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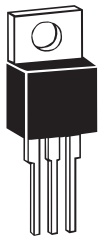
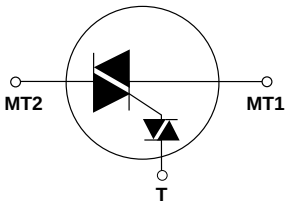


TO-220

E3



Quadrac

Internally Triggered Triacs (4 A to 15 A) RoHS

General Description

Teccor's *Quadrac* devices are triacs that include a diac trigger mounted inside the same package. This device, developed by Teccor, saves the user the expense and assembly time of buying a discrete diac and assembling in conjunction with a gated triac. Also, the alternistor *Quadrac* device (QxxxxLTH) eliminates the need for a snubber network.

The *Quadrac* device is a bidirectional AC switch and is gate controlled for either polarity of main terminal voltage. Its primary purpose is for AC switching and phase control applications such as speed controls, temperature modulation controls, and lighting controls where noise immunity is required.

Triac current capacities range from 4 A to 15 A with voltage ranges from 200 V to 600 V. *Quadrac* devices are available in the TO-220 package.

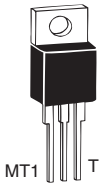
The TO-220 package is electrically isolated to 2500 V rms from the leads to mounting surface. 4000 V rms is available on special order. This means that no external isolation is required, thus eliminating the need for separate insulators and insulator-mounting steps and saving dollars over "hot tab" devices.

All Teccor triac and diac chips have glass-passivated junctions to ensure long-term device reliability and parameter stability.

Variations of devices in this data sheet are available for custom design applications. Consult the factory for more information.

Features

- **RoHS Compliant**
- **Glass-passivated junctions**
- **Electrically-isolated package**
- **Internal trigger diac**
- **High surge capability — up to 200 A**
- **High voltage capability — 200 V to 600 V**

$I_{T(RMS)}$	Part No.	V_{DRM}	I_{DRM}			V_{TM}	Trigger Diac Specifications (T–MT1)					
	Isolated						ΔV_{BO}	V_{BO}		$[\Delta V\pm]$	I_{BO}	C_T
(5)		(1)	(1) (10)			(1) (3)	(7)	(6)		(6)		(11)
	TO-220	Volts	mAmps T_C = 25 °C	mAmps T_C = 100 °C	mAmps T_C = 125 °C	Volts T_C = 25 °C	Volts	Volts		Volts	µAmps	µFarads
See “Package Dimensions” section for variations. (12)		MIN	MAX			MAX	MAX	MIN	MAX	MIN	MAX	MAX
4 A	**Q2004LT**	**200**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
	Q4004LT	**400**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
	Q6004LT	**600**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
6 A	**Q2006LT**	**200**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
	Q4006LT	**400**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
	Q6006LT	**600**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
	Q4006LTH	**400**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
	Q6006LTH	**600**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
8 A	**Q2008LT**	**200**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
	Q4008LT	**400**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
	Q6008LT	**600**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
	Q4008LTH	**400**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
	Q6008LTH	**600**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
10 A	**Q2010LT**	**200**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
	Q4010LT	**400**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
	Q6010LT	**600**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
	Q4010LTH	**400**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
	Q6010LTH	**600**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
15 A	**Q2015LT**	**200**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
	Q4015LT	**400**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
	Q6015LT	**600**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
	Q4015LTH	**400**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**
	Q6015LTH	**600**	**0.05**	**0.5**	**2**	**1.6**	**3**	**33**	**43**	**5**	**25**	**0.1**

