

## COMPONENT DERATING GUIDELINES

Device	Part Type	Derating Parameter	Derating Level
Capacitors	Film	DC Voltage	60%
		Ambient or Case Temperature	90% derated for Ripple Current
	Ceramic	Ambient or Case Temperature	90% derated for Ripple Current
		DC Voltage	90%
		Surge Current	80%
		Ripple Voltage or Current	80%
		Temp from Max Limit	10°C
	Electrolytic Aluminum	Ambient or Case Temperature	90% derated for Ripple Current
		Surge Current	80%
		Ripple Voltage or Current	80%
		DC Voltage	80%
		dv/dt when rated	80%
Tantalum	Temp from Max Limit	20C	
	DC Voltage	60%	
Connectors	AC or DC	Ambient or Case Temperature	80%
		Voltage Pin to Pin, Pins to ground/shield	80%
		Contact Current	80%
Diodes	Signal/Switch	Insert Temp (°C) (Delta T from Max Limit)	80%
		Forward Current	75%
		Forward Surge current	80%
		Ambient or Case Temperature	80%
		Reverse Voltage, Peak	90% <100V & 80% >100
		Max Junction Temp	80%
	Zener	Power Dissipation	60%
		Ambient or Case Temperature	80%
		Max Junction Temp	80%
		Zener current	75%
	Transient Suppressor	Forward and Reverse Surge Current	80%
		Average Current	65%
		Max Junction Temp	105°C
	Light Emitting Diode	Average Forward Current	65%
		Max Junction Temp	105C
	Schottky/ Positive	Power Dissipation	60%
		Intrinsic Negative (PIN) Reverse Voltage	70%
		Max Junction Temp	105C
Power Rectifier	Forward Current	65%	
	Reverse Voltage	70%	
Inductors	Pulse Transformers	Max Junction Temp	105C
		Operating Current	80%
		Dielectric Voltage	50%
	Coils	Hot Spot Temperature	20% below rating of insulation
		Operating Current	60%
		Dielectric Voltage	50%
Insulating Material	All Applications	Hot Spot Temperature	20% below rating of insulation
		Voltage Withstand, (Dielectric Strength)	80%
MOS Digital	MOS Digital	Temperature Rating	80% or 100C whichever is less
		Supply Voltage (VDD)	70%
		Ambient or Case Temperature	100%
		Frequency (% of Max Spec)	80%

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Integrated Circuits		Output Current	75%
		Fan Out	80%
		Max Junction Temp	80%
	MOS Linear	Input Voltage	70%
		Frequency (% of Max Spec)	80%
		Output Current	75%
		Fan Out	80%
		Max Junction Temp	110C
		Supply Voltage	+/-5%
	Bipolar Digital	Frequency (% of Max Spec)	80%
		Output Current	75%
		Fan Out	75%
		Max Junction Temp	110°C
		Supply Voltage	90% for devices rated up to 18Vdc max, and 80% for devices > 18Vdc
	Bipolar Linear, Incl. Voltage Regulators	Ambient or Case Temperature	100%
		Input Voltage between inputs and between inputs and ground (Peak)	90%
		Input Voltage	70%
		Frequency (% of Max Spec)	80%
		Output Current	75%
		Fan Out	75%
Max Junction Temp		110C	

