Characteristics

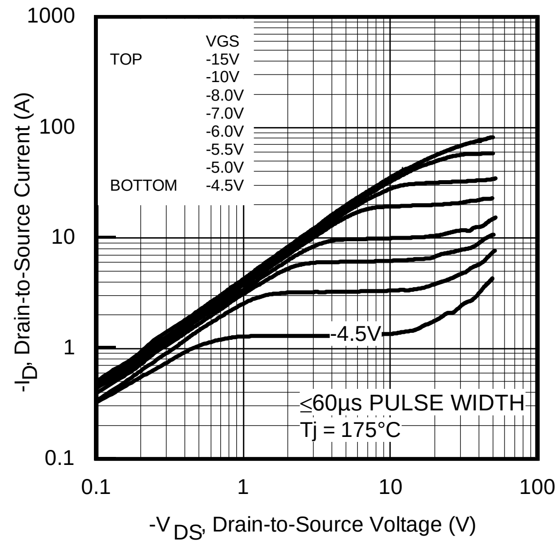


Fig 2. Typical Output Characteristics

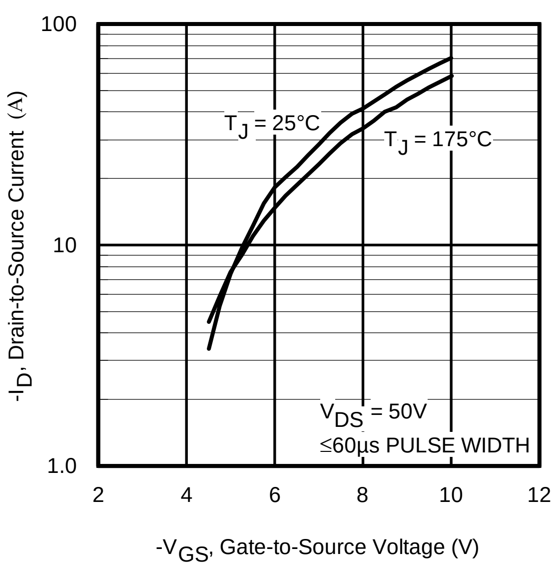


Fig 3. Typical Transfer Characteristics

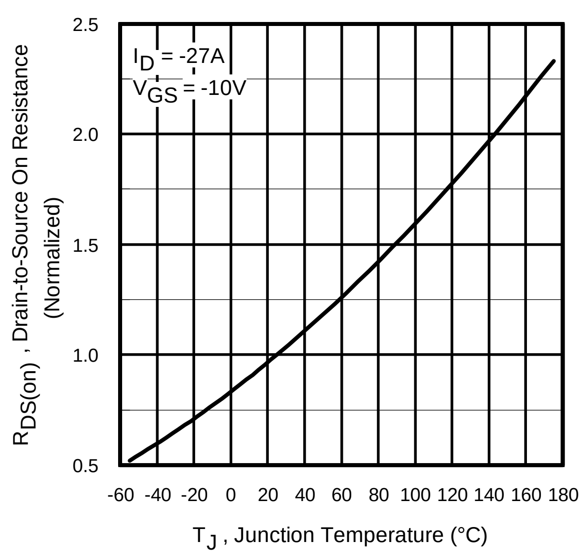


Fig 4. Normalized On-Resistance vs. Temperature

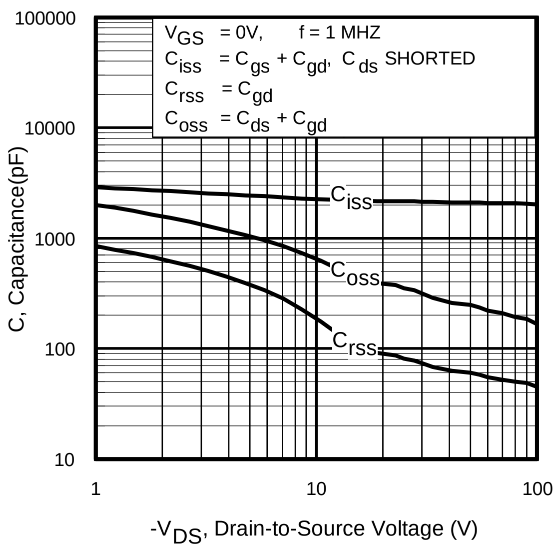


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

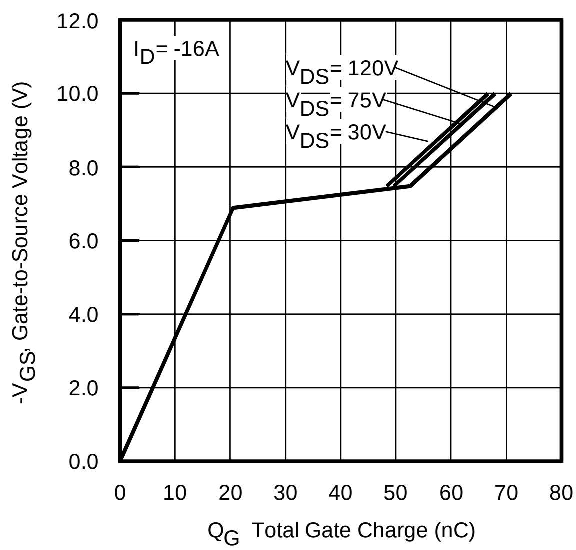


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

