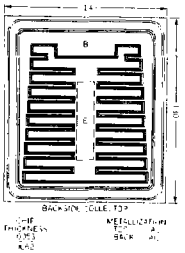
POWER TRANSISTORS
3 Amp, 80V, Planar NPN

JAN, JANTX, & JANTXV 2N3418
JAN, JANTX, & JANTXV 2N3419
JAN, JANTX, & JANTXV 2N3420
JAN, JANTX, & JANTXV 2N3421

FEATURES
- Meets MIL-S-19500/393
- Collector-Base Voltage: up to 125V
- Peak Collector Current: 5A
- High Power Dissipation in TO-5: 15W @ $T_C = 100°C$
- Fast Switching



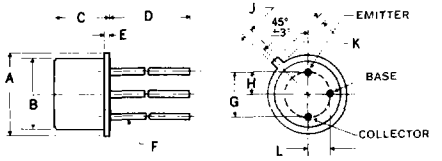
DESCRIPTION
Unitrode power transistors provide a unique combination of low saturation voltage, high gain, and fast switching. They are ideally suited for power supply, pulse amplifier and similar high frequency power switching applications.

ABSOLUTE MAXIMUM RATINGS

	JAN, JANTX, & JANTXV 2N3418 2N3420	JAN, JANTX, & JANTXV 2N3419 2N3421
Collector-Base Voltage, V_{CBO}	85V	125V
Collector-Emitter Voltage, V_{CEO}	60V	80V
Emitter-Base Voltage, V_{EBO}	8V	8V
D.C. Collector Current, I_C	3A	3A
Peak Collector Current, I_C	5A	5A
Power Dissipation		
25°C Ambient	1.0W	1.0W
100°C Case	15W	15W
Operating and Storage Temperature Range	−65°C to +200°C	

MECHANICAL SPECIFICATIONS

JAN, JANTX, & JANTXV 2N3418-2N3421



	INCHES	MILLIMETERS
A	335-370	8 51-9 40
B	305-335	7 75-8 51
C	240-260	6 09-6 60
D	1 5 MIN.	38 10 MIN
E	010-030	254-762
F	017 ± 002 001	432 ± 051 025
G	200	5 08
H	100	2 54
J	031±.003	787±.076
K	029-045	736-1 14
L	100	2 54

TO-5

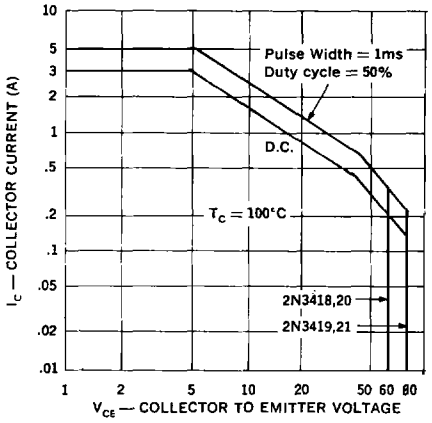
UNITRODE

ELECTRICAL SPECIFICATIONS (at 25°C unless noted)

