

IR2117/IR2118 (S)

SINGLE CHANNEL DRIVER

Features

- Floating channel designed for bootstrap operation
Fully operational to +600V
Tolerant to negative transient voltage
dV/dt immune
- Gate drive supply range from 10 to 20V
- Undervoltage lockout
- CMOS Schmitt-triggered inputs with pull-down
- Output in phase with input (IR2117) or out of phase with input (IR2118)

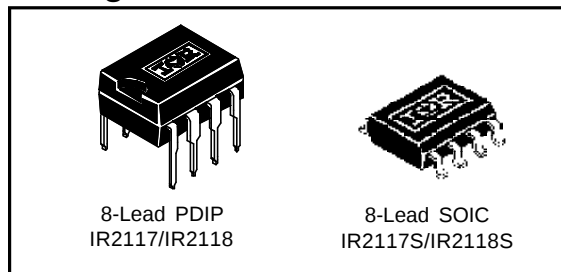
Description

The IR2117/IR2118(S) is a high voltage, high speed power MOSFET and IGBT driver. Proprietary HVIC and latch immune CMOS technologies enable ruggedized monolithic construction. The logic input is compatible with standard CMOS outputs. The output driver features a high pulse current buffer stage designed for minimum cross-conduction. The floating channel can be used to drive an N-channel power MOSFET or IGBT in the high or low side configuration which operates up to 600 volts.

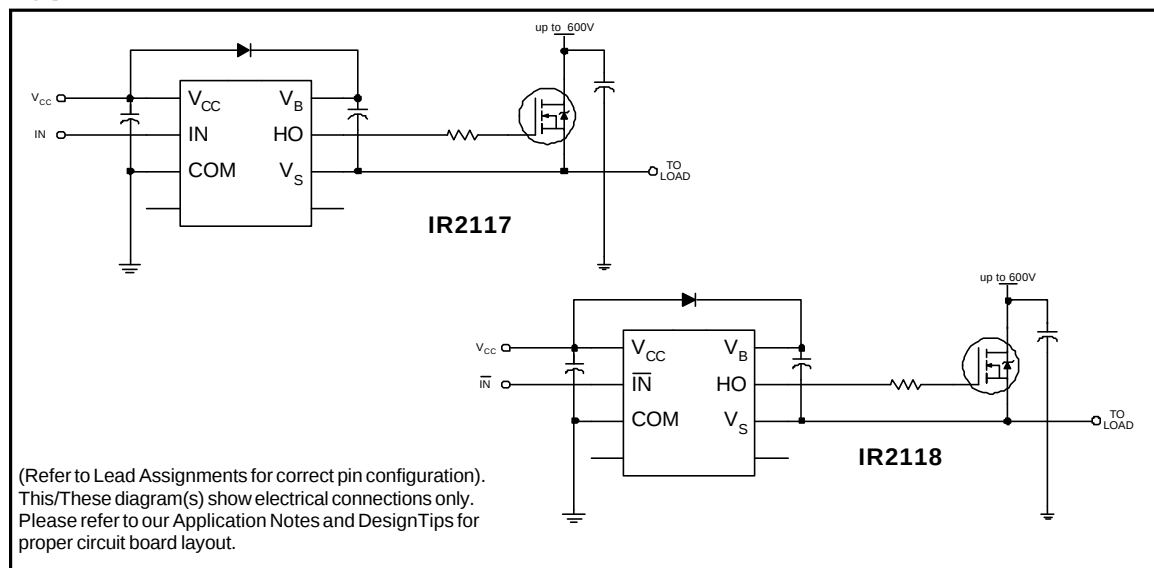
Product Summary

V_{OFFSET}	600V max.
$I_{\text{O}+/-}$	200 mA / 420 mA
V_{OUT}	10 - 20V
$t_{\text{on/off}}$ (typ.)	125 & 105 ns

Packages



Typical Connection



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Absolute Maximum Ratings

Absolute maximum ratings indicate sustained limits beyond which damage to the device may occur. All voltage parameters are absolute voltages referenced to COM. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions. Additional information is shown in Figures 5 through 8.