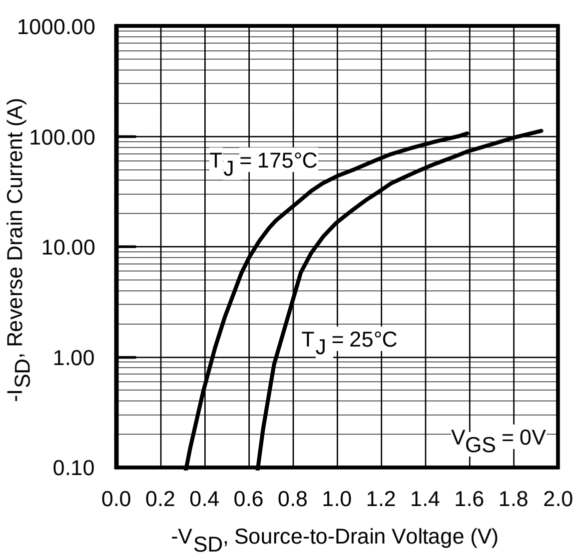


Fig 7. Typical Source-Drain Diode Forward Voltage

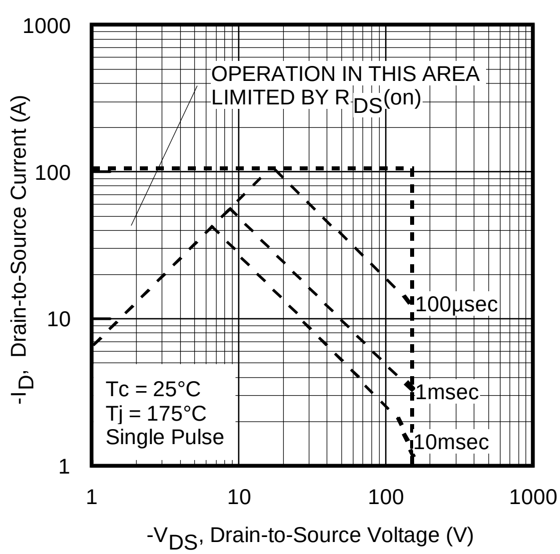


Fig 8. Maximum Safe Operating Area

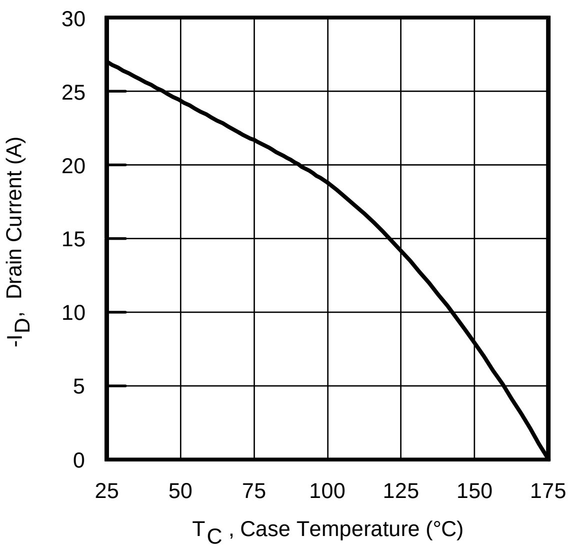


Fig 9. Maximum Drain Current vs. Ambient Temperature

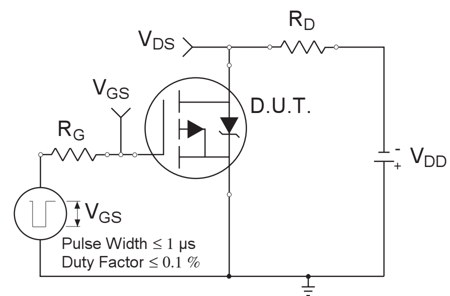


Fig 10a. Switching Time Test Circuit

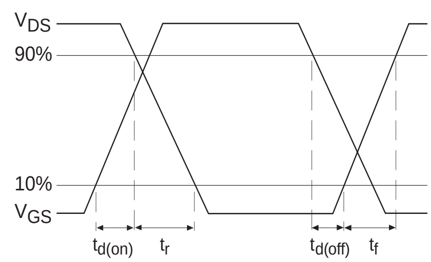
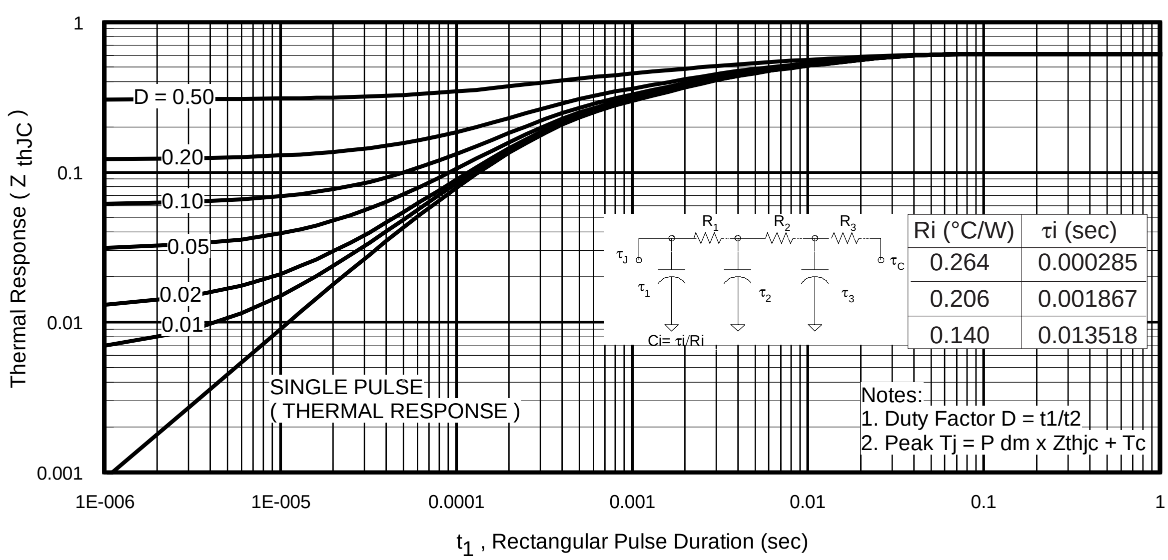