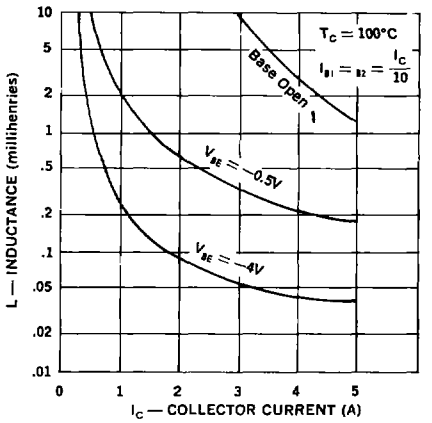
TEST	SYMBOL	MIN.	MAX.	UNITS	/393 Sub-group	MIL - STD - 750 METHOD	MIL - STD - 750 TEST CONDITIONS
Visual and Mechanical	—	—	—	—	A-1	2071	See Mechanical Data
Collector-Emitter Breakdown Voltage (1.)	BV_{CEO}				A-2	3011	$I_C = 50mAdc$, Cond. D
2N3418, 2N3420		60	—	Vdc			
2N3419, 2N3421		80	—	Vdc			
Collector-Emitter Cutoff Current	I_{CEX}				A-2	3041	$V_{EB} = 0.5Vdc$, Cond. A
2N3418, 2N3420		—	0.5	μAdc			$V_{CE} = 80Vdc$
2N3419, 2N3421		—	0.5	μAdc			$V_{CE} = 120Vdc$
Collector-Emitter Cutoff Current	I_{CEO}				A-2	3041	Cond. D
2N3418, 2N3420		—	5.0	μAdc			$V_{CE} = 45Vdc$
2N3419, 2N3421		—	5.0	μAdc			$V_{CE} = 60Vdc$
Emitter-Base Cutoff Current	I_{EBO}	—	0.5	μAdc	A-2	3061	$V_{EB} = 6Vdc$, Cond. D
Emitter-Base Cutoff Current	I_{EBO}	—	10	μAdc	A-2	3061	$V_{EB} = 8Vdc$, Cond. D
D.C. Current Gain (1.)	h_{FE}				A-3	3076	$I_C = 100mAdc$, $V_{CE} = 2Vdc$
2N3418, 2N3419		20	—	—			
2N3420, 2N3421		40	—	—			
D.C. Current Gain (1.)	h_{FE}				A-3	3076	$I_C = 1Adc$, $V_{CE} = 2Vdc$
2N3418, 2N3419		20	60	—			
2N3420, 2N3421		40	120	—			
D.C. Current Gain (1.)	h_{FE}				A-3	3076	$I_C = 2Adc$, $V_{CE} = 2Vdc$
2N3418, 2N3419		15	—	—			
2N3420, 2N3421		30	—	—			
D.C. Current Gain (1.)	h_{FE}				A-3	3076	$I_C = 5Adc$, $V_{CE} = 5Vdc$
2N3418, 2N3419		10	—	—			
2N3420, 2N3421		15	—	—			
Collector-Emitter Saturation Voltage (1.)	$V_{CE(sat)}$	—	0.25	Vdc	A-3	3071	$I_C = 1Adc$, $I_B = 0.1Adc$
Collector-Emitter Saturation Voltage (1.)	$V_{CE(sat)}$	—	0.5	Vdc	A-3	3071	$I_C = 2Adc$, $I_B = 0.2Adc$
Base-Emitter Saturation Voltage (1.)	$V_{BE(sat)}$	0.6	1.2	Vdc	A-3	3066	$I_C = 1Adc$, $I_B = 0.1Adc$
Base-Emitter Saturation Voltage (1.)	$V_{BE(sat)}$	0.7	1.4	Vdc	A-3	3066	$I_C = 2Adc$, $I_B = 0.2Adc$
Gain Bandwidth Product	f_T	40	160	MHz	A-4	3306	$I_C = 0.1Adc$, $V_{CE} = 10Vdc$, $f = 20MHz$
Output Capacitance	C_{ob}	—	150	pf	A-4	3236	$V_{CB} = 10Vdc$, $I_E = 0$, $f = 1MHz$
Switching Parameters							
Turn-on Time	t_{on}	—	0.3	μS	A-4	—	$I_C = 1Adc$, $I_{B1} = -I_{B2} = 0.1Adc$
Turn-off Time	t_{off}	—	1.2	μS	A-4	—	See Switching Speed Circuit
100°C							
Forward Biased Second Breakdown	$I_{s/b}$	3	—	Adc	B-6	3005	$V_{CE} = 5Vdc$, $t = 60sec$, $T_C = 100°C$
Forward Biased Second Breakdown	$I_{s/b}$	1	—	Adc	B-6	3005	$V_{CE} = 15Vdc$, $t = 60sec$, $T_C = 100°C$
Forward Biased Second Breakdown	$I_{s/b}$	0.4	—	Adc	B-6	3005	$V_{CE} = 37Vdc$, $t = 60sec$, $T_C = 100°C$
Forward Biased Second Breakdown	$I_{s/b}$				B-6	3005	$t = 60sec$, $T_C = 100°C$
2N3418, 2N3420		185	—	mAdc			$V_{CE} = 60Vdc$
2N3419, 2N3421		120	—	mAdc			$V_{CE} = 80Vdc$
Unclamped Reverse Biased Second Breakdown	$E_{s/b}$	45	—	mj	B-7	—	$I_C = 3Adc$, $L = 10mH$, Base Open
Clamped Reverse Biased Second Breakdown	$E_{s/b}$	180	—	mj	B-8	—	$I_C = 3Adc$, $L = 40mH$, V_{clamp} = Rated V_{CBO}
150°C							
Collector-Emitter Cutoff Current	I_{CEX}				A-5	3041	$V_{EB} = 0.5Vdc$, Cond. A, $T_A = 150°C$
2N3418, 2N3420		—	50	μAdc			$V_{CE} = 80Vdc$,
2N3419, 2N3421		—	50	μAdc			$V_{CE} = 120Vdc$,
−55°C							
D.C. Current Gain (1.)	h_{FE}	10	—	—	A-5	3076	$I_C = 1Adc$, $V_{CE} = 2Vdc$, $T_A = -55°C$

Note: 1. Pulse width = 300μSec, duty cycle ⩽ 2%.

