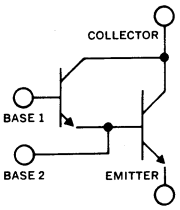
POWER DARLINGTONS

2 Amp, 300V, Planar NPN

U2T712
U2T713
U2T722
U2T723

FEATURES

- High Current Gain: up to 1000 min. @ $I_C = 1A$
- Low Saturation Voltage: as low as 1.5V max. @ $I_C = 2A$
- High Voltage: up to 300V. min. V_{CEO}
- Peak Current: to 5A
- Monolithic Planar Chip Construction



DESCRIPTION

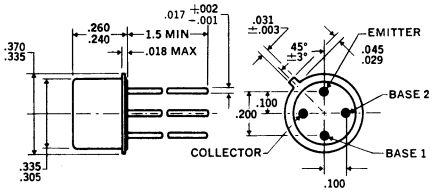
Unitrode NPN Darlingtons consist of a two transistor circuit on a single monolithic planar chip.

ABSOLUTE MAXIMUM RATINGS

	TO-33		3 PIN TO-66	
	U2T712	U2T713	U2T722	U2T723
Collector — Emitter Voltage	200V	300V	200V	300V
Emitter — Base Voltages				
V_{EB2}	6V	6V	6V	6V
V_{EB1}	12V	12V	12V	12V
D.C. Collector Current	2A	2A	2A	2A
Peak Collector Current	5A	5A	5A	5A
Base 1 Current	0.5A	0.5A	0.5A	0.5A
Power Dissipation				
25°C Ambient	1W	1W	2W	2W
100°C Case	5W	5W	20W	20W
Thermal Resistance				
Junction-to-Case	20°C/W		5°C/W	
Operating and Storage Temperature Range	−65°C to 200°C		−65°C to 200°C	

MECHANICAL SPECIFICATIONS

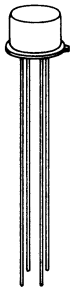
U2T712 U2T713



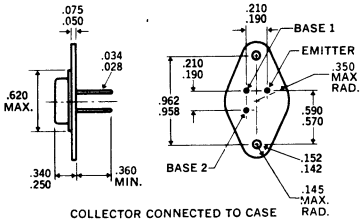
COLLECTOR CONNECTED TO CASE

Dimensions in inches.

TO-33



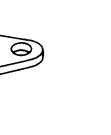
U2T722 U2T723



COLLECTOR CONNECTED TO CASE

Dimensions in inches.

3 PIN TO-66



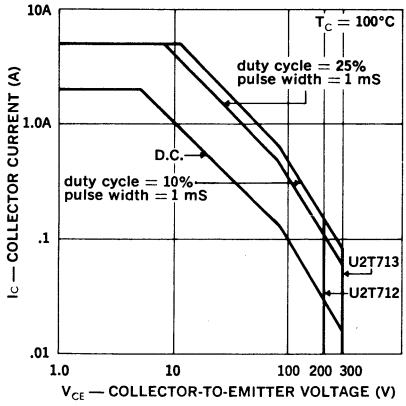
UNITRODE

ELECTRICAL SPECIFICATIONS (at 25°C unless noted)

