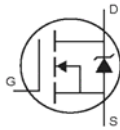
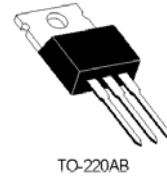


Advanced Process Technology
Dynamic dv/dt Rating
175 Operating Temperature
Fast Switching
Fully Avalanche Rated



$V_{DSS}=55V$
 $R_{DS(on)}=0.07\Omega$
 $I_D=17A$



Description

Fifth Generation HEXFET ® power MOSFETs from International Rectifier utilize advanced processing techniques to achieve the lowest possible on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device that HEXFET power MOSFETs are well known for, provides the designer with an extremely efficient device for use in a wide variety of applications.

The TO-220 package is universally preferred for all commercial-industrial applications at power dissipation levels to approximately 50 watts. The low thermal resistance and low package cost of the TO-220 contribute to its wide acceptance throughout the industry.

Absolute Maximum Ratings

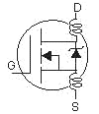
	Parameter	Max.	Units
$I_D @ T_C=25$	Continuous Drain Current, VGS @ 10V	17	A
$I_D @ T_C=100$	Continuous Drain Current, VGS @ 10V	12	
I_{DM}	Pulsed Drain Current	68	
$P_D @ T_C=25$	Power Dissipation	45	W
	Linear Derating Factor	0.30	W/
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy	71	mJ
I_{AR}	Avalanche Current	10	A
E_{AR}	Repetitive Avalanche Energy	4.5	mJ
dv/dt	Peak Diode Recovery dv/dt	5.0	V/ns
T_J I_{STG}	Operating Junction and Storage Temperature Range	-55 to +175	
	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	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	-	-	3.3	/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	-	0.50	-	
$R_{\theta JC}$	Junction-to-Ambient	-	-	62	

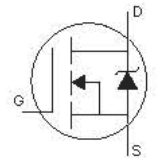
Electrical Characteristics @ $T_J=25$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	55	-	-	V	$V_{GS}=0V, I_D=250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	-	0.052	-	V/	Reference to 25 , $I_D=1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	-	-	0.07	Ω	$V_{GS}=10V, I_D=10A$
$V_{GS(th)}$	Gate Threshold Voltage	2.0	-	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
gfs	Forward Transconductance	4.5	-	-	S	$V_{DS}=25V, I_D=10A$
I_{DSS}	Drain-to-Source Leakage Current	-	-	25	μA	$V_{DS}=55V, V_{GS}=0V$
		-	-	250		$V_{DS}=44V, V_{GS}=0V, T_J=150$
I_{GSS}	Gate-to-Source Forward Leakage	-	-	100	nA	$V_{GS}=20V$
	Gate-to-Source Reverse Leakage	-	-	-100		$V_{GS}=-20V$
Qg	Total Gate Charge	-	-	20	nC	$I_D=10A$
Qgs	Gate-to-Source Charge	-	-	5.3		$V_{DS}=44V$
Qgd	Gate-to-Drain ("Miller") Charge	-	-	7.6		$V_{GS}=10V$, See Fig. 6 and 13
td(on)	Turn-On Delay Time	-	4.9	-	ns	$I_D=10A$
tr	Rise Time	-	34	-		$I_D=10A$
td(off)	Turn-Off Delay Time	-	19	-		$R_G=24\Omega$
tf	Fall Time	-	27	-		$R_D=2.6\Omega$, See Fig.10
L_D	Internal Drain Inductance	-	4.5	-	nH	Between lead, 6mm (0.25in.) from package and center of die contact
L_S	Internal Source Inductance	-	7.5	-		
C_{iss}	Input Capacitance	-	370	-	μF	$V_{GS}=0V$
C_{DSS}	Output Capacitance	-	140	-		$V_{DS}=25V$
C_{rss}	Reverse Transfer Capacitance	-	65	-		$F=1.0MHz$, See Fig.5



Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	-	-	17	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode)	-	-	68		
V_{SD}	Diode Forward Voltage	-	-	1.3	V	$T_J=25$, $I_S=10A, V_{GS}=0V$
trr	Reverse Recovery Time	-	56	83	ns	$T_J=25$, $I_F=10A$
Qrr	Reverse Recovery Charge	-	120	180	nC	$di/dt=100A/\mu s$



Notes:

Repetitive rating; pulse width limited by max. junction temperature. (See fig.11)

 $V_{DD}=25V$, starting $T_J=25$, $L=1.0mH, R_G=25\Omega, I_{AS}=10A$. (See Figure 12)

 $I_{SD}\leq 10A, di/dt \leq 280A/\mu s, V_{DD}\leq V_{(BR)DSS}, T_J\leq 175$

 Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

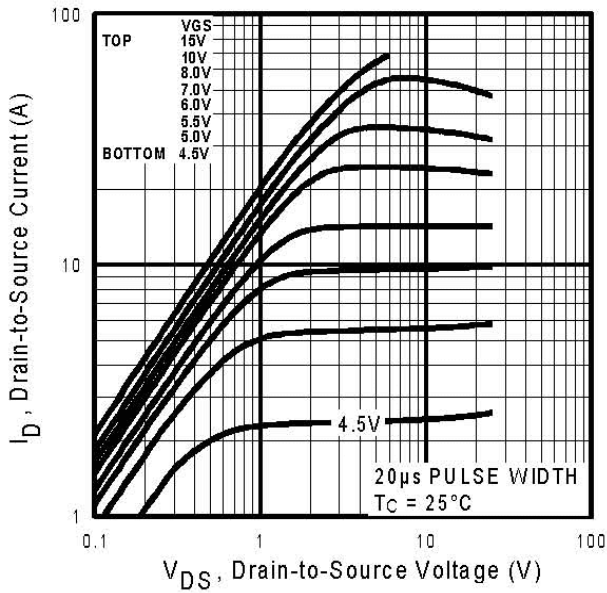


