50 Volt, 0.1 Ohm HEXFET

TO-220AB Plastic Package

The HEXFET technology has expanded its product base to serve the low voltage, very low RDS(on) MOSFET transistor requirements, International Rectifier's highly efficient geometry and unique processing of the HEXFET have been combined to create the lowest on resistance per device performance, in addition to this feature all HEXFETs have documented reliability and parts per million quality I

The HEXFET transistors also offer all of the well established advantages of MOSFETs such as voltage control, very fast switching, ease of paralleling, and temperature stability of the electrical parameters.

They are well suited for applications such as switching power supplies, motor controls, inverters, choppers, audio are operated from low voltage batteries, such as automotive, portable equipment, etc.

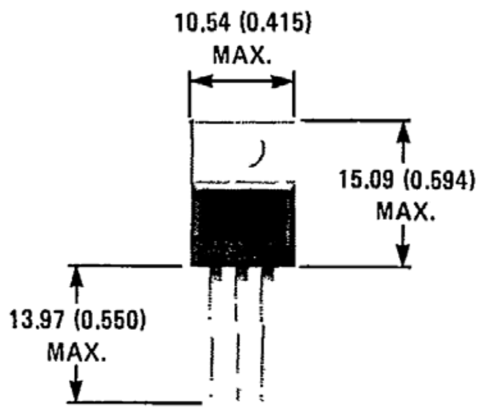
Product Summary

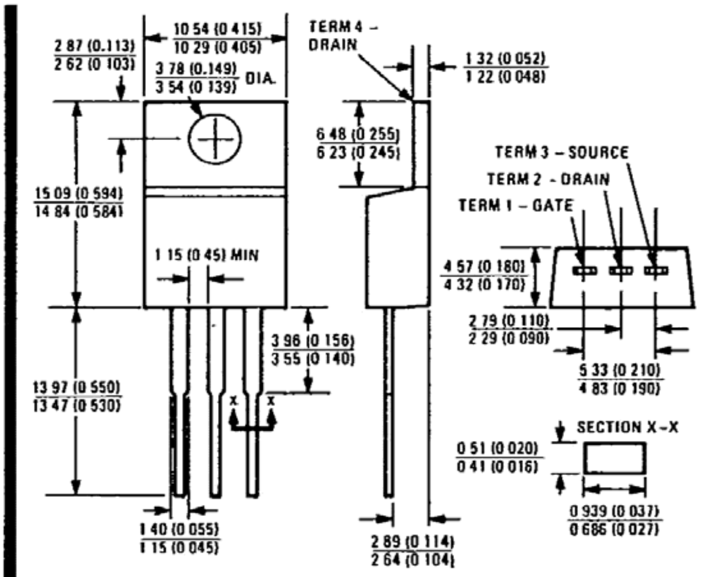
Part Number	V_{DS}	$R_{DS(on)}$	I_D
IRFZ20	50V	0.10Ω	15A
IRFZ22	50V	0.12Ω	14A

Features:

Extremely Low $R_{DS(on)}$
Compact Plastic Package
Fast Switching
Low Drive Current
Ease of Paralleling
Excellent Temperature Stability
Parts Per Million Quality

CASE STYLE AND DIMENSIONS



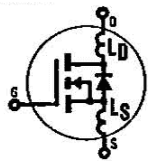


Case Style TO-220AB
Dimensions in Millimeters and (Inches)

Absolute Maximum Ratings

	Parameter	IRFZ20	IRFZ22	Units
V_{DS}	Drain-Source Voltage ①	50	50	V
V_{DGR}	Drain-Gate Voltage (R_{GS} = 20KΩ)	50	50	V
I_D@T_C=25℃	Continuous Drain Current	15	14	A
I_D@ Tc=100℃	Continuous Drain Current	10	9.0	A
I_{DM}	Pulsed Drain Current ③	60	56	A
V_{GS}	Gate –Source Voltage	±20		V
P_D@ Tc=25℃	Max. Power Dissipation	40 (See Fig. 14)		W
	Linear Derating Factor	0.32 (See Fig. 14)		W/K ④
I_{LM}	Inductive Current, Clamped	(See Fig. 15 and 16) L=100μH		A
		60	56	
T_J Tstg	Operating Junction and Storage Temperature Range	-56 to 150		℃
	Lead Temperature	300 (0.063 in. (1.6mm) from case for 10s)		℃