Fig 10b. Switching Time Waveforms



Ri (°C/W)	τi (sec)
0.264	0.000285
0.206	0.001867
0.140	0.013518

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

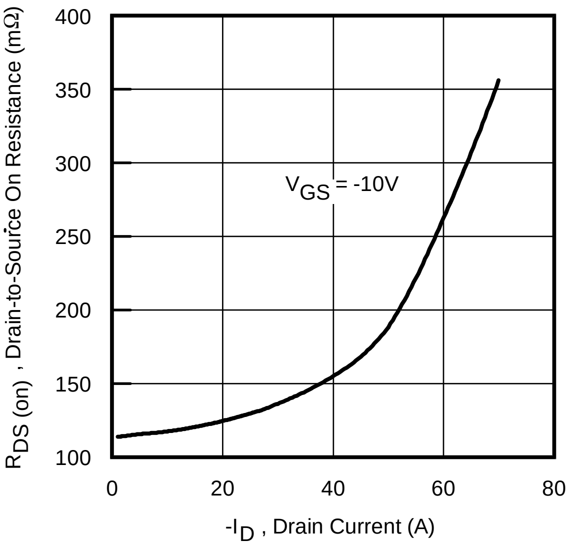


Fig 12. On-Resistance vs. Drain Current

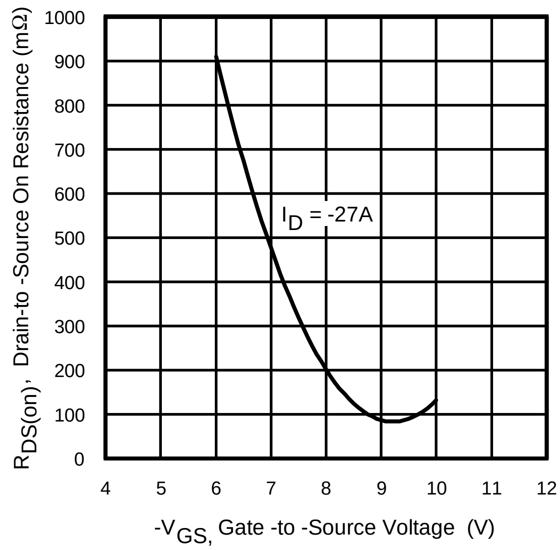


Fig 13. On-Resistance vs. Gate Voltage

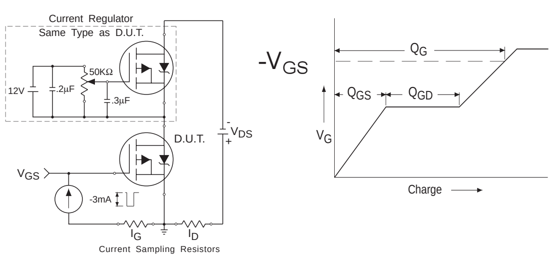
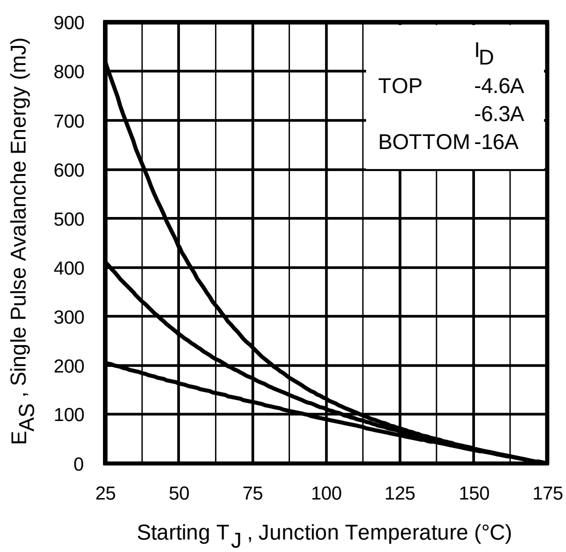


Fig 14a&b. Basic Gate Charge Test Circuit and Waveform



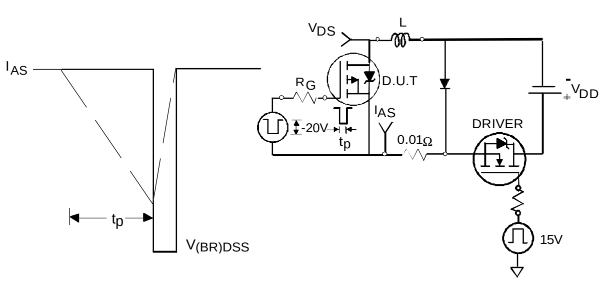
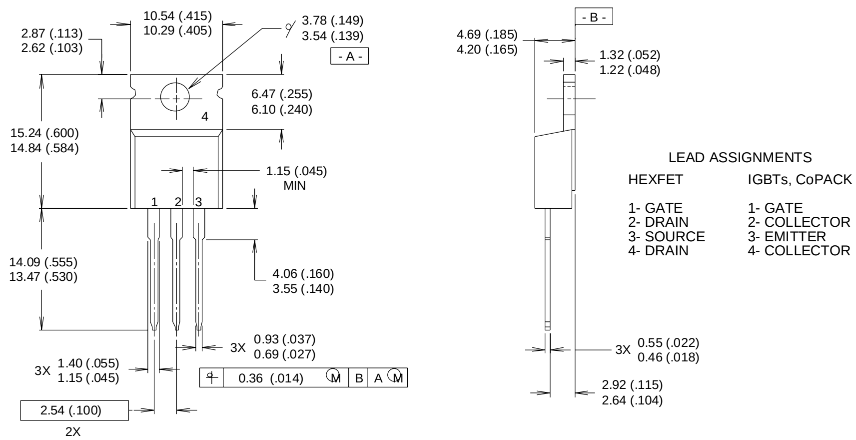


Fig 15a&b. Unclamped Inductive Test circuit and Waveforms

Fig 15c. Maximum Avalanche Energy vs. Drain Current

TO-220AB Package Outline

Dimensions are shown in millimeters (inches)



NOTES:

1 DIMENSIONING & TOLERANCING PER ANSI Y14.5M, 1982.

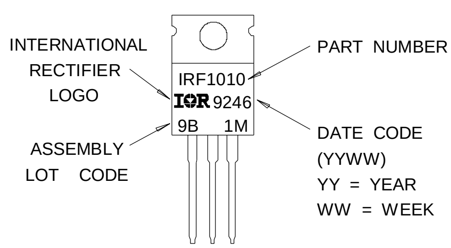
2 CONTROLLING DIMENSION : INCH

3 OUTLINE CONFORMS TO JEDEC OUTLINE TO-220AB.

4 HEATSINK & LEAD MEASUREMENTS DO NOT INCLUDE BURRS.

TO-220AB Part Marking Information

EXAMPLE : THIS IS AN IRF1010
WITH ASSEMBLY
LOT CODE 9B1M



Notes:

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

② Starting T_J = 25°C, L = 1.6mH, R_G = 25Ω, I_{AS} = -17A.

③ $I_{SD} \leq$ -17A, di/dt ≤ -520A/µs, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq$ 175°C.

④ Pulse width ≤ 300µs; duty cycle ≤ 2%.

⑤ R_θ is measured at T_J of approximately 90°C.

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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