Symbol	Definition	Min.	Max.	Units
V _B	High side floating supply voltage	-0.3	625	V
V _S	High side floating supply offset voltage	V _B - 25	V _B + 0.3	
V _{HO}	High side floating output voltage	V _S - 0.3	V _B + 0.3	
V _{CC}	Logic supply voltage	-0.3	25	
V _{IN}	Logic input voltage	-0.3	V _{CC} + 0.3	
dV _S /dt	Allowable offset supply voltage transient (figure 2)	—	50	V/ns
P _D	Package power dissipation @ T _A ≤ +25°C (8 lead PDIP)	—	1.0	W
	(8 lead SOIC)	—	0.625	
R _{thJA}	Thermal resistance, junction to ambient (8 lead PDIP)	—	125	°C/W
	(8 lead SOIC)	—	200	
T _J	Junction temperature	—	150	°C
T _S	Storage temperature	-55	150	
T _L	Lead temperature (soldering, 10 seconds)	—	300	

Recommended Operating Conditions

The input/output logic timing diagram is shown in figure 1. For proper operation the device should be used within the recommended conditions. The V_S offset rating is tested with all supplies biased at 15V differential.

Symbol	Definition	Min.	Max.	Units
V _B	High side floating supply absolute voltage	V _S + 10	V _S + 20	V
V _S	High side floating supply offset voltage	Note 1	600	
V _{HO}	High side floating output voltage	V _S	V _B	
V _{CC}	Logic supply voltage	10	20	
V _{IN}	Logic input voltage	0	V _{CC}	
T _A	Ambient temperature	-40	125	°C

Note 1: Logic operational for V_S of -5 to +600V. Logic state held for V_S of -5V to -V_B. (Please refer to the Design Tip DT97-3 for more details).

Dynamic Electrical Characteristics

V_{BIAS} (V_{CC} , V_{BS}) = 15V, C_L = 1000 pF and T_A = 25°C unless otherwise specified. The dynamic electrical characteristics are measured using the test circuit shown in Figure 3.

Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
t_{on}	Turn-on propagation delay	—	125	200	ns	$V_S = 0V$
t_{off}	Turn-off propagation delay	—	105	180		$V_S = 600V$
t_r	Turn-on rise time	—	80	130		
t_f	Turn-off fall time	—	40	65		

Static Electrical Characteristics

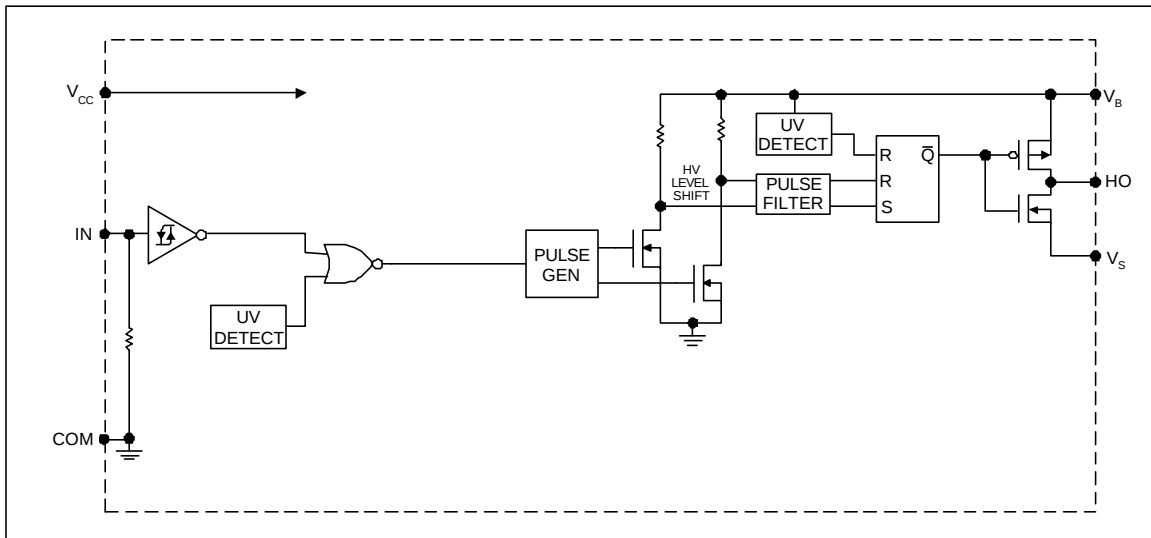
V_{BIAS} (V_{CC} , V_{BS}) = 15V and T_A = 25°C unless otherwise specified. The V_{IN} , V_{TH} and I_{IN} parameters are referenced to COM. The V_O and I_O parameters are referenced to COM and are applicable to the respective output leads: HO or LO.