Electrical Characteristics @ Tc=25℃ (Unless Otherwise Specified)

Parameter	Type	Min.	Typ.	Max.	Units	Test Conditions	
BV_{DSS} Drain-Source Breakdown Voltage	IRFZ20	50	-	-	V	V_{GS}=0V	
	IRFZ22	50	-	-	V	I_D=250μA	
$V_{GS(th)}$ Gate Threshold Voltage	ALL	2.0	-	4.0	V	V_{DS}=V_{GS}, I_D=250μA	
I_{GSS} Gate-Source Leakage Forward	ALL	-	-	500	nA	V_{GS}=20V	
I_{GSS} Gate-Source Leakage Reverse	ALL	-	-	-500	nA	V_{GS}=-20V	
I_{DSS} Zero Gate Voltage Drain Current	IRFZ20	-	-	250	μA	V_{DS}=Max. Rating, V_{GS}=0V	
	IRFZ22	-	-	1000	μA	V_{DS}=Max. Rating x 0.8, V_{GS}=0V, Tc=125℃	
$R_{DS(on)}$ Static Drain-Source On-State Resistance②	IRFZ20	15	-	-	A	V_{DS}>$I_{D(on)}$ x $R_{DS(on)max}$, V_{GS}=10V	
	IRFZ22	14	-	-	A		
gfs Forward Transconductance ②	ALL	-	0.080	0.100	Ω	V_{GS}=10V, f_D=9.0A	
Ciss Input Capacitance	ALL	-	0.110	0.120	Ω		
Coss Output Capacitance	ALL	5.0	6.0	-	S(Ω)	V_{DS}>$I_{D(on)}$ x $R_{DS(on)max}$, V_{GS}=9.0V	
Crss Reverse Transfer Capacitance	ALL	-	560	850	pF	V_{GS}=0V, V_{DS}=25V, f =1.0MHz See Fig. 10	
td(on) Turn-On Delay Time	ALL	-	250	350	pF		
tr Rise Time	ALL	-	60	100	pF		
td(off) Turn-Off Delay Time	ALL	-	15	30	ns	V_{DD}≈25V, I_D=9.0A, Zo=50Ω See Fig. 17 (MOSFET switching times are essentially independent of operating temperature.)	
tf Fall Time	ALL	-	45	90	ns		
Qg Total Gate Charge (Gate-Source Plus Gate-Drain)	ALL	-	20	40	nC		
Qgs Gate-Source Charge	ALL	-	15	30	nC		
Qgd Gate – Drain ("Millar") Charge	ALL	-	12	17	nC	VGS=10V, ID=20A, VDS=0.8Max. Rating. See Fig. 18 for test circuit, (Gate charge is exxentially independent of opwerting temperature.)	
L_D Internal Drain Inductance	ALL	-	9.0	-	nC		
		-	3.0	-	nC		
Ls Internal Source Inductance	ALL	-	3.5	-	nH	Measured from the contact screw on tab to center of dia	Modified MOSFET symbol showing the internal device inductances. 
Ls		-	4.5	-	nH	Measured from the drain lead, 6mm (0.25 in.) from package to center of die.	
		-	75	-	nH	Measured from the source lead, 6mm (0.25in.) from package to source bonding pad.	

