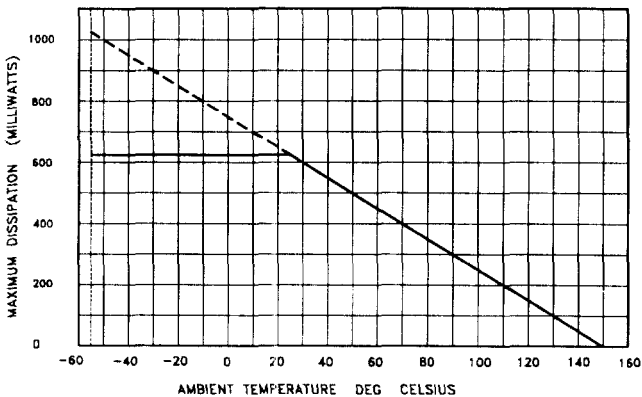


FMMT617 FMMT624  
 FMMT618 FMMT625  
 FMMT619

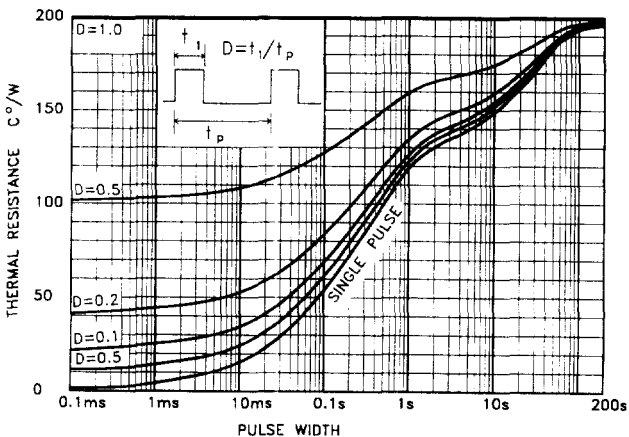
## SuperSOT Series

FMMT717 FMMT722  
 FMMT718 FMMT723  
 FMMT720

### THERMAL CHARACTERISTICS AND DERATING INFORMATION



DERATING CURVE



MAXIMUM TRANSIENT THERMAL RESISTANCE

\* Reference above figures, Devices were mounted on a 15mmx15mm ceramic substrate

# SuperSOT

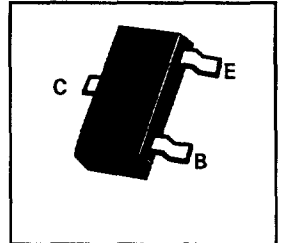
## SOT23 PNP SILICON POWER (SWITCHING) TRANSISTORS

FMMT717 FMMT718  
FMMT720 FMMT722  
FMMT723

ISSUE 3 JUNE 1996

### FEATURES

- \* **625mW POWER DISSIPATION**
- \*  $I_C$  CONT 2.5A
- \*  $I_C$  Up To 10A Peak Pulse Current
- \* Excellent  $h_{fe}$  Characteristics Up To 10A (pulsed)
- \* Extremely Low Saturation Voltage E.g. 10mV Typ.
- \* Exhibits extremely low equivalent on-resistance;  $R_{CE(sat)}$



DEVICE TYPE	COMPLEMENT	PARTMARKING	$R_{CE(sat)}$
FMMT717	FMMT617	717	72mΩ at 2.5A
FMMT718	FMMT618	718	97mΩ at 1.5A
FMMT720	FMMT619	720	163mΩ at 1.5A
FMMT722	-	722	-
FMMT723	FMMT624	723	-

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	FMMT 717	FMMT 718	FMMT 720	FMMT 722	FMMT 723	UNIT
Collector-Base Voltage	$V_{CBO}$	-12	-20	-40	-70	-100	V
Collector-Emitter Voltage	$V_{CEO}$	-12	-20	-40	-70	-100	V
Emitter-Base Voltage	$V_{EBO}$	-5	-5	-5	-5	-5	V
Peak Pulse Current**	$I_{CM}$	-10	-6	-4	-3	-2.5	A
<b>Continuous Collector Current</b>	$I_C$	<b>-2.5</b>	<b>-1.5</b>	<b>-1.5</b>	<b>-1.5</b>	<b>-1</b>	<b>A</b>
Base Current	$I_B$	-500					mA
<b>Power Dissipation at <math>T_{amb}=25^\circ\text{C}</math>*</b>	$P_{tot}$	<b>625</b>					<b>mW</b>
Operating and Storage Temperature Range	$T_J, T_{stg}$	-55 to -150					$^\circ\text{C}$

