WESTCODE SEMICONDUCTORS

Technical Publication
WT600
Issue 1
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Discrete Power Darlington Transistor Types WT635-01 & WT635-02

- 67.5kW Switched Power
- 150 Amperes Continuous
- 450 Volts Sustaining Voltage

These transistors are designed for switching into clamped inductive loads (see Figure 1), for such applications as:

Choppers
Inverters
A.C. Machines (Speed Regulation)

utilising the transistors with Pulse Width Modulation or Multi-Step systems for frequency and/or voltage control.

The driver and output transistors are connected in a conventional Darlington configuration. The WT635-01D or -02D provides the drive to the WT635-01M or -02M output transistor. The discrete Darlington connection enables access to be made to the driver emitter-output base terminal, allowing the extraction of stored base charge to be accomplished, either directly, or via a diode in inverse parallel with the driver base-emitter terminals (see Note 4).

Maximum ratings

		WT635-01	WT635-02
V_{CEV}		500V	550V
$V_{CER(SUS)}$	$R_{BE} = 10\Omega$	400V	450V
V_{EBO}		10V	
$I_{C(CONT)}$		150A	
$I_{C(PEAK)}$		150A	
$I_{B(CONT)}$	WT635-01D/-02D	15A	
$I_{B(CONT)}$	WT635-01M/-02M	50A	
P_{tot}	25°C T_C	0.85 kW	
T_j		150°C	

Limit electrical characteristics at Tj 125°C

I_{CEV}	at V_{CEV}, $V_{EB} = 2V$, $R_{BE} = 10\Omega$	20mA max.
I_{EBO}	at V_{EBO}	100mA max.
$V_{CER(SUS)}$	$R_{BE} = 10\Omega$	400V min. 450V min.
$V_{CE(SAT)}$	at $I_C = 150A$, $I_B = \left(\frac{150}{h_{FE}} \times 1.5\right) A$	2.2V max.
$V_{BE(SAT)}$		3.2V max.
h_{FE}	at $V_{CE} = 2.5V$, $I_C = 150A$	30 min.
t_{on}	resistive load (Note 4)	3μs typical
t_s	$I_C = 150A$	10μs typical
t_f	$I_B = \pm\left(\frac{150}{h_{FE}} \times 1.5\right) A$, $V_{CE} = 200V$, $V_{EB} = V$	6μs typical
$t_{on(I)}$	clamped inductive load (Note 4) $I_C = 150A$, $I_B = \pm\left(\frac{150}{h_{FE}} \times 1.5\right) A$	1.25μs typical
$t_{f(I)}$	$V_{CE} = V_{CER(SUS)}$, $V_{EB} = 5V$ max.	2.00μs typical
$R_{TH(J-C)}$	WT635-01D/-02D	0.53°C/W
$R_{TH(J-C)}$	WT635-01M/-02M	0.15°C/W