Specific Test Conditions

[$\Delta V\pm$] — Dynamic breakback voltage (forward and reverse)
ΔV_{BO} — Breakover voltage symmetry
C_T — Trigger firing capacitance
di/dt — Maximum rate-of-change of on-state current
dv/dt — Critical rate-of-rise of off-state voltage at rated V_{DRM} gate open
dv/dt(c) — Critical rate-of-rise of commutation voltage at rated V_{DRM} and $I_{T(RMS)}$ commutating di/dt = 0.54 rated $I_{T(RMS)}$/ms; gate unenergized
I^2t — RMS surge (non-repetitive) on-state current for period of 8.3 ms for fusing
I_{BO} — Peak breakover current
I_{DRM} — Peak off-state current gate open; V_{DRM} = maximum rated value
I_{GTM} — Peak gate trigger current (10 µs Max)
I_H — Holding current; gate open
$I_{T(RMS)}$ — RMS on-state current, conduction angle of 360°
I_{TSM} — Peak one-cycle surge
t_{gt} — Gate controlled turn-on time
V_{BO} — Breakover voltage (forward and reverse)
V_{DRM} — Repetitive peak blocking voltage
V_{TM} — Peak on-state voltage at maximum rated RMS current

General Notes

- All measurements are made at 60 Hz with resistive load at an ambient temperature of +25 °C unless otherwise specified.
- Operating temperature range (T_J) is -40 °C to +125 °C.
- Storage temperature range (T_S) is -40 °C to +125 °C.
- Lead solder temperature is a maximum of +230 °C for 10 seconds maximum; ≥1/16" (1.59 mm) from case.
- The case temperature (T_C) is measured as shown on dimensional outline drawings. See “Package Dimensions” section of this catalog.

Electrical Specification Notes

(1) For either polarity of MT2 with reference to MT1
(2) See Figure E3.1 for I_H versus T_C.
(3) See Figure E3.4 and Figure E3.5 for i_T versus v_T.
(4) See Figure E3.9 for surge ratings with specific durations.

I_H	I_{TSM}	dv/dt(c)	dv/dt		t_{gt}	I^2t	I_{GTM}	di/dt
(1) (2)	(4) (8)	(1) (5) (8)	(1)		(6) (9)			(9)
			Volts/µSec					
mAmps	Amps	Volts/µSec	T_C = 100 °C	T_C = 125 °C	µSec	$Amps^2Sec$	Amps	Amps/µSec
MAX	60/50Hz	MIN	MIN		TYP			
40	**55/46**	**3**	**75**	**50**	**3**	**12.5**	**1.2**	**50**
40	**55/46**	**3**	**75**	**50**	**3**	**12.5**	**1.2**	**50**
40	**55/46**	**3**	**50**	**50**	**3**	**12.5**	**1.2**	**50**
50	**80/65**	**4**	**150**	**100**	**3**	**26.5**	**1.5**	**70**
50	**80/65**	**4**	**150**	**100**	**3**	**26.5**	**1.5**	**70**
50	**80/65**	**4**	**125**	**85**	**3**	**26.5**	**1.5**	**70**
50	**80/65**	**25**	**575**	**450**	**3**	**26.5**	**1.5**	**70**
50	**80/65**	**25**	**425**	**350**	**3**	**26.5**	**1.5**	**70**
60	**100/83**	**4**	**175**	**120**	**3**	**41**	**1.5**	**70**
60	**100/83**	**4**	**175**	**120**	**3**	**41**	**1.5**	**70**
60	**100/83**	**4**	**150**	**100**	**3**	**41**	**1.5**	**70**
60	**100/83**	**25**	**575**	**450**	**3**	**41**	**1.5**	**70**
60	**100/83**	**25**	**425**	**350**	**3**	**41**	**1.5**	**70**
60	**120/100**	**4**	**200**	**150**	**3**	**60**	**1.5**	**70**
60	**120/100**	**4**	**200**	**150**	**3**	**60**	**1.5**	**70**
60	**120/100**	**4**	**175**	**120**	**3**	**60**	**1.5**	**70**
60	**120/100**	**30**	**925**	**700**	**3**	**60**	**1.5**	**70**
60	**120/100**	**30**	**775**	**600**	**3**	**60**	**1.5**	**70**
70	**200/167**	**4**	**300**	**200**	**3**	**166**	**1.5**	**100**
70	**200/167**	**4**	**300**	**200**	**3**	**166**	**1.5**	**100**
70	**200/167**	**4**	**200**	**150**	**3**	**166**	**1.5**	**100**
70	**200/167**	**30**	**925**	**700**	**3**	**166**	**1.5**	**100**
70	**200/167**	**30**	**775**	**600**	**3**	**166**	**1.5**	**100**

(5) See Figure E3.6, Figure E3.7, and Figure E3.8 for current rating at specific operating temperature.