\*Maximum power dissipation is calculated assuming that the device is mounted on a ceramic substrate measuring 15x15x0.6mm

\*\*Measured under pulsed conditions. Pulse width=300μs. Duty cycle ≤ 2%

Spice parameter data is available upon request for these devices

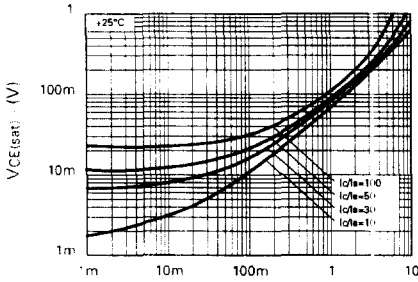
# FM717

## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

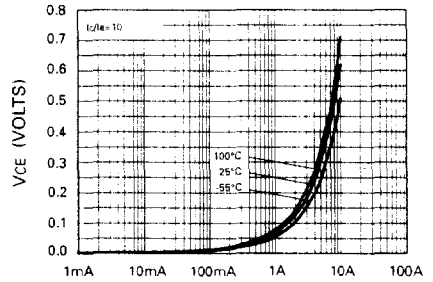
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-12	-35		V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-12	-25		V	$I_C = -10\text{mA}^*$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-5	-8.5		V	$I_E = -100\mu\text{A}$
Collector Cut-Off Current	$I_{CBO}$			-100	nA	$V_{CB} = -10\text{V}$
Emitter Cut-Off Current	$I_{EBO}$			-100	nA	$V_{EB} = -4\text{V}$
Collector Emitter Cut-Off Current	$I_{CES}$			-100	nA	$V_{CES} = -10\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		-10 -100 -110 -180	-17 -140 -170 -220	mV mV mV mV	$I_C = -0.1\text{A}, I_B = -10\text{mA}^*$ $I_C = -1\text{A}, I_B = -10\text{mA}^*$ $I_C = -1.5\text{A}, I_B = -50\text{mA}^*$ $I_C = -2.5\text{A}, I_B = -50\text{mA}^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		-0.9	-1.0	V	$I_C = -2.5\text{A}, I_B = -50\text{mA}^*$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		-0.8	-1.0	V	$I_C = -2.5\text{A}, V_{CE} = -2\text{V}^*$
Static Forward Current Transfer Ratio	$h_{FE}$	300 300 180 60 45	475 450 275 100 70			$I_C = -10\text{mA}, V_{CE} = -2\text{V}^*$ $I_C = -100\text{mA}, V_{CE} = -2\text{V}^*$ $I_C = -2.5\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -8\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -10\text{A}, V_{CE} = -2\text{V}^*$
Transition Frequency	$f_T$	80	110		MHz	$I_C = -50\text{mA}, V_{CE} = -10\text{V}$ $f = 100\text{MHz}$
Output Capacitance	$C_{obo}$		21	30	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$
Turn-On Time	$t_{(on)}$		70		ns	$V_{CC} = -6\text{V}, I_C = -2\text{A}$
Turn-Off Time	$t_{(off)}$		130		ns	$I_{B1} = I_{B2} = 50\text{mA}$

\*Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$

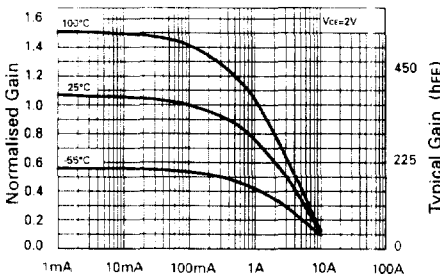
## TYPICAL CHARACTERISTICS



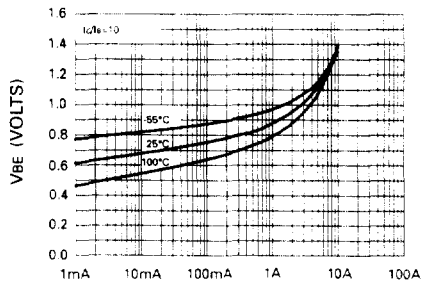
Collector Current (A)  
**VCE(SAT) vs IC**