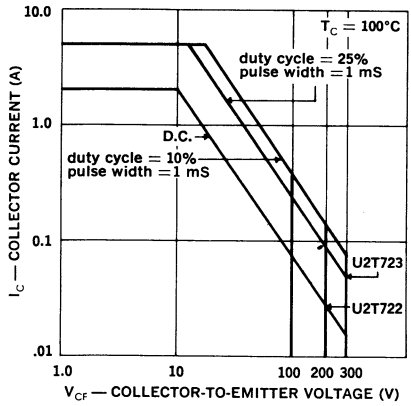
Test	Symbol	U2T712 & 722 Min.	U2T712 & 722 Max.	U2T713 & 723 Min.	U2T713 & 723 Max.	Units	Test Conditions
D.C. Current Gain (Note 1)	h_{FE}	1000	—	1000	—	—	$I_C = 1A$, $V_{CE} = 5V$, $R_{B2E} = 1K$
Collector Saturation Voltage (Note 1)	V_{CE} (sat)	—	1.5	—	1.5	V	$I_C = 2A$, $R_{B2E} = 100$, $I_{B1} = 20mA$
Collector-Emitter Breakdown Voltage (Note 1)	BV_{CEO}	200	—	300	—	V	$I_C = 10mA$
	BV_{CER}	250 Typ.	—	350 Typ.	—	V	$I_C = 10mA$, $R_{B1E} = 2.2K$, $R_{B2E} = 100$
Collector Cutoff Current	I_{CER}	—	10.0	—	10.0	μA	$R_{B1E} = 2.2K$, $R_{B2E} = 100$ U2T712 & 722: $V_{CE} = 200$ U2T713 & 723: $V_{CE} = 300$
Collector Capacitance	C_{obo}	—	100	—	100	pf	$V_{CB1} = 10V$, $I_E = 0$, f = 1mHz
A.C. Current Gain	h_{fe}	4.0 Typ.	—	4.0 Typ.	—	—	$I_C = 0.5A$, $V_{CE} = 10V$, f = 20mHz, $R_{B2E} = 100$
Rise Time Storage Time Fall Time	t_r t_s t_f	0.6 Typ. 1.5 Typ. 1.0 Typ.		0.6 Typ. 1.5 Typ. 1.0 Typ.		μS μS μS	$V_{CC} = 100V$, I_B (on) = I_B (off) = 25mA, $I_C = 2A$, $R_{B2E} = 100$

Note 1. Pulse width = 300 μS; duty cycle $\leqslant$ 2%

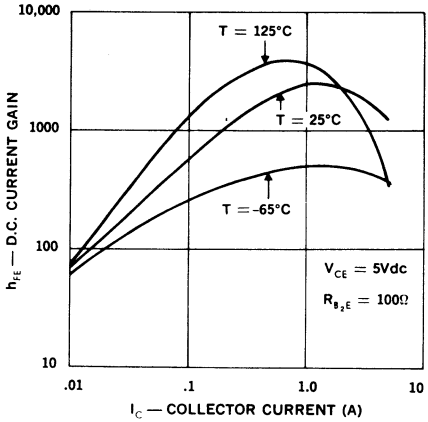
Maximum Safe Operating Area U2T712 & 713



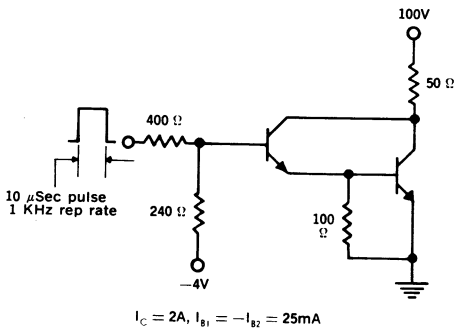
Maximum Safe Operating Area U2T722 & 723



D.C. Current Gain vs. Collector Current U2T712, U2T713, U2T722, U2T723



Switching Speed Circuit



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POWER TRANSISTORS

2 Amp, 500V, Fast Switching Silicon NPN Mesa

UMT3584
UMT3585

FEATURES

- Collector Base Voltage: up to 500V
- Peak Collector Current: 5A
- Rise Time $\leqslant 3\mu s$ } $I_C = 1A$
- Fall Time $\leqslant 3\mu s$ }
- Economical Plastic Molded Construction

DESCRIPTION

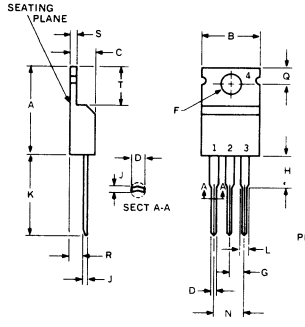
These high voltage triple diffused glass passivated power transistors in a plastic TO-220 package combine fast switching, low saturation voltage and rugged $E_s/_b$ capability. They are designed for use in off-line switching regulators, converters, inverters and deflection circuitry.