(6) See Figure E3.2 and Figure E3.3 for test circuit.

(7) ΔV_{BO} = [+ V_{BO}] - [- V_{BO}]

(8) See Figure E3.7 and Figure E3.8 for maximum allowable case temperature at maximum rated current.

(9) Trigger firing capacitance = 0.1 µF with 0.1 µs rise time

(10) $T_C = T_J$ for test conditions in off state

(11) Maximum required value to ensure sufficient gate current

(12) See package outlines for lead form configurations. When ordering special lead forming, add type number as suffix to part number.

Thermal Resistance (Steady State) $R_{\theta JC}$ [$R_{\theta JA}$] °C/W (TYP)	
TYPE	**Isolated TO-220**
4 A	**3.6 [50]**
6 A	**3.3**
8 A	**2.8**
10 A	**2.6**
15 A	**2.1**

Electrical Isolation

All Teccor isolated *Quadrac* packages withstand a minimum high potential test of 2500 V ac rms from leads to mounting tab over the operating temperature range of the device. The following isolation table shows standard and optional isolation ratings.

Electrical Isolation from Leads to Mounting Tab *	
V AC RMS	**TYPE**
2500	**Standard**
4000	**Optional ****

* UL Recognized File #E71639
**For 4000 V isolation, use “V” suffix in part number.