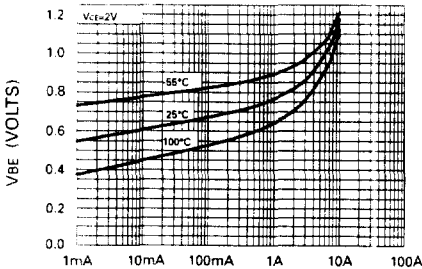
Collector Current  
**VCE(SAT) vs IC**



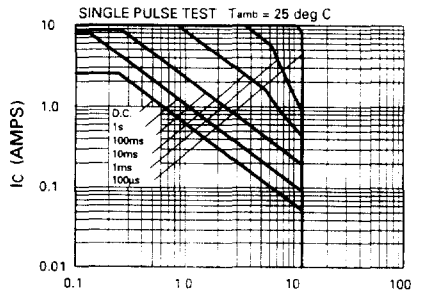
Collector Current  
**hFE vs IC**



Collector Current  
**VBE(SAT) vs IC**



Collector Current  
**VBE(ON) vs IC**



**Safe Operating Area**

# FMMT718 FMMT720

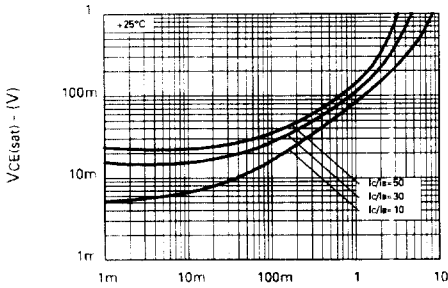
## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

PARAMETER	SYMBOL	FMMT718			FMMT720			UNIT	CONDITIONS.
		MIN.	TYP.	MAX.	MIN.	TYP.	MAX.		
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-20	-65		-40	-95		V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-20	-55		-40	-85		V	$I_C = -10\text{mA}^*$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-5	-8.8		-5	-8.8		V	$I_E = -100\mu\text{A}$
Collector Cut-Off Current	$I_{CBO}$			-100				nA nA	$V_{CB} = -15\text{V}$ $V_{CB} = -35\text{V}$
Emitter Cut-Off Current	$I_{EBO}$			-100				nA	$V_{EB} = -4\text{V}$
Collector Emitter Cut-Off Current	$I_{CES}$			-100				nA nA	$V_{CES} = -15\text{V}$ $V_{CES} = -35\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		-16 -130 -145	-40 -200 -220		-25 -150 -245	-40 -220 -330	mV mV mV mV	$I_C = -0.1\text{A}, I_B = -10\text{mA}^*$ $I_C = -1\text{A}, I_B = -20\text{mA}^*$ $I_C = -1\text{A}, I_B = -50\text{mA}^*$ $I_C = -1.5\text{A}, I_B = -50\text{mA}^*$ $I_C = -1.5\text{A}, I_B = -100\text{mA}^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$		-0.87	-1.0		-0.89	-1.0	V V	$I_C = -1.5\text{A}, I_B = -50\text{mA}^*$ $I_C = -1.5\text{A}, I_B = -75\text{mA}^*$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$		0.81	-1.0		-0.80	-1.0	V V	$I_C = -2\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -1.5\text{A}, V_{CE} = -2\text{V}^*$
Static Forward Current Transfer Ratio	$h_{FE}$	300 300	475 450		300 300 180 60	480 450 290 130			$I_C = -10\text{mA}, V_{CE} = -2\text{V}^*$ $I_C = -0.1\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -1\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -1.5\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -2\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -3\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -4\text{A}, V_{CE} = -2\text{V}^*$ $I_C = -6\text{A}, V_{CE} = -2\text{V}^*$
Transition Frequency	$f_T$	150	180		150	190		MHz	$I_C = -50\text{mA}, V_{CE} = -10\text{V}$ $f = 100\text{MHz}$
Output Capacitance	$C_{obo}$		21	30		19	25	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$
Turn-On Time	$t_{(on)}$		40					ns	$V_{CC} = -10\text{V}, I_C = -1\text{A}$ $I_{B1} = I_{B2} = -20\text{mA}$
Turn-Off Time	$t_{(off)}$		670					ns	
Turn-On Time	$t_{(on)}$					40		ns	$V_{CC} = -15\text{V}, I_C = -0.75\text{A}$ $I_{B1} = I_{B2} = -15\text{mA}$
Turn-Off Time	$t_{(off)}$					435		ns	