Fig 1. Typical Output Characteristics, $T_J=25$

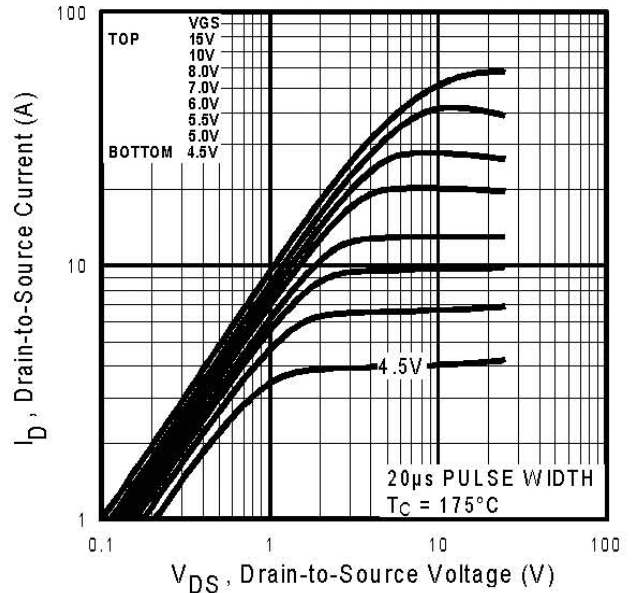


Fig 2. Typical Output Characteristics, $T_J=175$

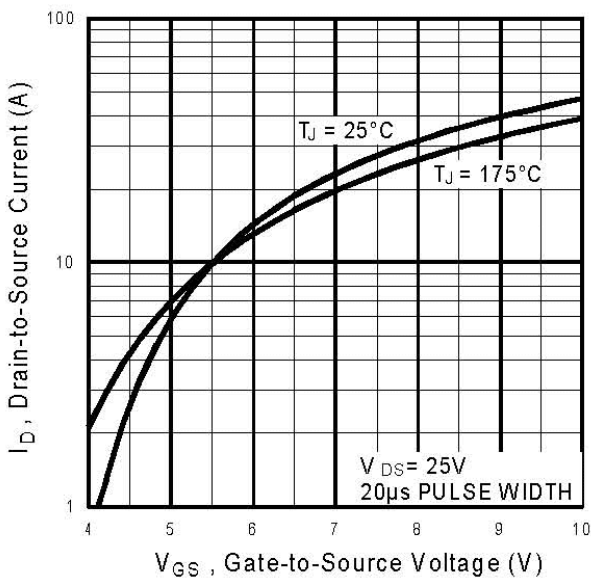


Fig 3. Typical Transfer Characteristics

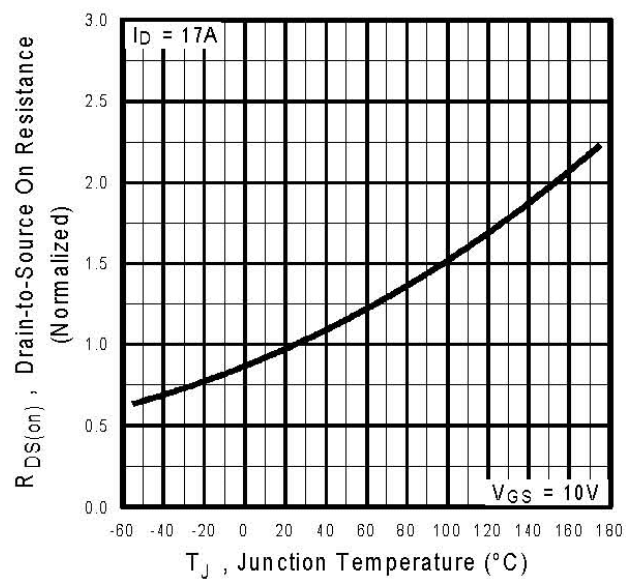


Fig 4. Normalized On-Resistance Vs. Temperature

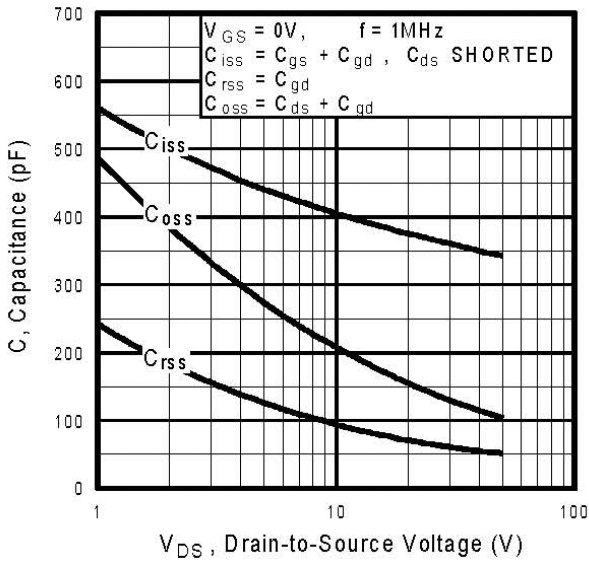