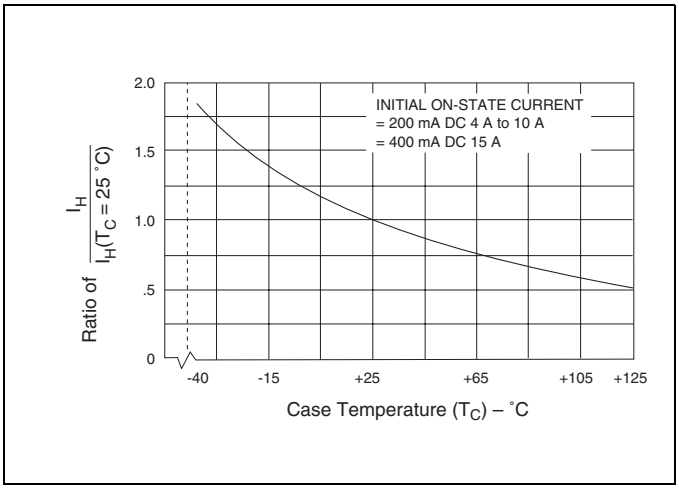


Figure E3.1 Normalized DC Holding Current versus Case Temperature

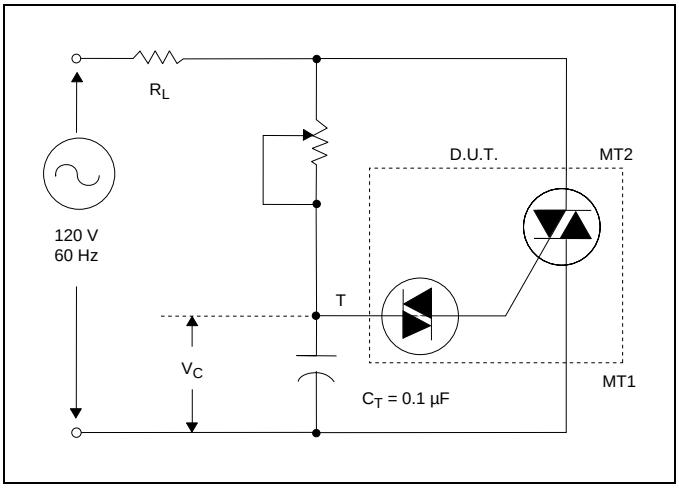


Figure E3.2 Test Circuit

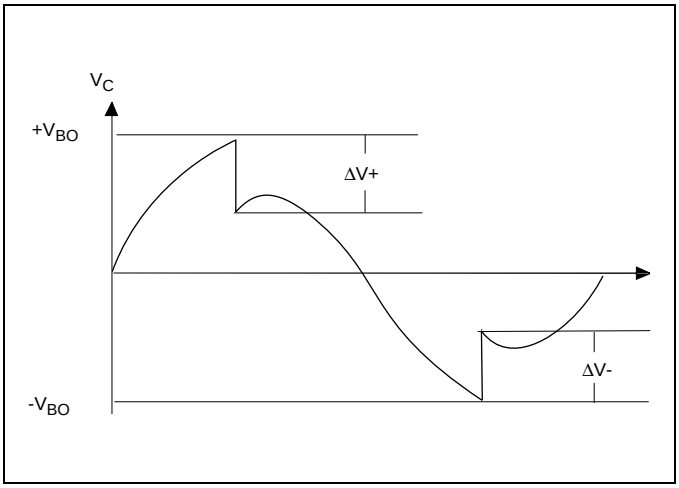


Figure E3.3 Test Circuit Waveforms

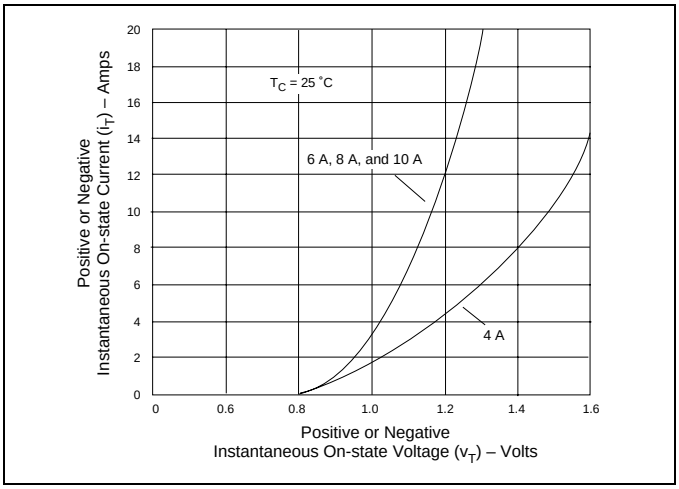


Figure E3.4 On-state Current versus On-state Voltage (Typical) (4 A to 10 A)

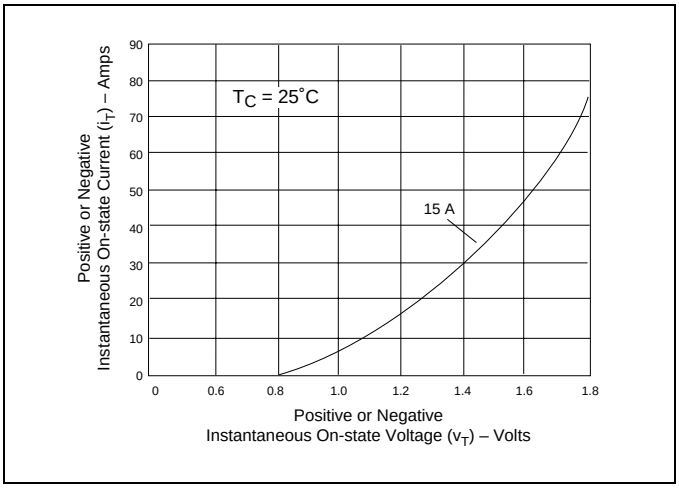


Figure E3.5 On-state Current versus On-state Voltage (Typical) (15 A)