\*Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$

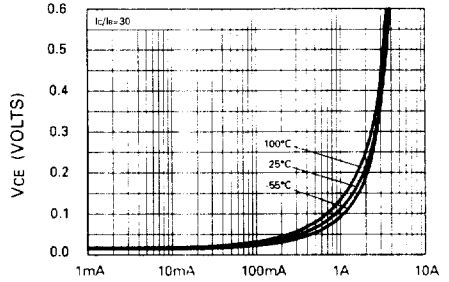
# FMMT718

## TYPICAL CHARACTERISTICS



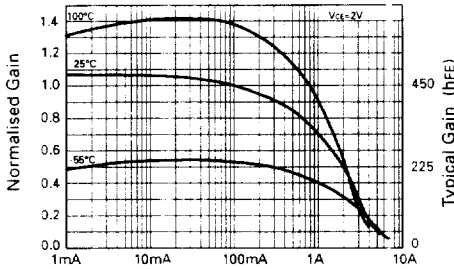
IC - Collector Current (A)

**VCE(SAT) v IC**



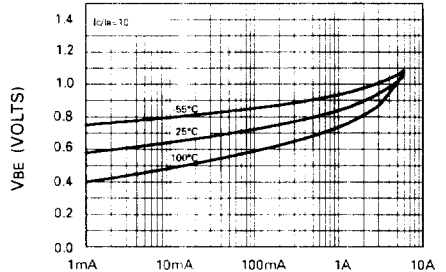
Collector Current

**VCE(SAT) vs IC**



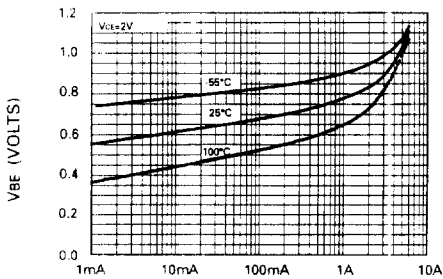
Collector Current

**hFE vs IC**



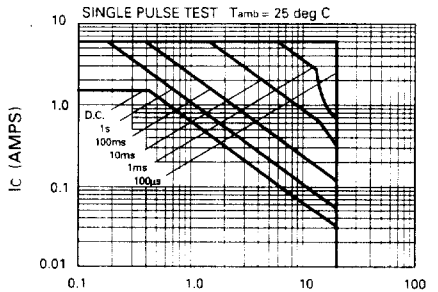
Collector Current

**VBE(SAT) vs IC**



Collector Current

**VBE(ON) vs IC**

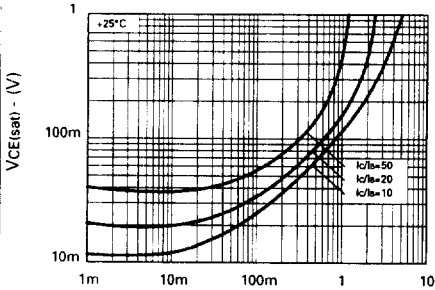


VCE (VOLTS)

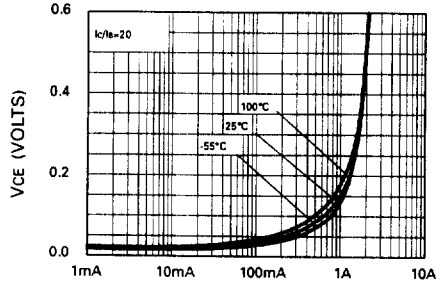
**Safe Operating Area**

# FMMT720

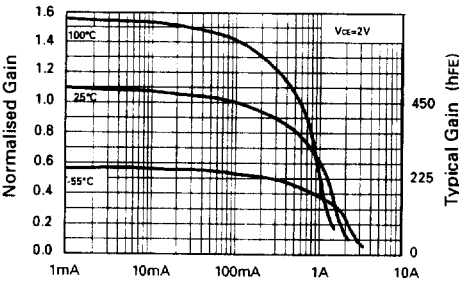
## TYPICAL CHARACTERISTICS



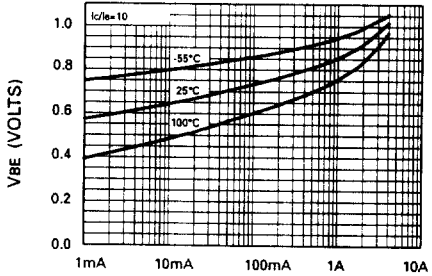
$I_C$  - Collector Current (A)  
 **$V_{CE(SAT)}$  v  $I_C$**



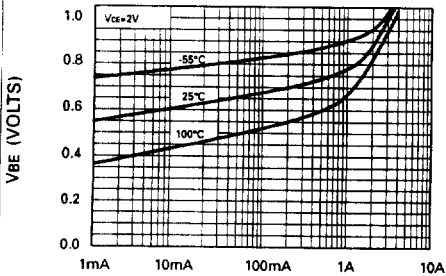
Collector Current  
 **$V_{CE(SAT)}$  vs  $I_C$**