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

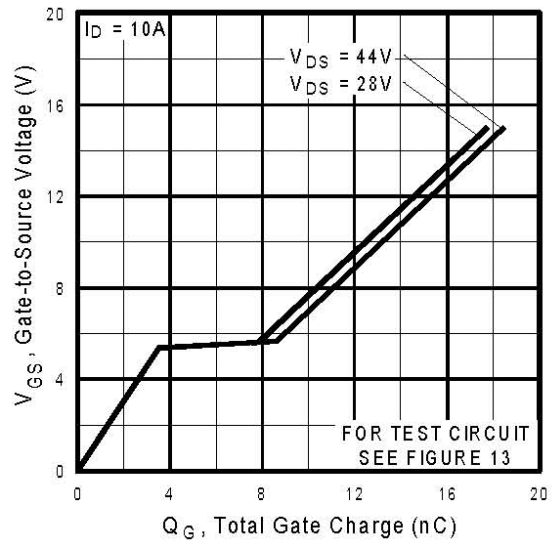


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

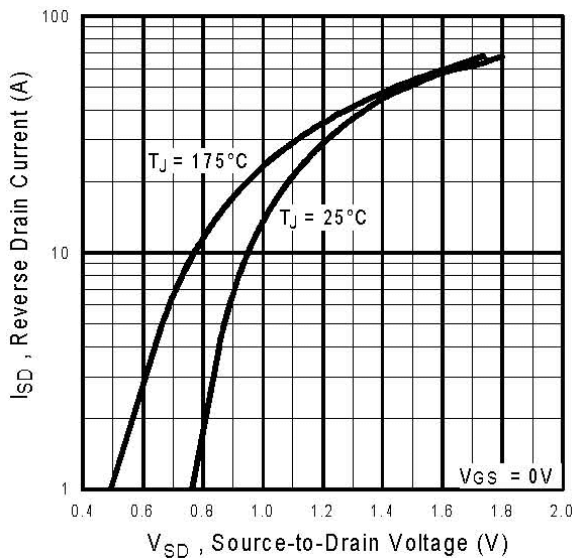


Fig 7. Typical Source-Drain Diode Forward Voltage

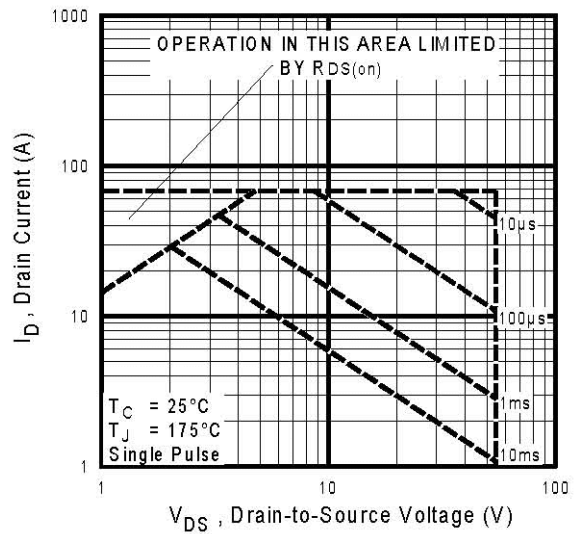


Fig 8. Maximum Safe Operating Area

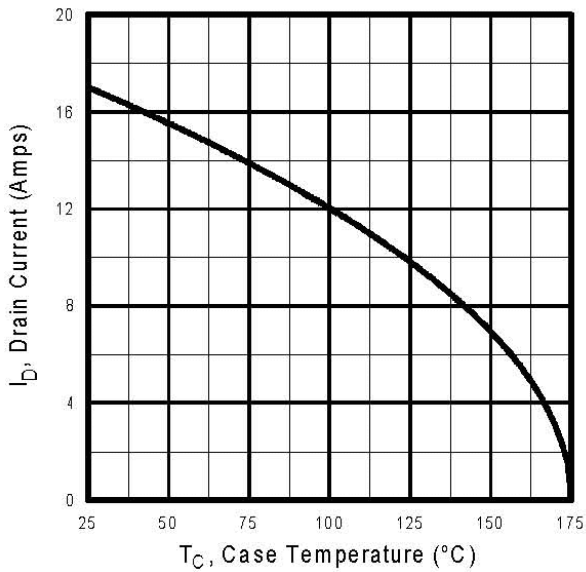