Thermal Resistance

R_{thJC}	Junction-to-Case	ALL	-	-	3.12	K/W④	
R_{thCS}	Case-to-Sink	ALL	-	1.0	-	K/W④	Mounting surface flat, smooth, and greased.
R_{thJA}	Junction-to-Ambient	ALL	-	-	80	K/W④	Typical socket Mount

Source-Drain Diode Ratings and Characteristics

Is	Continuous Source Current (Body Diode)	IRFZ20	-	-	15	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier. 
		IRFZ22	-	-	14	A	
I_{SM}	Pulse Source Current (Body Diode) ③	IRF20	-	-	60	A	
		IRF22	-	-	56	A	
V_{SD}	Diode Forward Voltage	IRF20	-	-	1.5	V	Tc=25°C, I_S=15A, V_{GS}=0V
		IRF22	-	-	1.4	V	Tc=25°C, I_S=14A, V_{GS}=0V
t_{ff}	Reverse Recovery Time	ALL	-	100	-	ns	T_J=150°C, I_F=15A, dI_F/dt=100A/μs
Q_{RR}	Reverse Recovered Charge	ALL	-	0.4	-	μC	T_J=150°C, I_F=15A, dI_F/dt=100A/μs
ton	Forward Turn-on Time	ALL	Intrinsic turn-on time is negligible. Turn-on speed is substantially controlled by L_S+L_D				

① T_J=25°C to 150°C.
②Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 2%.
③Repetitive Rating: Pulse width limited by max. junction temperature.
See Transient Impedance Curve (Fig. 5).
④K/W =°C/W
W/K=W/°C