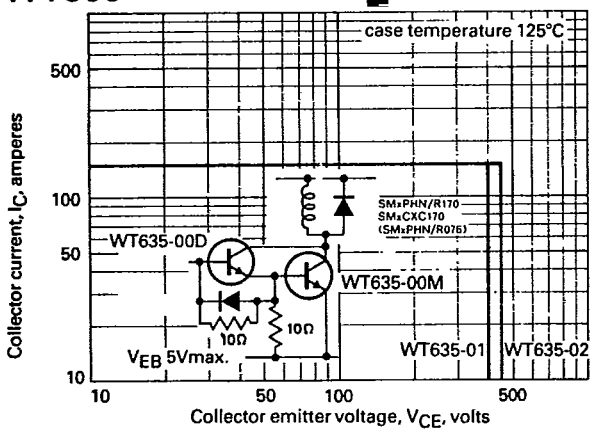


Figure 1 Max. Forward and Reverse Bias Switching Periphery

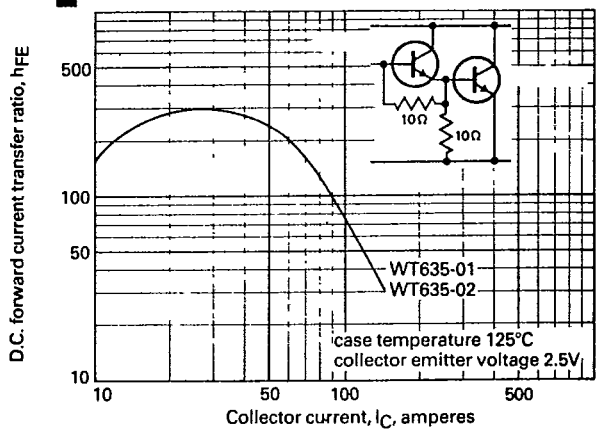


Figure 2 Min. D.C. Forward Current Transfer Ratio v. Collector Current

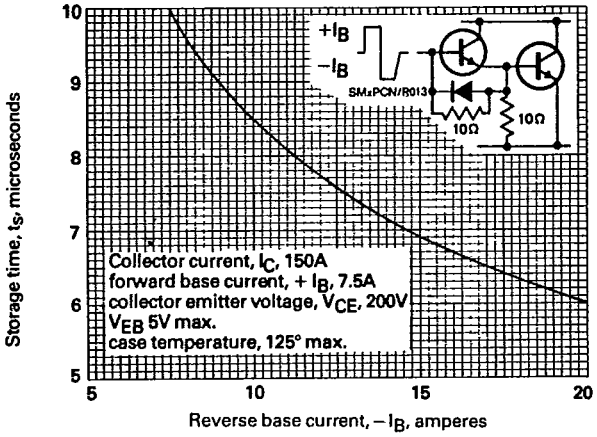


Figure 3 Storage Time v. Reverse Base Current – B

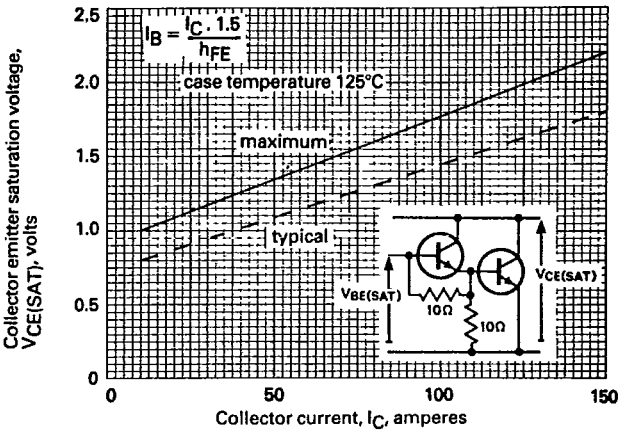


Figure 4 Collector to Emitter Saturation Voltage Characteristics

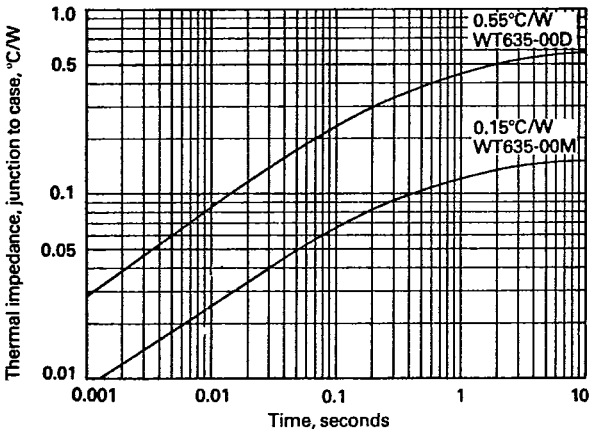


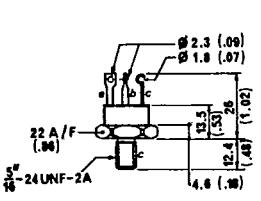
Figure 5 Transient Thermal Impedance, Junction to Case

NOTES

1. All data is given at a design junction temperature of 125°C.
2. A diode should be used across the input emitter-base junction to limit its V_{EB} to 1.0V and the total Darlington V_{EB} to 2.0V in line with the condition for limit, I_{CEV}. The diode also clamps the input junction during clamped inductive load turn-off.
3. The forward and reverse bias switching periphery indicates that clamped inductive load continuous current operation is permissible at rated sustaining voltage and rated continuous collector current. (See Figure 1).
4. For switching time measurements the amplitude of the forward and reverse base currents are equal, charge extraction from the output transistor (WT635-01M/-02M) being accomplished via a diode (type SMxPCN/R013) in inverse parallel with the driver (WT635-01D/–02D) base-emitter terminals.

WT635-00D WT635-00M

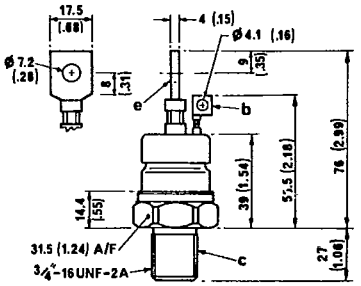
dimensions in mm. (inches)



TO – 63

Mounting Torque
0.35-0.55 KgM

Weight: 30 grams



Mounting Torque 2.5-2.77 KgM
threads not to be lubricated

Weight: 255 grams

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