Fig 9. Maximum Drain Current Vs. Case Temperature

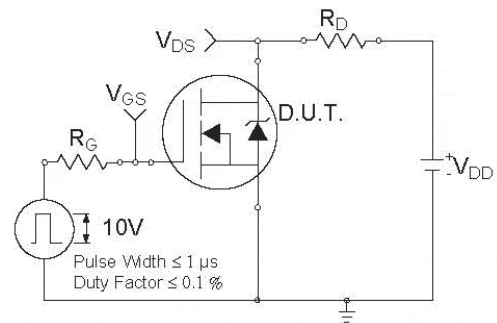


Fig 10a. Switching Time Test Circuit

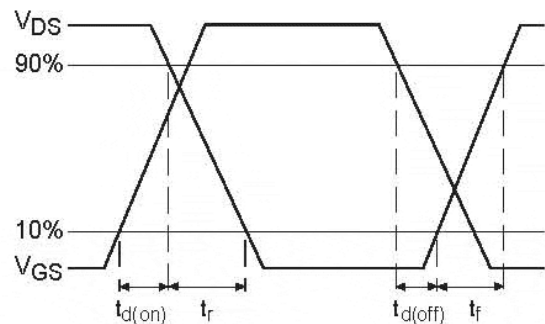


Fig 10b. Switching Time Waveforms

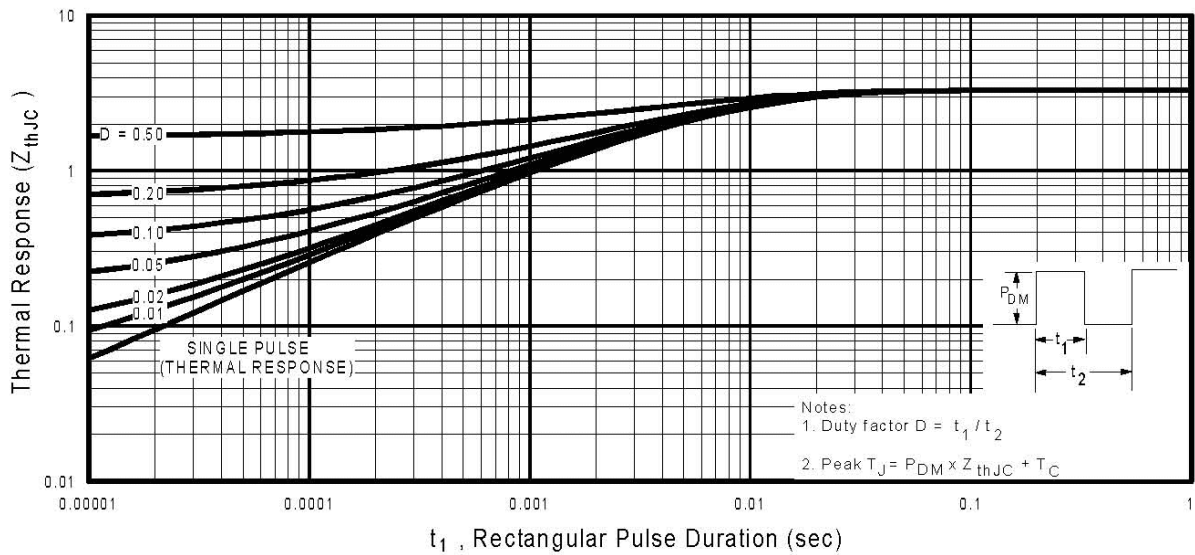


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

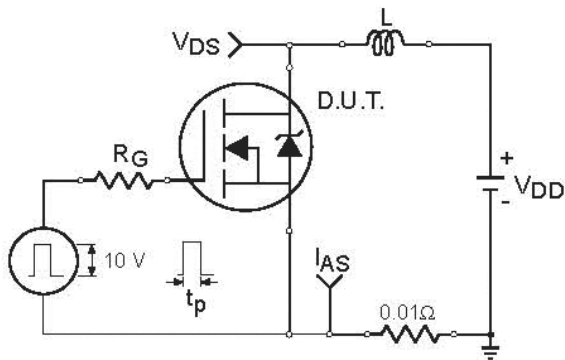