Symbol	Definition	Min.	Typ.	Max.	Units	Test Conditions
V _{IH}	input voltage - logic "1" (IR2117) logic "0" (IR2118)	9.5	—	—	V	
V _{IL}	Input voltage - logic "0" (IR2117) logic "1" (IR2118)	—	—	6.0		
V _{OH}	High level output voltage, V _{BIAS} - V _O	—	—	100	mV	I _O = 0A
V _{OL}	Low level output voltage, V _O	—	—	100		I _O = 0A
I _{LK}	Offset supply leakage current	—	—	50	μA	V _B = V _S = 600V
I _{QBS}	Quiescent V _{BS} supply current	—	50	240		V _{IN} = 0V or V _{CC}
I _{QCC}	Quiescent V _{CC} Supply Current	—	70	340		V _{IN} = 0V or V _{CC}
I _{IN+}	Logic "1" input bias current (IR2117)	—	20	40		V _{IN} = V _{CC}
	(IR2118)					V _{IN} = 0V
I _{IN-}	Logic "0" input bias current (IR2117)	—	—	1.0		V _{IN} = 0V
	(IR2118)				V _{IN} = V _{CC}	
V _{BSUV+}	V _{BS} supply undervoltage positive going threshold	7.6	8.6	9.6	V	
V _{BSUV-}	V _{BS} supply undervoltage negative going threshold	7.2	8.2	9.2		
V _{CCUV+}	V _{CC} supply undervoltage positive going threshold	7.6	8.6	9.6		
V _{CCUV-}	V _{CC} supply undervoltage negative going threshold	7.2	8.2	9.2		
I _{O+}	Output high short circuit pulsed current	200	250	—	mA	V _O = 0V V _{IN} = Logic "1" PW ≤ 10 μs
I _{O-}	Output low short circuit pulsed current	420	500	—		V _O = 15V V _{IN} = Logic "0" PW ≤ 10 μs

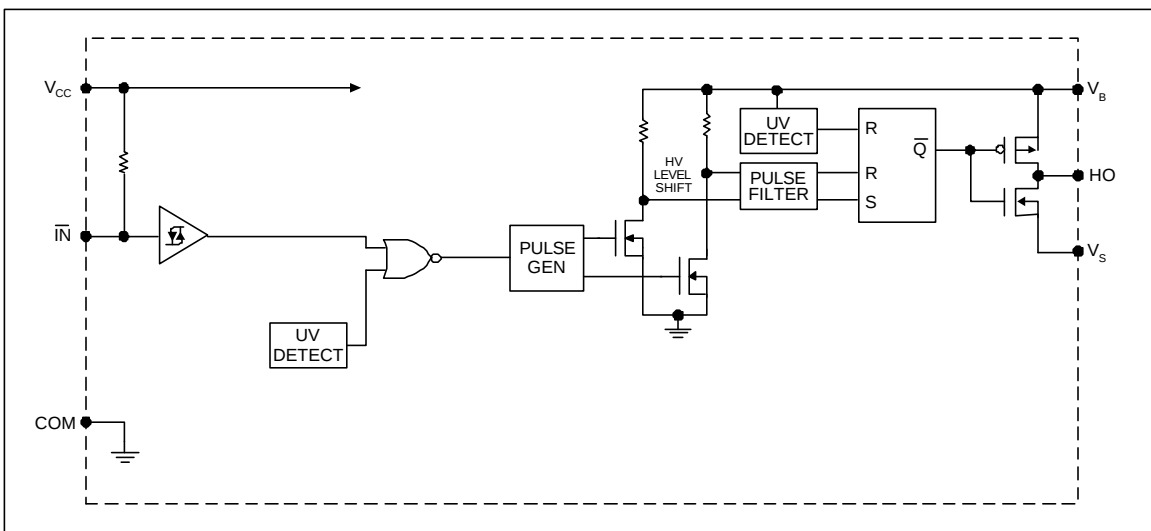
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Functional Block Diagram (IR2117)



