

ZTX650 ZTX651

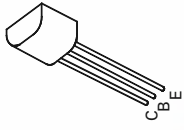
NPN SILICON PLANAR MEDIUM POWER TRANSISTORS

ZTX650 ZTX651

ISSUE 2 - JULY 94

FEATURES

- * 60 Volt V_{CE0}
- * 2 Amp continuous current
- * Low saturation voltage
- * $P_{tot}=1$ Watt



E-Line
TO92 Compatible

ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	ZTX650	ZTX651	UNIT
Collector-Base Voltage	V_{CBO}	60	80	V
Collector-Emitter Voltage	V_{CEO}	45	60	V
Emitter-Base Voltage	V_{EBO}		5	V
Peak Pulse Current	I_{CM}		6	A
Continuous Collector Current	I_C		2	A
Power Dissipation at $T_{amb}=25^{\circ}C$ derate above $25^{\circ}C$	P_{tot}		1 5.7	W mW/ $^{\circ}C$
Operating and Storage Temperature Range	T_j, T_{stg}		-55 to +200	$^{\circ}C$

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

PARAMETER	SYMBOL	ZTX650			ZTX651			CONDITIONS.
		MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	60			80			$I_C=100\mu A$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	45			60			$I_C=10mA^*$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5			5			$I_E=100\mu A$
Collector Cut-Off Current	I_{CBO}			0.1				$V_{CB}=45V$ $V_{CB}=60V$ $V_{CB}=45V, T_{amb}=100^{\circ}C$ $V_{CB}=60V, T_{amb}=100^{\circ}C$
Emitter Cut-Off Current	I_{EBO}			0.1				$V_{EB}=4V$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	0.12	0.23	0.3	0.12	0.23	0.3	$I_C=1A, I_B=100mA^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	0.9	0.9	1.25	0.9	0.9	1.25	$I_C=2A, I_B=200mA^*$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$	0.8	0.8	1	0.8	0.8	1	$I_C=1A, I_B=100mA^*$ $I_C=1A, V_{CE}=2V^*$

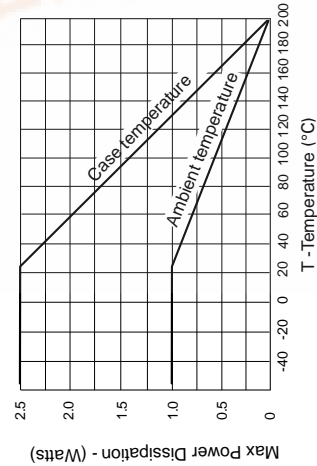
PARAMETER	SYMBOL	ZTX650		ZTX651		UNIT	CONDITIONS.
		MIN.	TYP.	MAX.	MIN.		
Transition Frequency	f_T	140	175		140	175	$I_C=100mA, V_{CE}=5V$ $f=100MHz$
Switching Times	t_{on}		45			45	$I_C=500mA, V_{CC}=10V$ $I_B=I_C=50mA$
	t_{off}		800			800	
Output Capacitance	C_{obo}		30			30	$V_{CB}=10V, f=1MHz$

Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$

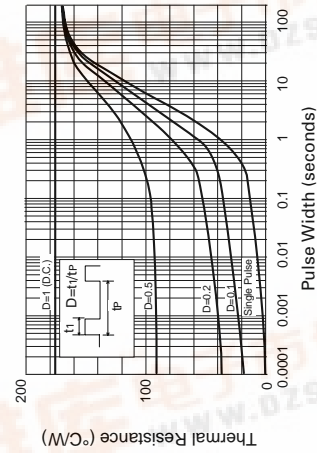
HERMAL CHARACTERISTICS

PARAMETER	SYMBOL	MAX.	UNIT
Thermal Resistance: Junction to Ambient ₁	$R_{th(j-amb)1}$	175	$^{\circ}C/W$
Junction to Ambient ₂	$R_{th(j-amb)2}$	116	$^{\circ}C/W$
Junction to Case	$R_{th(j-case)}$	70	$^{\circ}C/W$

Device mounted on P.C.B. with copper equal to 1 sq. Inch minimum.



Derating curve



Maximum transient thermal impedance

ZTX650 ZTX651

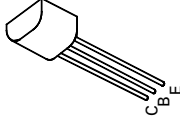
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Collector-Base Voltage	V_{CB0}	60	80	V
Collector-Emitter Voltage	V_{CE0}	45	60	V
Emitter-Base Voltage	V_{EBO}	5	5	V
Peak Pulse Current	I_{CM}	6	6	A
Continuous Collector Current	I_C	2	2	A
Power Dissipation at $T_{amb}=25^{\circ}C$ derate above $25^{\circ}C$	P_{tot}	1	5.7	W
Operating and Storage Temperature Range	T_j, T_{stg}	-55 to +200		$^{\circ}C$

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

PARAMETER	SYMBOL	ZTX650			ZTX651			UNIT	CONDITIONS.
		MIN.	TYP.	MAX.	MIN.	TYP.	MAX.		
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	60			80			V	$I_C=100\mu A$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	45			60			V	$I_C=10mA^*$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5			5			V	$I_E=100\mu A$
Collector Cut-Off Current	I_{CBO}			0.1			0.1	μA	$V_{CB}=45V$ $V_{CE}=60V$
Emitter Cut-Off Current	I_{EBO}			0.1			0.1	μA	$V_{CB}=45V, T_{amb}=100^{\circ}C$ $V_{CE}=60V, T_{amb}=100^{\circ}C$ $V_{EB}=4V$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	0.12	0.23	0.3	0.12	0.23	0.3	V	$I_C=1A, I_B=100mA^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	0.9	0.9	1.25	0.9	0.9	1.25	V	$I_C=2A, I_B=200mA^*$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$	0.8	0.8	1	0.8	0.8	1	V	$I_C=1A, I_B=2V^*$

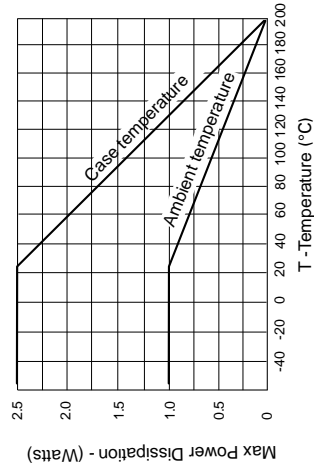
PARAMETER	SYMBOL	ZTX650		ZTX651		UNIT	CONDITIONS.
		MIN.	TYP.	MAX.	TYP.		
Transition Frequency	f_T	140	175	140	175	MHz	$I_C=100mA, V_{CE}=5V$ $f=100MHz$
Switching Times	t_{on}	45	45	45	45	ns	$I_C=500mA, V_{CC}=10V$ $I_B=I_C=50mA$
	t_{off}	800	800	800	800	ns	
Output Capacitance	C_{obo}	30	30	30	30	pF	$V_{CB}=10V, f=1MHz$

Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$

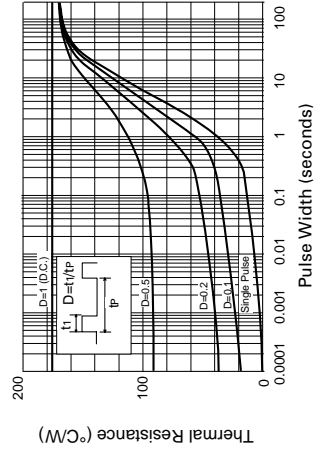
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Derating curve



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TYPICAL CHARACTERISTICS