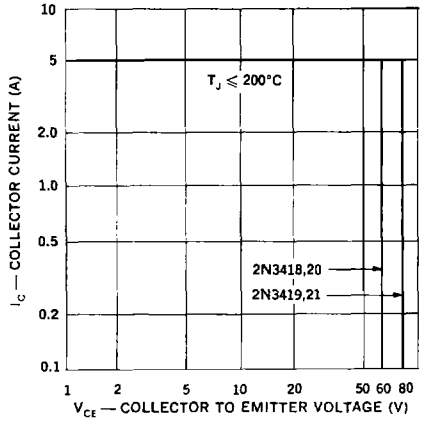
Forward Bias
Safe Operating Area



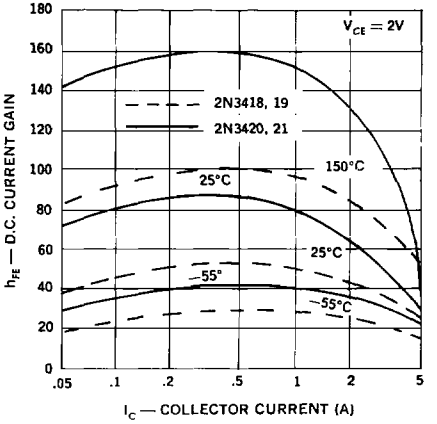
Unclamped Reverse Bias
Second Breakdown



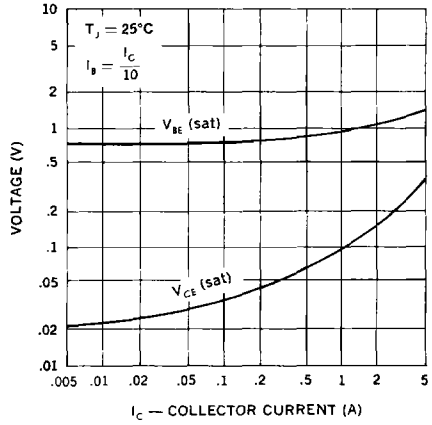
Reverse Bias
Safe Operating Area
Clamped Inductive Switching



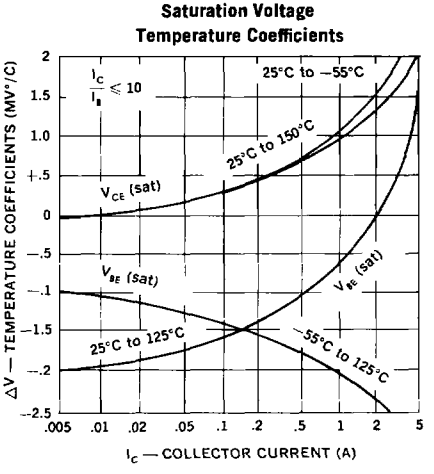
D.C. Current Gain Vs. Collector Current



Saturation Voltage



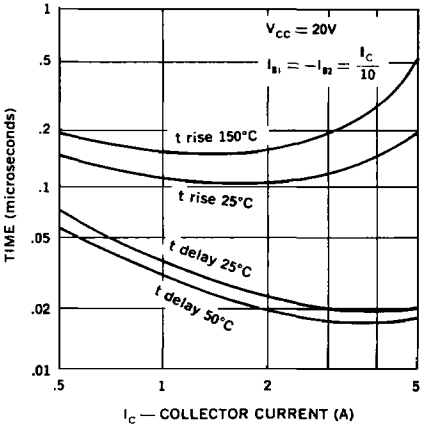
Saturation Voltage
Temperature Coefficients



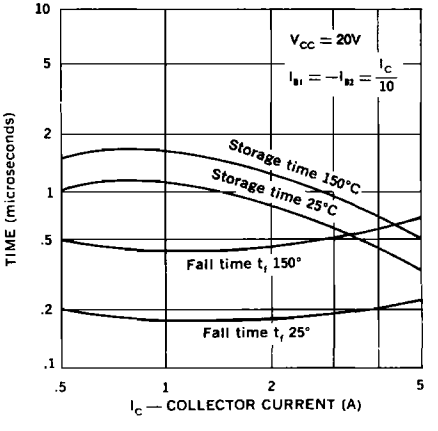
UNITRODE CORPORATION • 5 FORBES ROAD
LEXINGTON, MA 02173 • TEL. (617) 861-6540
TWX (710) 326-6509 • TELEX 95-1064

PRINTED IN U.S.A.

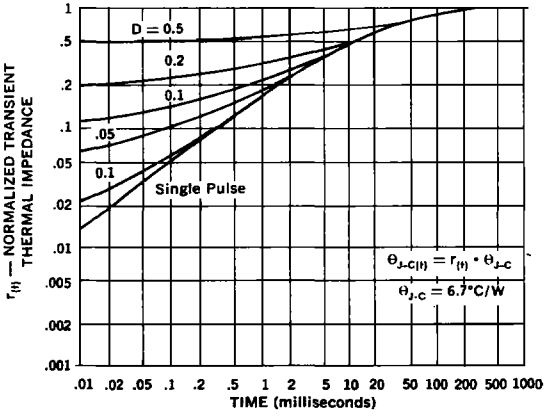
Switching Speed Characteristics



Switching Speed Characteristics



Thermal Response



Switching Speed Circuit