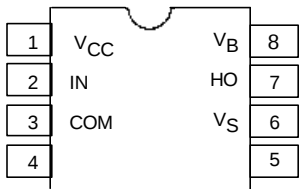
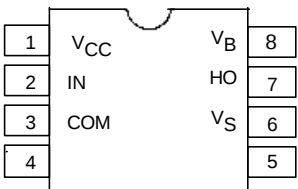
Functional Block Diagram (IR2118)

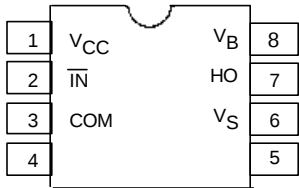
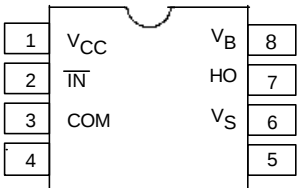


Lead Definitions

Symbol	Description
V _{CC}	Logic and gate drive supply
IN	Logic input for gate driver output (HO), in phase with HO (IR2117)
$\overline{\text{IN}}$	Logic input for gate driver output (HO), out of phase with HO (IR2118)
COM	Logic ground
V _B	High side floating supply
HO	High side gate drive output
V _S	High side floating supply return

Lead Assignments

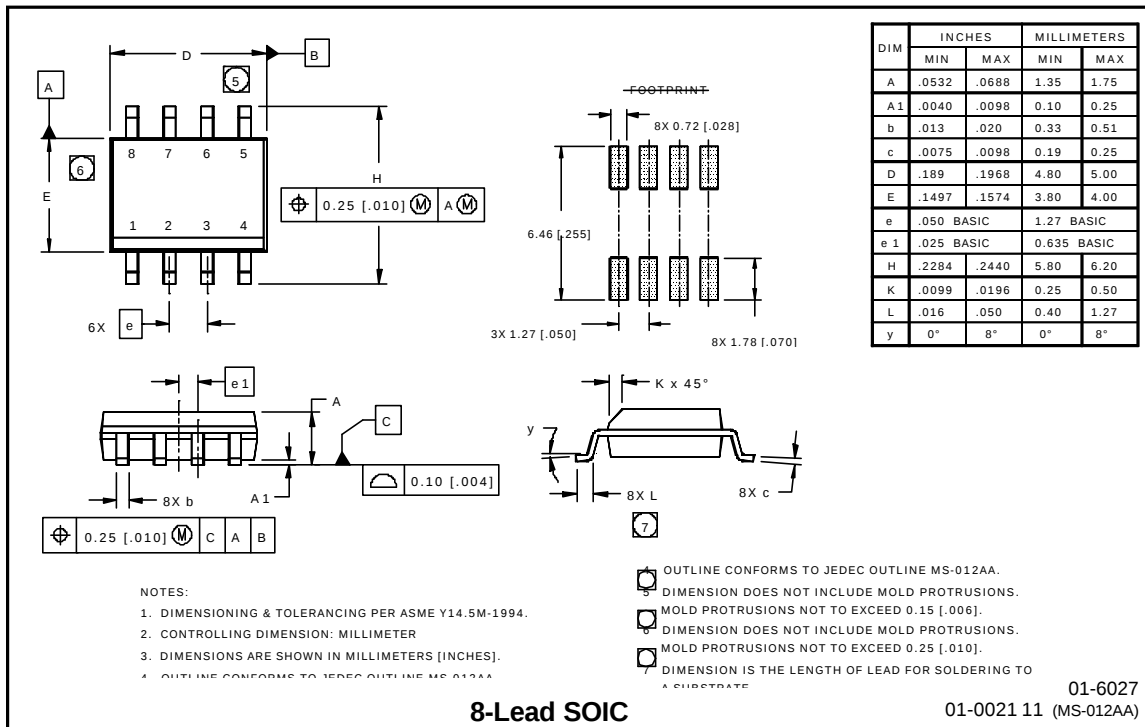
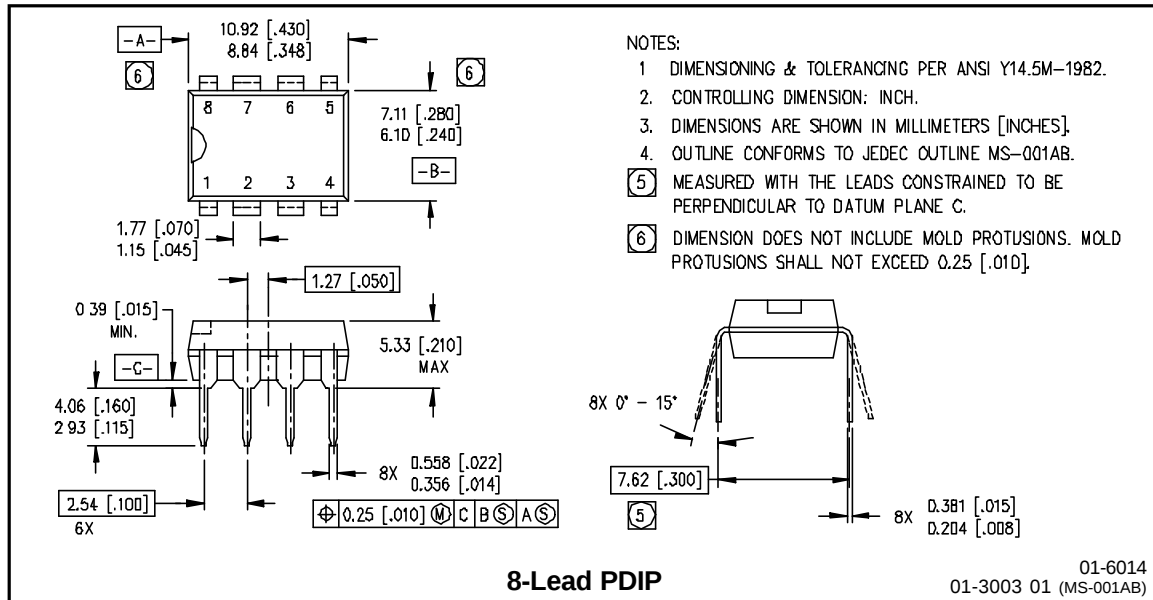
 8 Lead PDIP IR2117	 8 Lead SOIC IR2117S
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 8 Lead PDIP IR2118	 8 Lead SOIC IR2118S
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Case outlines