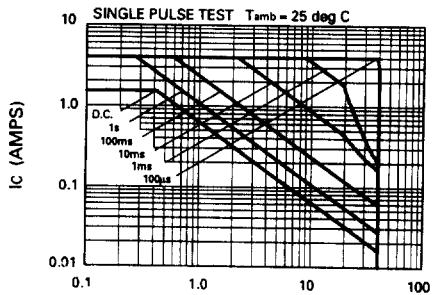
Collector Current  
**hFE vs  $I_C$**



Collector Current  
 **$V_{BE(SAT)}$  vs  $I_C$**



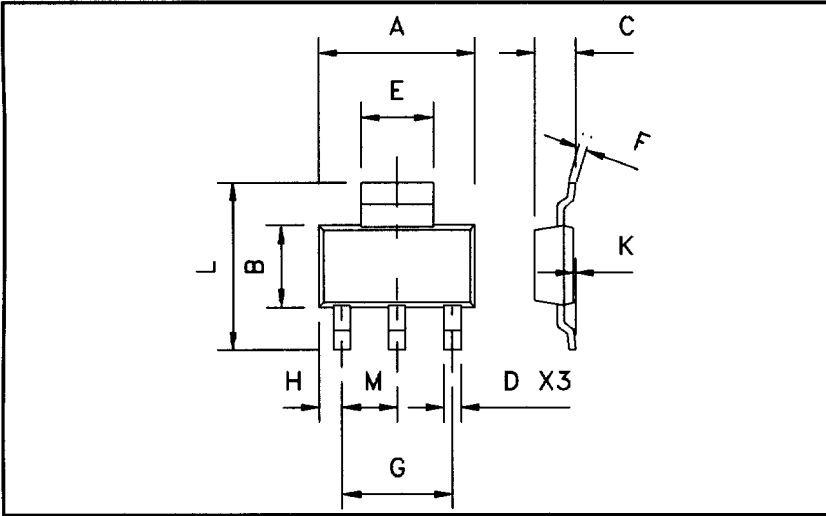
Collector Current  
 **$V_{BE(ON)}$  vs  $I_C$**