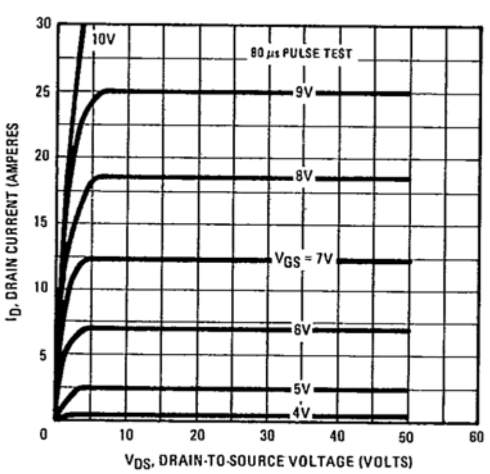


Fig. 1-Typical Output Characteristics

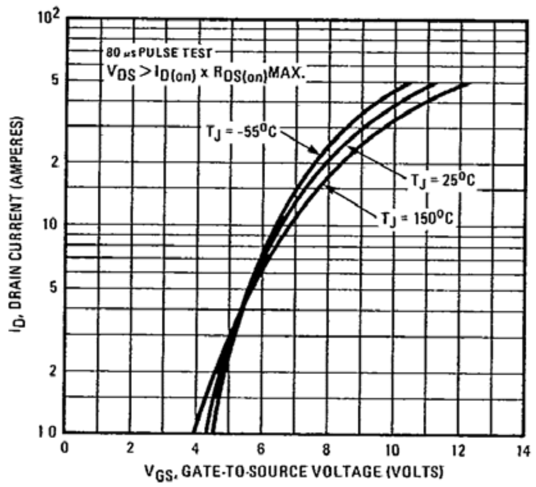


Fig. 2 –Typical Transfer Characteristics

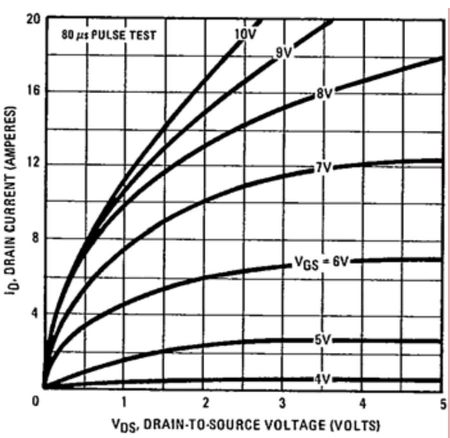


Fig.3 –Typical Saturation Characteristics

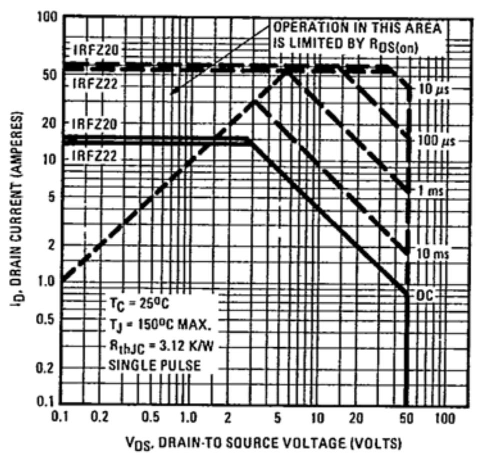


Fig. 4 – Maximum Safe Operating Area

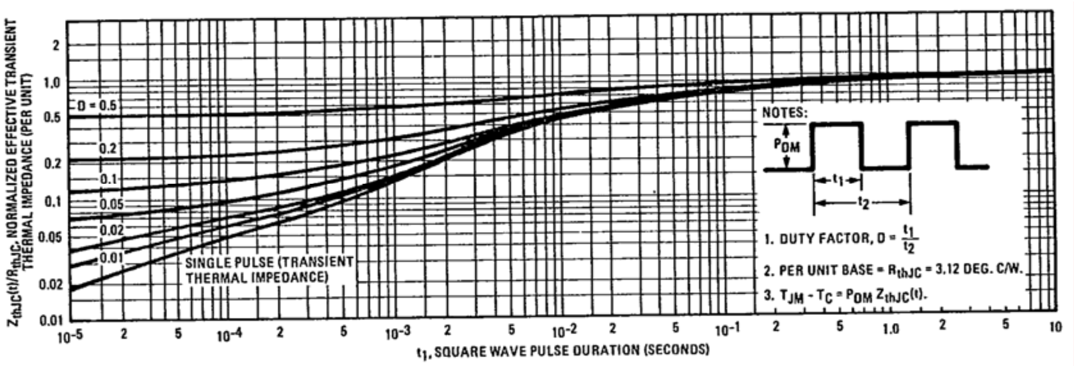


Fig. 5- Maximum Effective Transient Thermal Impedance, Junction-to-Case Vs. Pulse Duration