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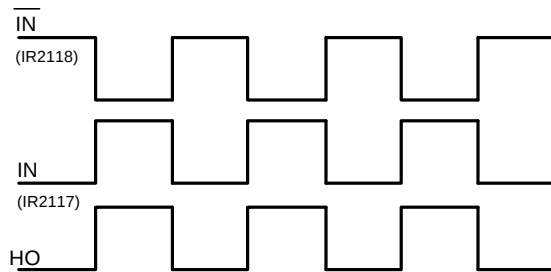


Figure 1. Input/Output Timing Diagram

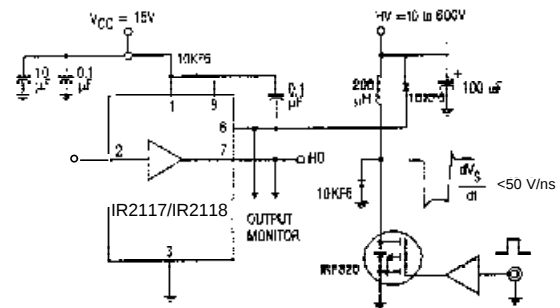


Figure 2. Floating Supply Voltage Transient Test Circuit

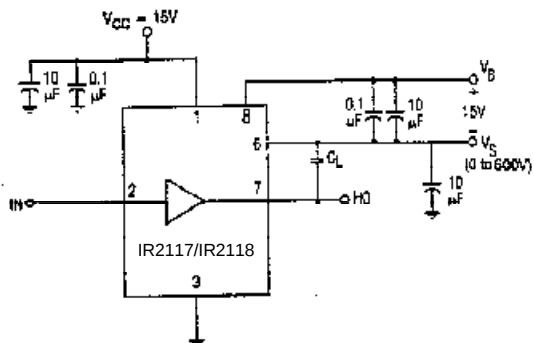


Figure 3. Switching Time Test Circuit

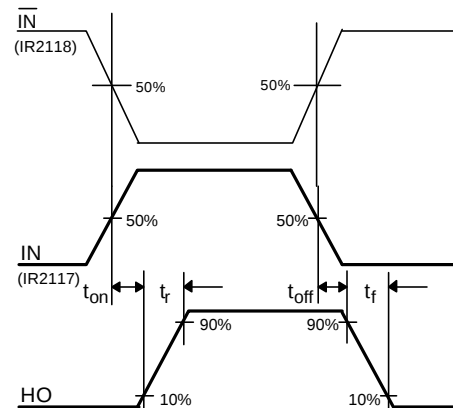


Figure 4. Switching Time Waveform Definition

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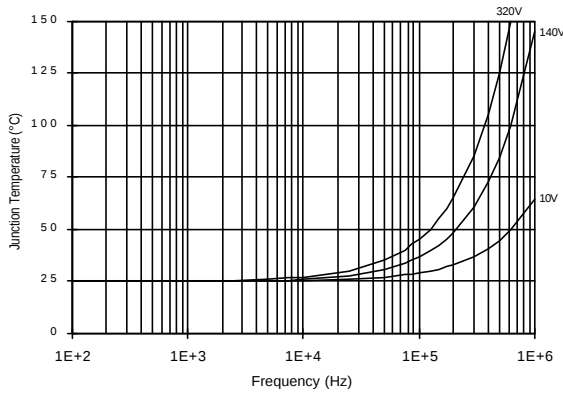


Figure 5. IR2117/IR2118 T_J vs. Frequency (IRFBC20)