**Safe Operating Area**

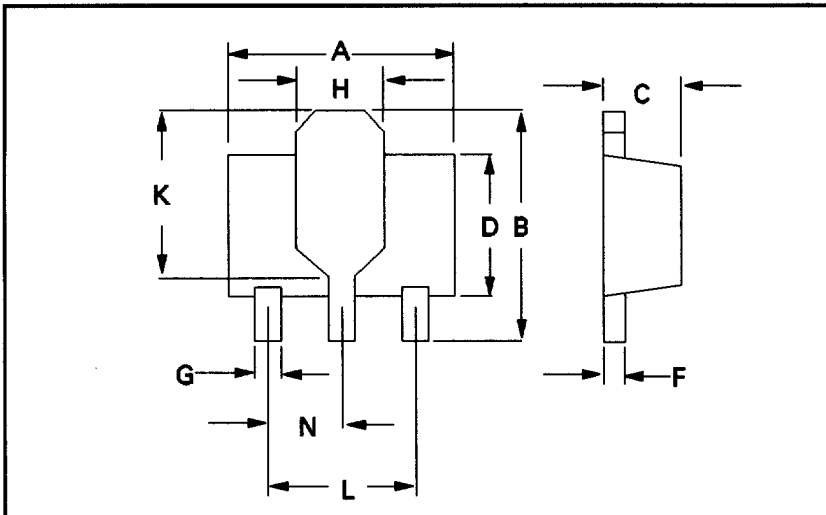
# PACKAGE OUTLINE DETAILS

## SOT223



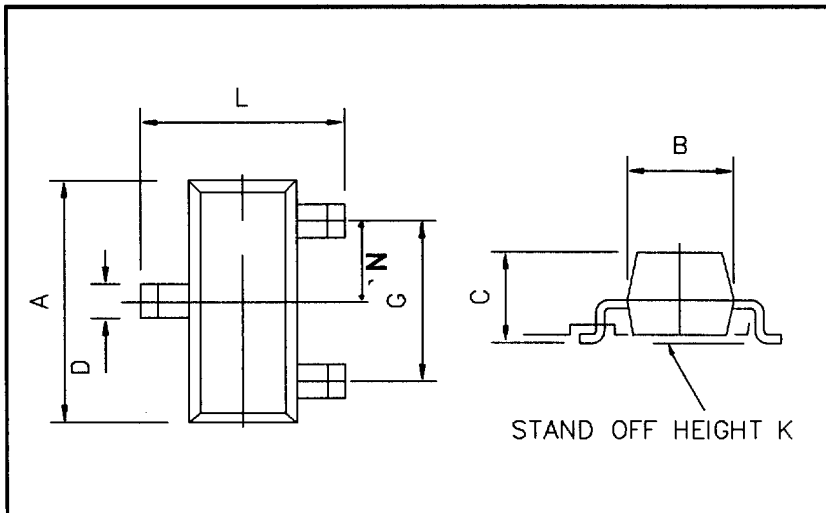
DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	6.3	6.7	0.248	0.264
B	3.3	3.7	0.130	0.146
C	-	1.7	-	0.067
D	0.6	0.8	0.024	0.031
E	2.9	3.1	0.114	0.122
F	0.24	0.32	0.009	0.013
G	NOM 4.6		NOM 0.181	
H	0.85	1.05	0.033	0.041
K	0.02	0.10	0.0008	0.004
L	6.7	7.3	0.264	0.287
M	NOM 2.3		NOM 0.0905	

## SOT89



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	4.40	4.60	0.173	0.181
B	3.75	4.25	0.150	0.167
C	1.40	1.60	0.550	0.630
D	-	2.60	-	0.102
F	0.28	0.45	0.011	0.018
G	0.38	0.55	0.015	0.022
H	1.50	1.80	0.060	0.072
K	2.60	2.85	0.102	0.112
L	2.90	3.10	0.114	0.122
N	1.40	1.60	0.055	0.063

## SOT23



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	2.67	3.05	0.105	0.120
B	1.20	1.40	0.047	0.055
C	-	1.10	-	0.043
D	0.37	0.53	0.0145	0.021
F	0.085	0.15	0.0033	0.0059
G	NOM 1.9		NOM 0.075	
K	0.01	0.10	0.0004	0.004
L	2.10	2.50	0.0825	0.0985
N	NOM 0.95		NOM 0.37	

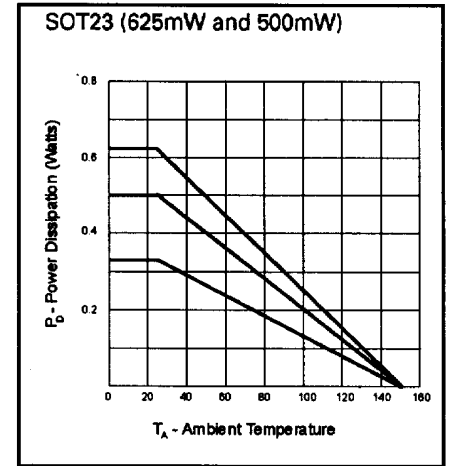
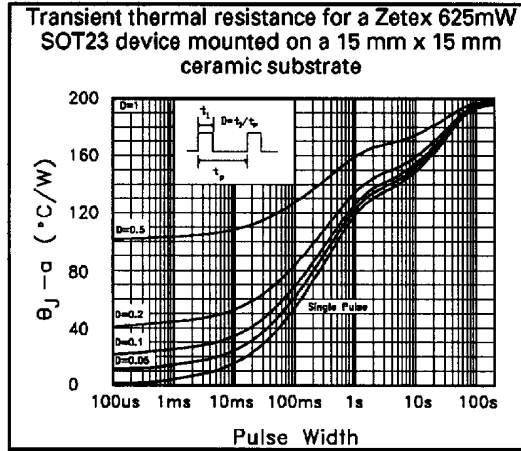


# THERMAL RESISTANCE AND DERATING INFORMATION

## D) SOT23 625 mW devices

$\theta_{j-c}$  = 100°C/W Typical  
 $\theta_{j-a}$  = 190°C/W Typical  
 = 200°C/W Maximum

Mounted on a 15 x 15 x 0.6 mm alumina substrate connected using 25mm x 0.5mm dia copper wire



\*330mW shown for reference only

## E) SOT23 500 mW devices

$\theta_{j-c}$  = 110°C/W Typical  
 $\theta_{j-a}$  = 200°C/W Typical  
 = 250°C/W Maximum

Mounted on a 15 x 15 x 0.6 mm alumina substrate connected using 25mm x 0.5mm dia copper wire