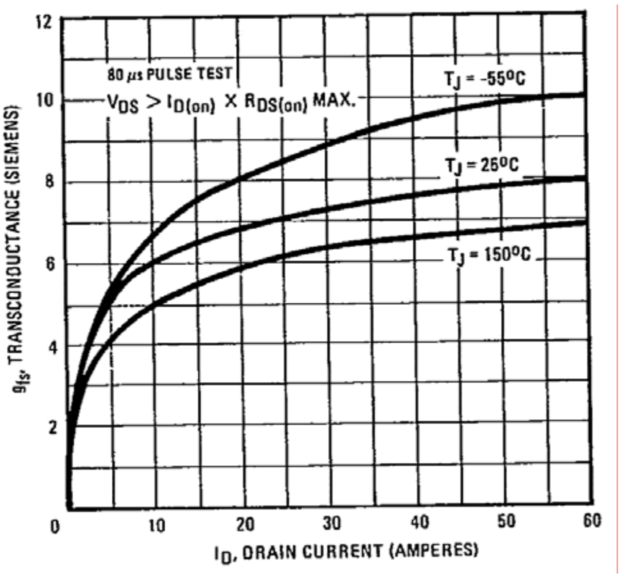


Fig. 6 Typical Transconductance Vs. Drain Current

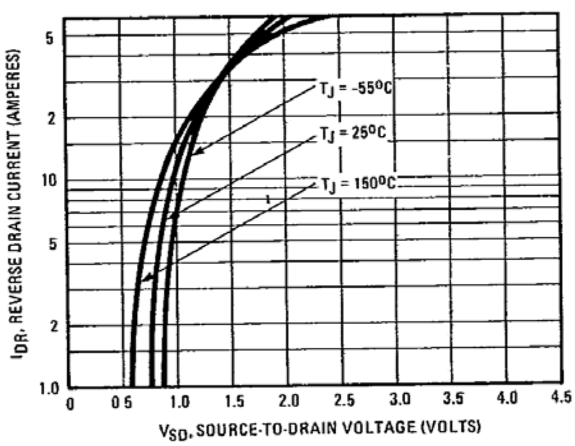


Fig. 7 Typical Source-Drain Diode Forward Voltage

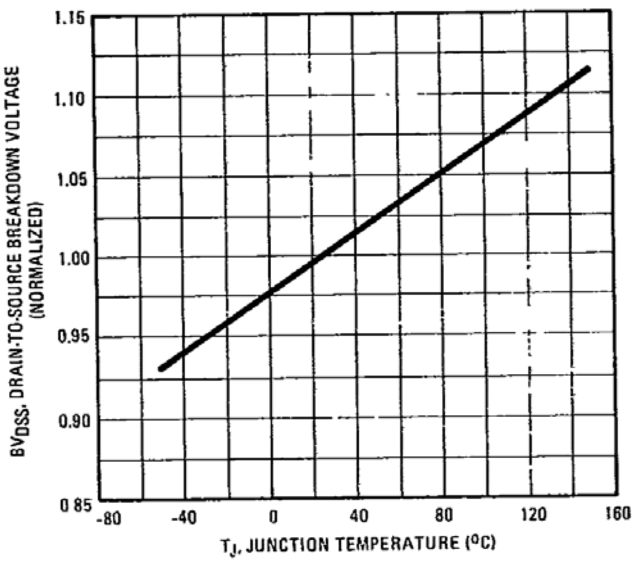


Fig. 8 – Breakdown Voltage Vs. Temperature

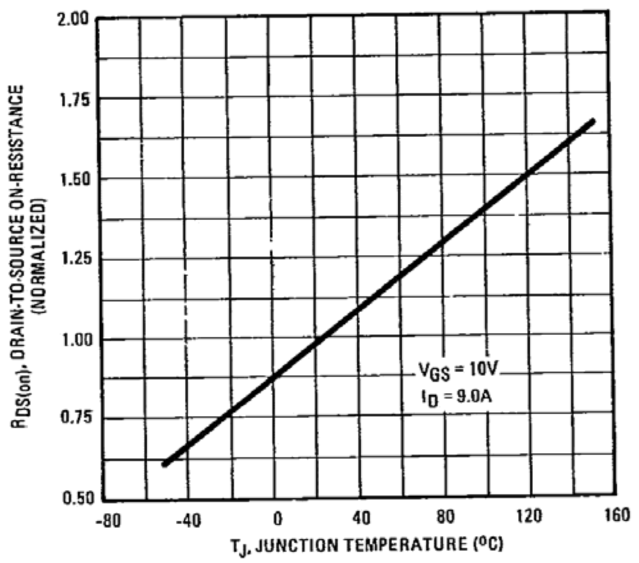


Fig.9 – Normalized On- Resistance Vs. Temperature

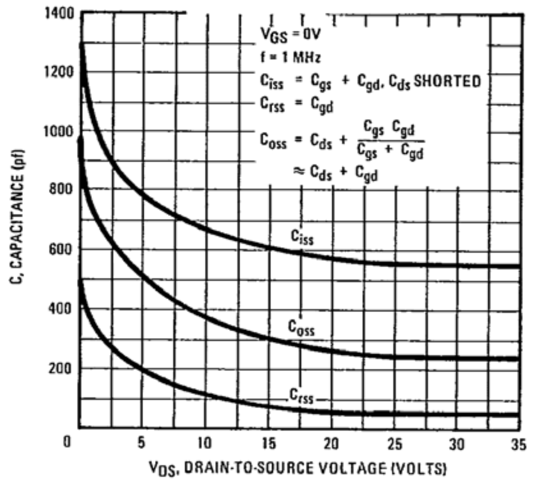