 $R_{GATE} = 33\Omega$, $V_{CC} = 15V$

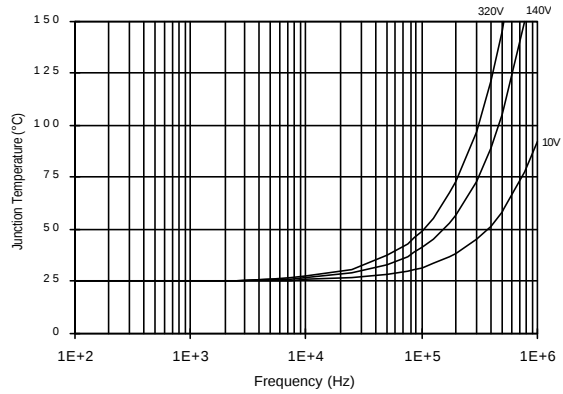


Figure 6. IR2117/IR2118 T_J vs. Frequency (IRFBC30)
 $R_{GATE} = 22\Omega$, $V_{CC} = 15V$

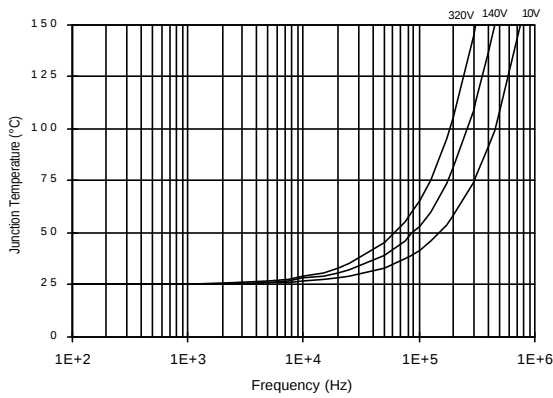


Figure 7. IR2117/IR2118 T_J vs. Frequency (IRFBC40)
 $R_{GATE} = 15\Omega$, $V_{CC} = 15V$

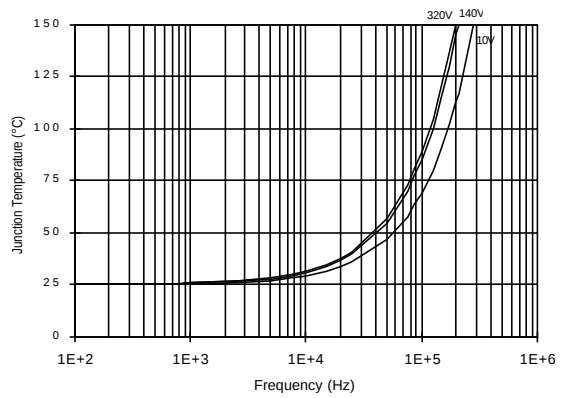


Figure 8. IR2117/IR2118 T_J vs. Frequency (IRFPE50)
 $R_{GATE} = 10\Omega$, $V_{CC} = 15V$

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Data and specifications subject to change without notice. 1/24/2002