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Integrated Circuits	<b>Microprocessors</b>	Supply Voltage	+/-5%
		MOS	Frequency (% of Max Spec)
	Output Current		75%
	Fan Out		80%
	Max Junction Temp, 8-BIT		125°C
	Max Junction Temp, 16-BIT		125°C
	Max Junction Temp, 32-BIT		100°C
	Supply Voltage		+/-5%a
	Bipolar	Frequency (% of Max Spec)	80%
		Output Current	75%
		Fan Out	75%
		Max Junction Temp, 8-BIT	110C
		Max Junction Temp, 16-BIT	110C
	<b>Memory/PROM</b>	Supply Voltage	+/-5%
		MOS	Frequency (% of Max Spec)
	Output Current		75%
	Max Junction Temp		125C
	Max Write Cycles (EEPROM)		105,000
	Bipolar	Fixed Supply Voltage	+/-5%
		Frequency (% of Max Spec)	90%
Output Current		75%	
Max Junction Temp		125C	
Fuses	Chip or Through Hole	Rated Current	50%
		Voltage	90%
Opto	Photo Transistor	Max Junction Temp	105C
	Avalanche Photo Diode	Reverse Voltage	70%
	Photo Diode, PIN	Max Junction Temp	105C
Printed Circuit Card (PCB)	Glass or FR4	Operating Temperature	110C or 80% of glass transition temperature, whichever is less
Resistors	Composition	Power Dissipation	50%
		Temp from Max Limit	30C
	Film	Joule Rating for Inrush Limiting Resistors	80%
		Power Dissipation	50%
	Thermistor	Temp from Max Limit	40C
		Power Dissipation	50%
Wirewound Accurate	Temp from Max Limit	20C	
	Power Dissipation	50%	
Resistors	Wirewound Power	Temp from Max Limit	10%
		Power Dissipation	50%
	Thick/Thin Film	Temp from Max Limit	125C
		Power Dissipation	50%
		Voltage	80%
		Joule Rating for Inrush Limiting Resistors	80%
Temp from Max Limit	80C		

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Thermistors	Chip or Through Hole	Maximum Current	80%
Thyristors	All SMT and Through Hole	Ambient or Case Temperature	80%
		Max Junction Temperature	80%
		Peak forward blocking voltage	80%
		Peak reverse blocking voltage	80%
		Turn-Off time	Guardband allow 140% of maximum
		Static dv/dt	80%
		Reapplied dv/dt	Does not exceed derated static dv/dt
		Commutating dv/dt	60%
		Forward RMS Current	80%
		Forward average current	75% Max
		Rate of rise of anode current di/dt	80%
		Fusing current I <sup>2</sup> T	80%
		Forward Surge current	80%
		Latching Current	Guardband allow 120% of min.
		Holding Current	Guardband allow 120% of min.
		Average of peak gate power	70%
		Peak Gate Voltage or Current	85%
		Reverse Gate Voltage, Peak	60%
Isolation Voltage for isolated case device	80%		
Fans	Tube Axial Ball Bearing	Airflow Rating	80% for Aging
		Voltage	90% to 100% unless otherwise specified by manufacturing
		Operating Temperature	80%
Transistors	Silicon Bipolar	Power Dissipation	60%
		Ambient or Case Temperature	80%
		Voltage (Peak) V <sub>ce</sub> , V <sub>be</sub> , V <sub>cb</sub> , V <sub>ds</sub> , V <sub>gs</sub>	80%
		I <sub>c</sub> , Collector Current	80%
		Base Current, Peak	80%
		Breakdown Voltage	85%
		Max Junction Temp	125C
	GaAs MESFET	Power Dissipation	60%
		Breakdown Voltage	70%
		Max Junction Temp	100C
	Silicon MOSFET	Power Dissipation	65%
		Breakdown Voltage	70%
Max Junction Temp		110C	
Transistors (RF Pulse)	Silicon Bipolar	Power Dissipation	60%
		V <sub>ce</sub> , Collector-Emitter Voltage	70%
		I <sub>c</sub> , Collector Current	60%
		Breakdown Voltage	85%
	Max Junction Temp	125C	
	GaAs MESFET	Power Dissipation	60%
Breakdown Voltage		70%	
Max Junction Temp		100C	
Switches	All SMT and Through Hole	Resistive Load Current	75%
		Operating Cycles	< 100% of rated @ 10 years
		Ambient or Case Temperature	80%

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Switches	All SMT and Through Hole	Capacitive Load Current	75%
		Inductive Load Current	40%
		Contact Power	50%
Varistors	Surge Arrestors, and MOVs	Operating Voltage	80%
		Joule Rating	80% calculated
		Operating Temperature	80%
Wire	Stranded or Solid Conductor	Maximum Working Voltage	80%
		Temperature Rating	80% or 100C whichever is less