Fig. 10 –Typical Capacitance Vs. Drain-to-Source Voltage

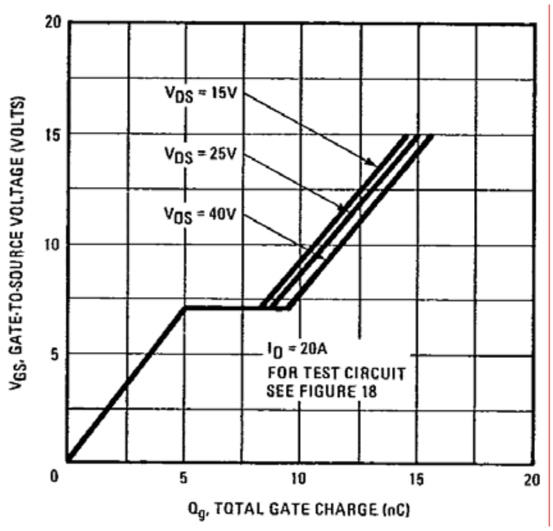


Fig. 11 – Typical Gate Charge Vs. Gate-to-Source Voltage

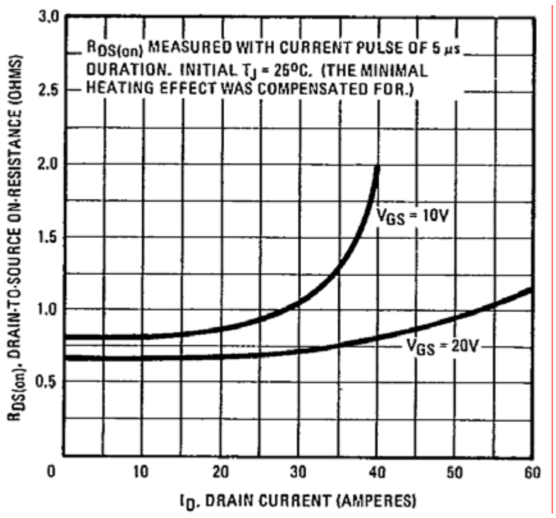


Fig. 12 – Typical On-Resistance Vs. Drain Current

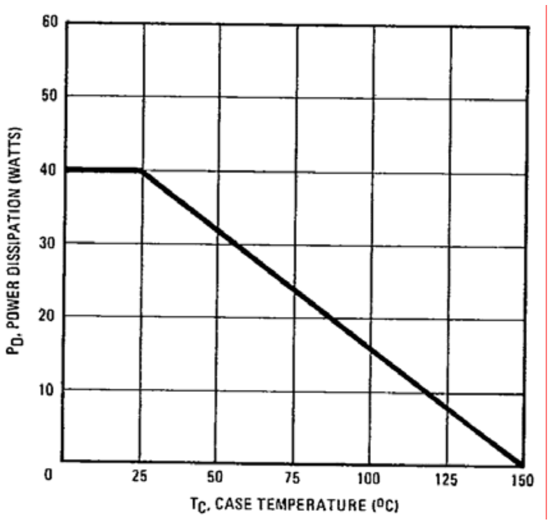


Fig.14 –Power Vs. Temperature Derating Curve

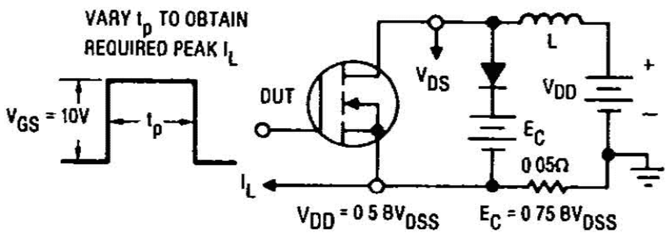


Fig. 15 –Clamped Inductive Test Circuit