Fig 12a. Unclamped Inductive Test Circuit

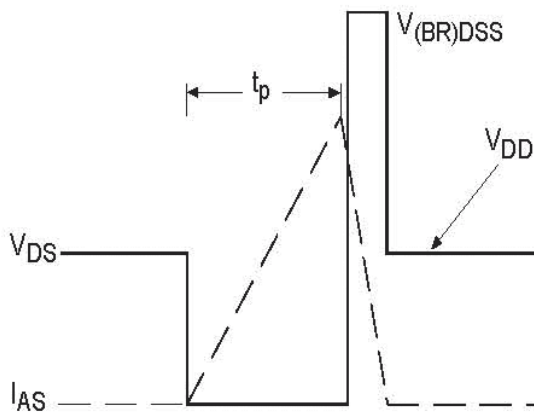


Fig 12b. Unclamped Inductive Waveforms

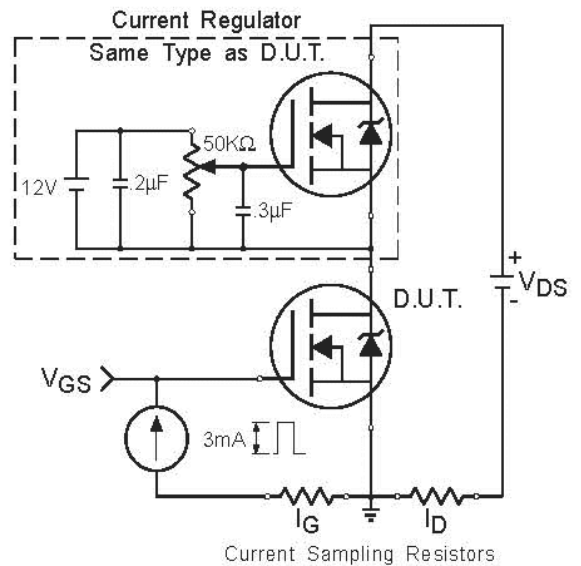
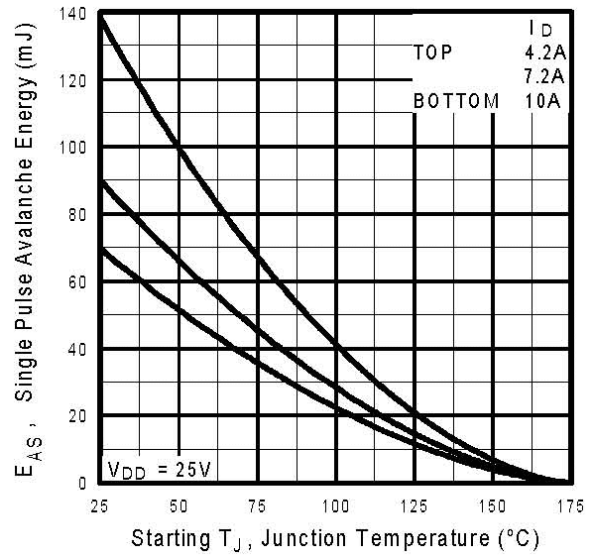
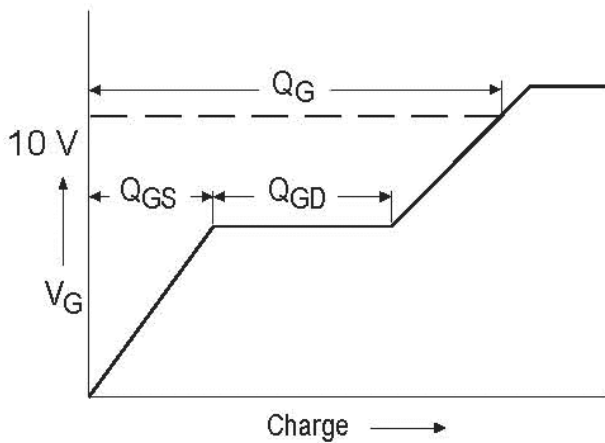
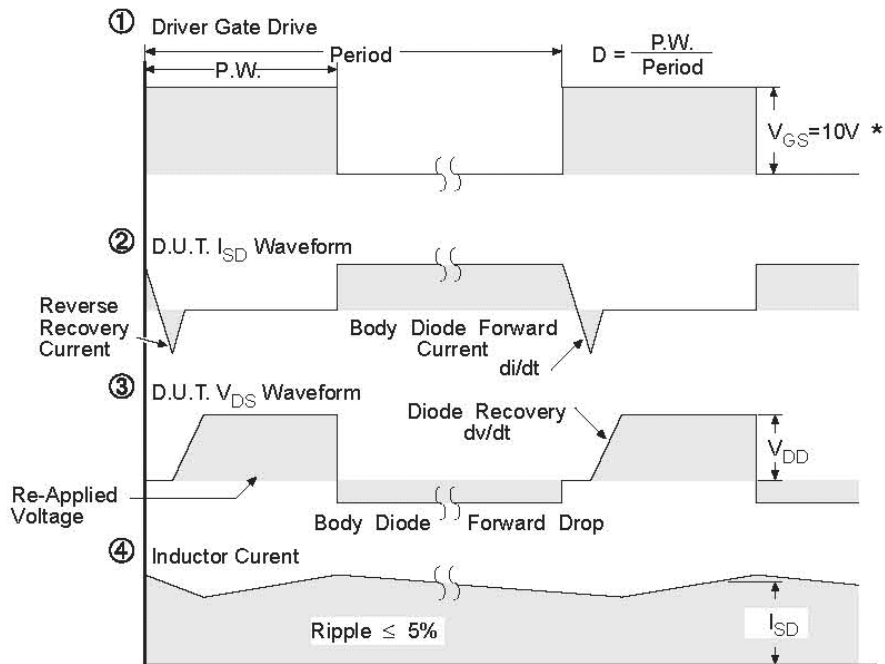
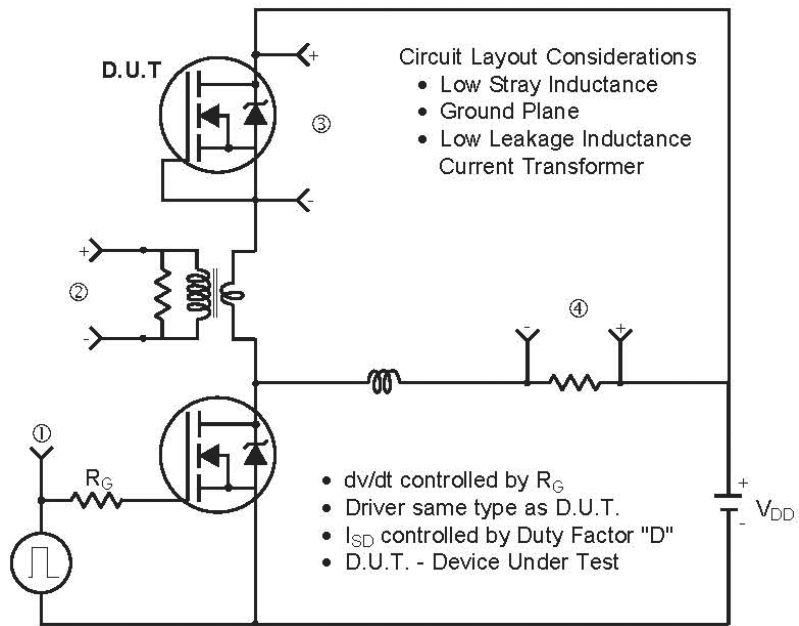