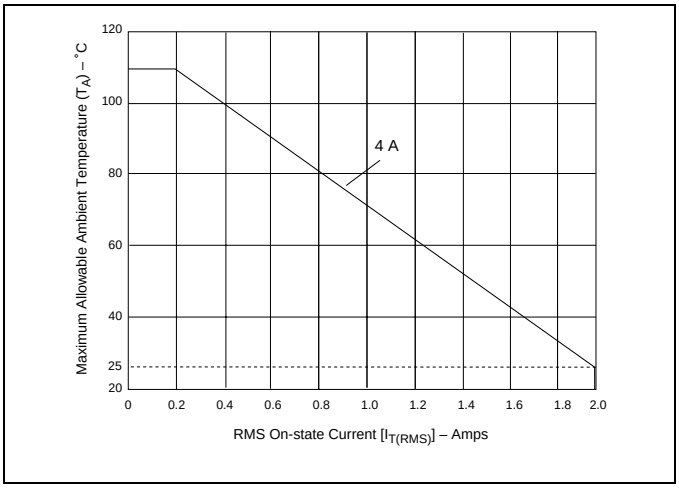


Figure E3.6 Maximum Allowable Ambient Temperature versus On-state Current

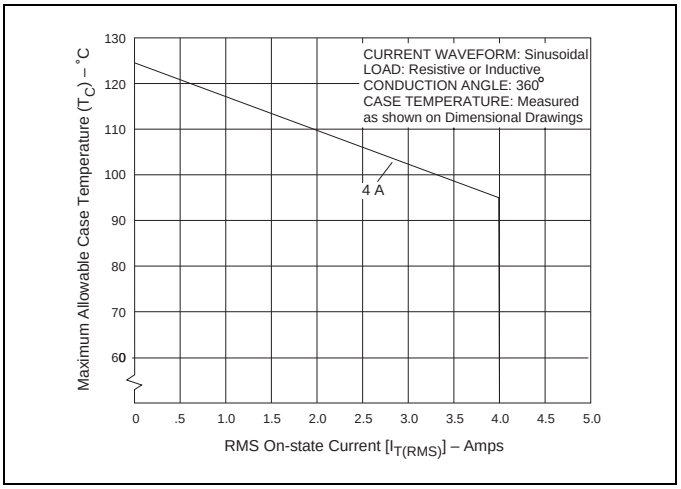


Figure E3.7 Maximum Allowable Case Temperature versus On-state Current (4 A)

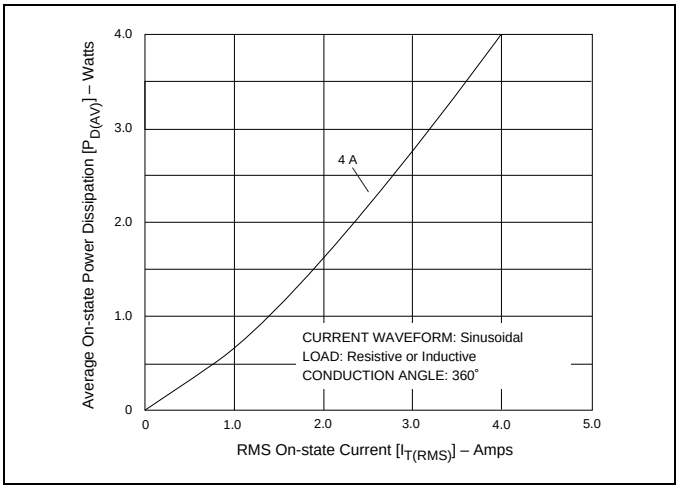


Figure E3.10 Power Dissipation (Typical) versus On-state Current (4 A)

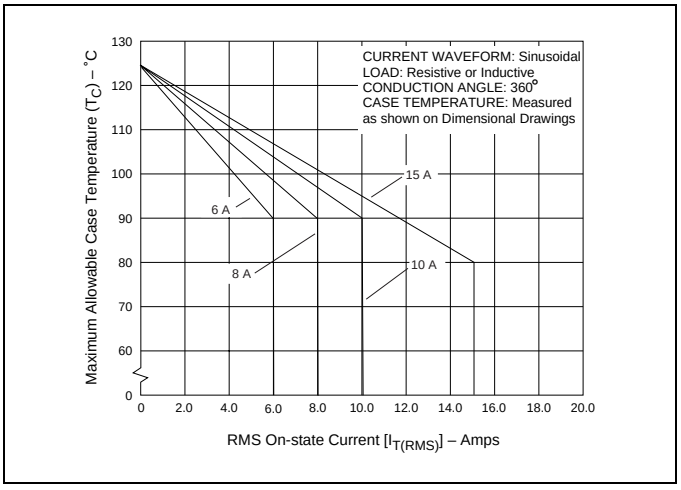


Figure E3.8 Maximum Allowable Case Temperature versus On-state Current (6 A to 15 A)