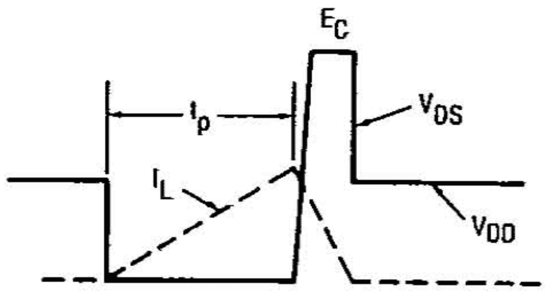


Fig. 16 – Clamped Inductive Waveforms

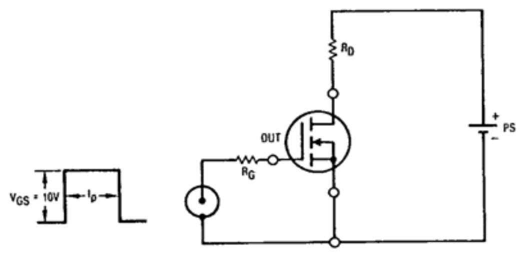


Fig. 17 – Switching Time Test Circuit

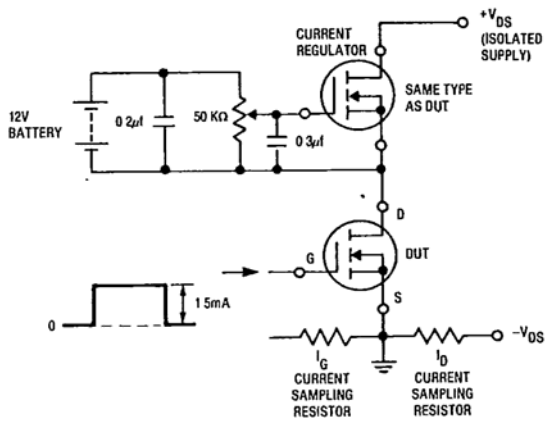


Fig. 18-Gate Charge Test Circuit

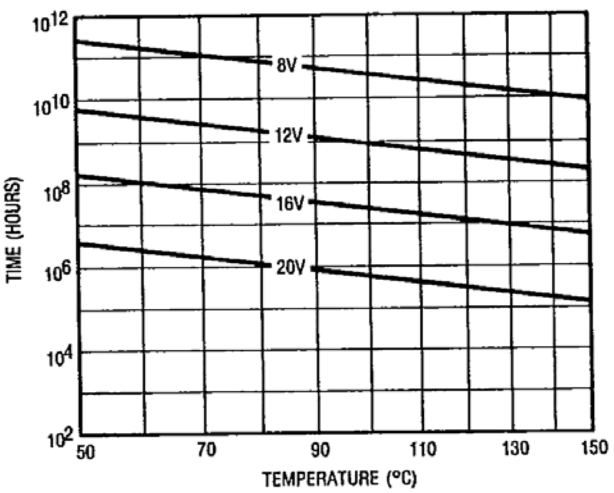


Fig. 19 – Typical Time to Accumulated 1% Failure

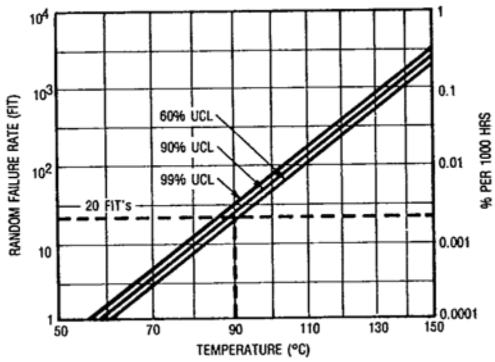


Fig. 20 – Typical High Temperature Reverse Bias (HTRB) Failure Rate