Fig 13b. Gate Charge Test Circuit

Peak Diode Recovery dv/dt Test Circuit



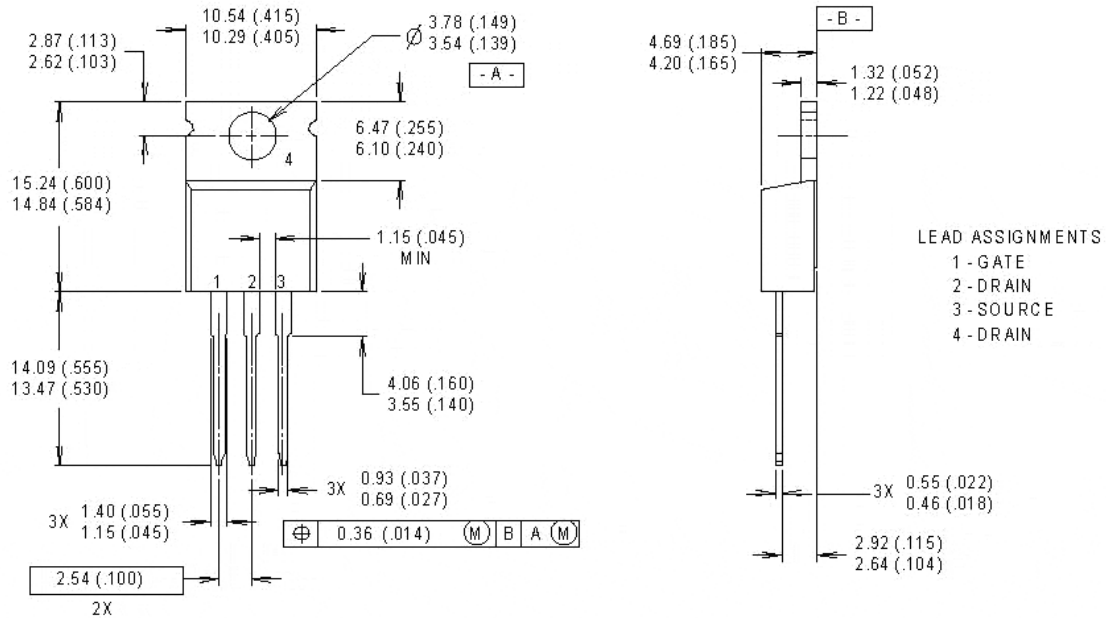
* $V_{GS} = 5V$ for Logic Level Devices

Fig 14. For N-Channel HEXFET ® power MOSFETs

Package Outline

TO-220AB

Dimensions are shown in millimeters (inches)



NOTES:

- 1 DIMENSIONING & TOLERANCING PER ANSII Y14.5M, 1982.
- 2 CONTROLLING DIMENSION : INCH

- 3 OUTLINE CONFORMS TO JEDEC OUTLINE TO-220-AB.
- 4 HEATSINK & LEAD MEASUREMENTS DO NOT INCLUDE BURRS.