ABSOLUTE MAXIMUM RATINGS

	UMT3584	UMT3585
Collector Base Voltage, V_{CBO}	375V	500V
Collector Emitter Voltage, $V_{CEO\ (SUS)}$	250V	300V
Emitter Base Voltage, V_{EBO}	6V	6V
Collector Current, I_C continuous	2A	2A
I_{CM} peak	5A	5A
D.C. Base Current, continuous	1A	1A
Power Dissipation, P_T 25°C Case	35W	35W
Operating and Storage Temperature Range	−65 to +150°C	

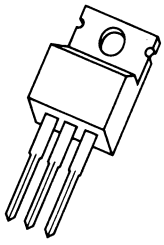
MECHANICAL SPECIFICATIONS

UMT3584, UMT3585



DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	14.23	15.87	0.560	0.625
B	9.66	10.66	0.380	0.420
C	3.56	4.82	0.140	0.190
D	0.51	1.14	0.020	0.045
F	3.531	3.733	0.139	0.147
G	2.29	2.79	0.090	0.110
H		6.35	—	0.250
J	0.38	0.64	0.015	0.025
K	12.70	14.27	0.500	0.562
L	1.14	1.77	0.045	0.070
N	4.83	5.33	0.190	0.210
Q	2.54	3.04	0.100	0.120
R	2.04	2.92	0.080	0.115
S	1.14	1.39	0.045	0.055
T	5.85	6.85	0.230	0.270

TO-220



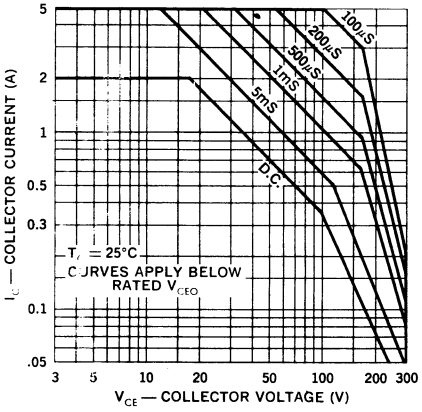
ELECTRICAL SPECIFICATIONS (at 25°C unless noted)

Test	Symbol	UMT3584 MIN.	UMT3584 MAX.	UMT3585 MIN.	UMT3585 MAX.	Units	Test Conditions
D.C. Current Gain (Note 1)	h_{FE}	40	—	40	—		$I_C = 100mA, V_{CE} = 10V$
		8	80	8	80		$I_C = 1A, V_{CE} = 2V$
		25	100	25	100		$I_C = 1A, V_{CE} = 10V$
Collector Saturation Voltage (Note 1)	$V_{CE(sat)}$	—	0.75	—	0.75	V	$I_C = 1A, I_B = 125mA$
Base Saturation Voltage (Note 1)	$V_{BE(sat)}$	—	1.4	—	1.4	V	$I_C = 1A, I_B = 100mA$
Collector-Emitter Sustaining Voltage (Note 2)	$V_{CEO(sus)}$	250	—	300	—	V	$I_C = 200mA$
Collector-Emitter Sustaining Voltage (See Note 2)	$V_{CER(sus)}$	300	—	400	—	V	$I_C = 200mA$ $R_{BE} = 200\Omega$
Emitter Cutoff Current	I_{EBO}	—	0.5	—	0.5	mA	$V_{BE} = -6V$
Collector-Cutoff Current	I_{CEO}	—	5.0	—	5.0	mA	$V_{CE} = 150V$
Collector-Cutoff Current	I_{CEV}	—	1.0	—	—	mA	$V_{CE} = 340V, V_{BE} = -1.5V$
		—	—	—	1.0		$V_{CE} = 450V, V_{BE} = -1.5V$
Collector Cutoff Current, 150°C	I_{CEV}	—	3.0	—	3.0	mA	$V_{CE} = 300V, V_{BE} = -1.5V$
Small Signal Forward Transfer Ratio	h_{fe}	3	—	3	—	—	$I_C = 200mA, V_{CE} = 10V$ $f = 5$ MHz
Collector Capacitance	C_{ob}	—	120	—	120	pF	$V_{CB} = 10V, f = 1$ MHz
Second Breakdown Collector Current	$I_{s/b}$	350	—	350	—	mA	$V_{CE} = 100V$
Second Breakdown Energy	$E_{s/b}$	200	—	200	—	μJ	$I_C = 2A$ $R_{BE} = 20\Omega$ $L = 100\mu H$
Switching Speeds							
Rise Time	t_r	—	3.0	—	3.0	μs	$I_C = 1A$
Storage Time	t_s	—	4.0	—	4.0		$I_{B1} = I_{B2} = 100mA$
Fall Time	t_f	—	3.0	—	3.0		$V_{CC} = 200V$
Thermal Resistance: Junction-to-Case	$R_{\theta JC}$	—	3.57	—	3.57	°C/W	
Junction-to-Ambient	$R_{\theta JA}$	—	70	—	70	°C/W	