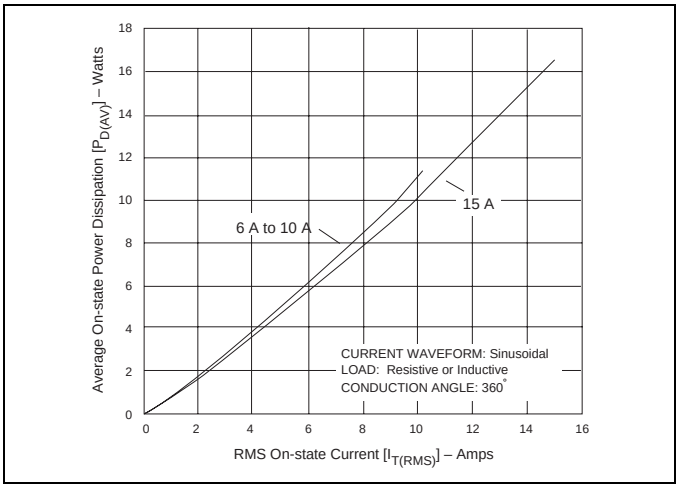


Figure E3.11 Power Dissipation (Typical) versus On-state Current (6 A to 10 A and 15 A)

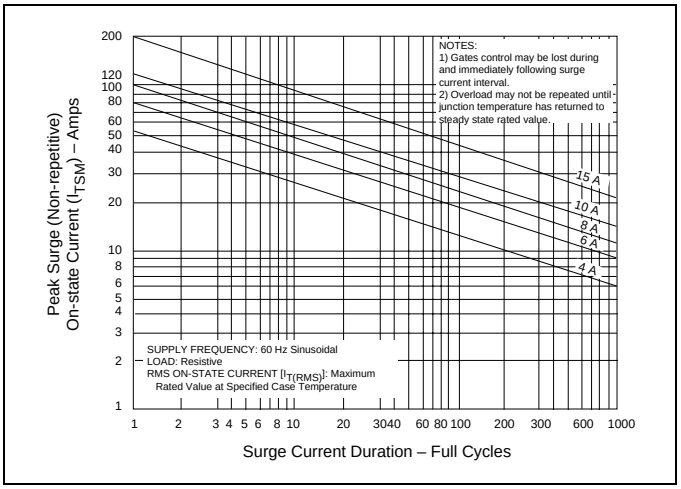


Figure E3.9 Peak Surge Current versus Surge Current Duration

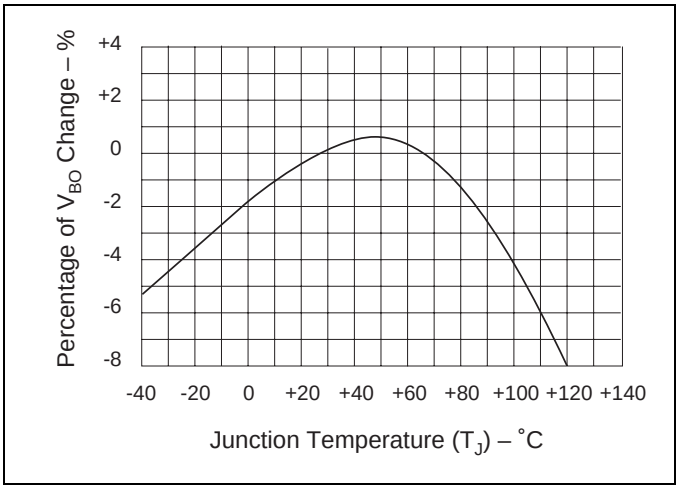


Figure E3.12 Normalized diac V_{BO} versus Junction Temperature

Notes