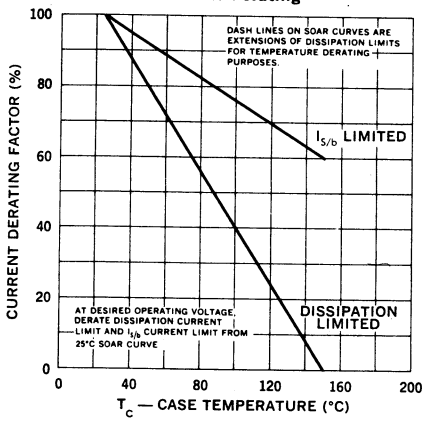
Notes

1. Pulse length = 250 μs; duty cycle $\leqslant$1%.
2. Sustaining Voltage. Measured at a high current point where collector-emitter voltage is lowest. Current pulse length $\cong$ 50 μs; duty cycle $\leqslant$1%. Voltage clamped at maximum collector-emitter voltage.

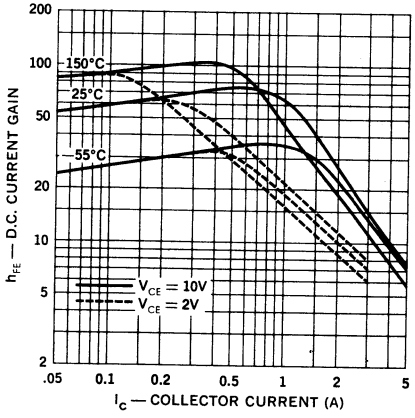
Forward Bias Safe Operating Area



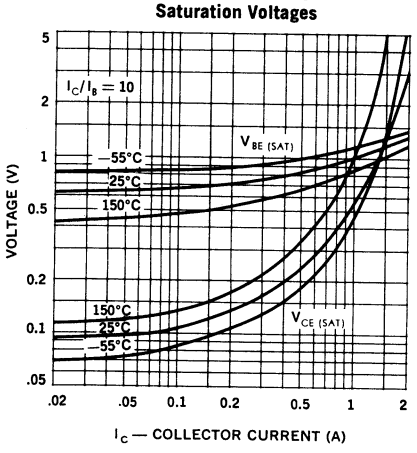
Power Derating



D.C. Current Gain



Saturation Voltages



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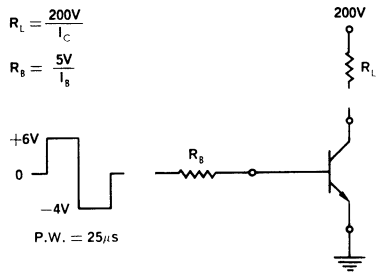
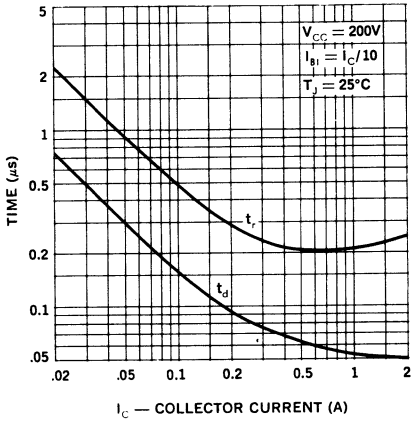
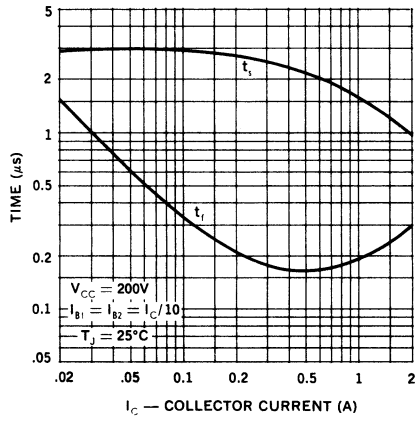
Switching Time Test Circuit



Turn-On Time



Turn-Off Time



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