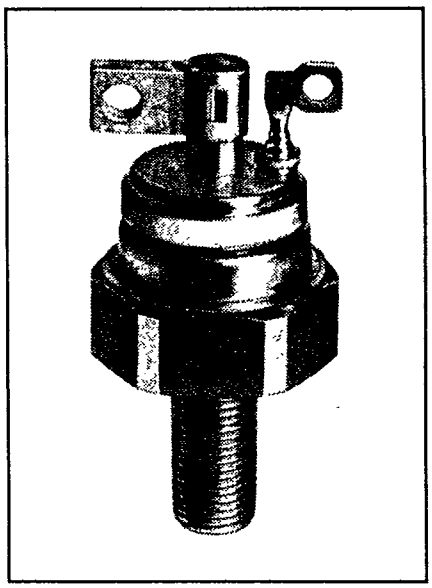
D60T/D62T___40
D60T/D62T___50
D60T/D62T___60

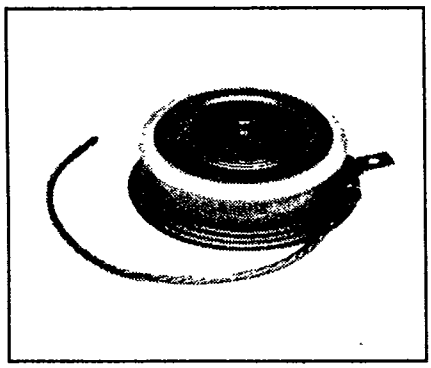
T-33-15

Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272

NPN Power Switching Transistors
40-50-60 Amperes
400-500 Volts



D60T___40/50/60
NPN Power Switching Transistors
40-50-60 Amperes/400-500 Volts



D62T___40/50/60
NPN Power Switching Transistors
40-50-60 Amperes/400-500 Volts

Features:
- ☐ Triple Diffused Design
- ☐ Compression Bonded Construction/No Solder
- ☐ Double Sided Cooling on D62T
- ☐ Fast Switching
- ☐ 100 kHz Operation
- ☐ 200 Amperes Peak

Applications:
- ☐ High Frequency Inverters
- ☐ Motor Controls
- ☐ Switching Regulators
- ☐ VLF Transmitters
- ☐ Induction Heating
- ☐ Power Supplies

Ordering Information
Example: Select the complete ten digit part number you desire from the table—i.e. a D62T454010 describes a Disc Package Transistor rated at 450 Volts, 40 Amperes, and a gain of 10 at rated current (40 Amperes). D60T454010 is the same transistor in a stud package.

Type	$V_{CEO(SUS)}$ Volts (×10)	Current Rating Amperes	Gain
D60T	40	40	10
D62T	45	50	
	50	60	

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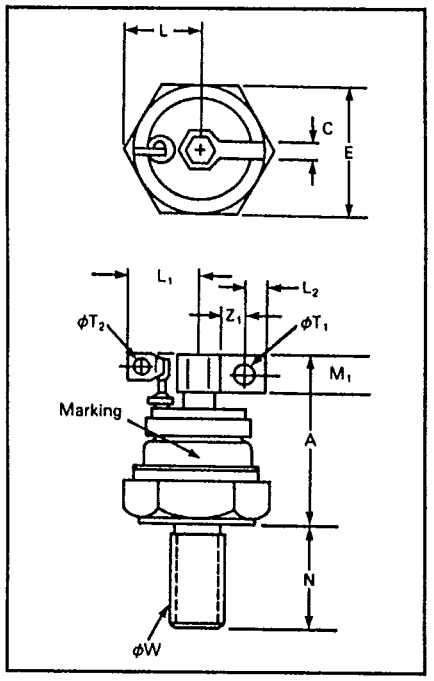
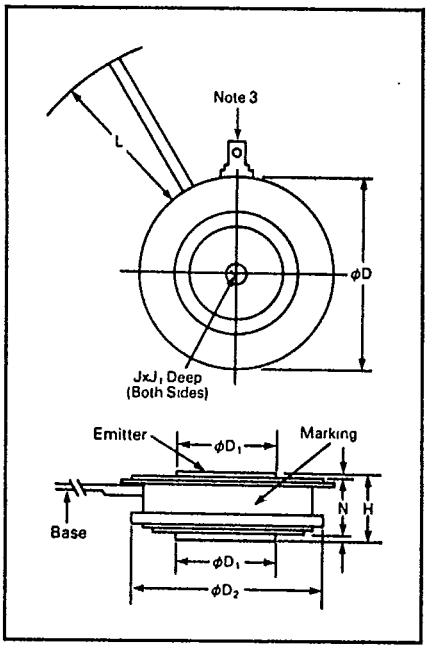
D60T/D62T___40, D60T/D62T___50, D60T/D62T___60
NPN Power Switching Transistors
40-50-60 Amperes/400-500 Volts



D60T___40/50/60, 400-500 Volts Outline Drawing

Dimension	Inches Min.	Inches Max.	Millimeters Min.	Millimeters Max.
A		1.80		45.72
C	.160	.180	4.06	4.57
E	1.212	1.252	30.78	31.75
L		.812		20.62
L_1		.64		16.26
L_2	.155		3.94	
M_1	.350	.450	8.88	11.42
N	1.040	1.077	24.89	27.69
ϕT_1	.193	.203	4.90	5.16
ϕT_2	.145	.160	3.68	4.06
Z_1	.22		5.59	
ϕW	1/2-20 UNF 3A			

Creep and Strike Distance:
D60T- 17 in. min. (4.3mm).
(In accordance with NEMA standards.)
Finish—Nickel Plate,
Approx. Weight—4.9 oz. (140 g).
1. Complete threads to extend to within 2½ threads of seating plane.
2. Angular orientation of terminals is undefined.
3. Pitch diameter of 1/2-20 UNF 3A (COATED) threads (ASA B1.1-1960).



D62T___40/50/60, 400-500 Volts Outline Drawing

Dimension	Inches Min.	Inches Max.	Millimeters Min.	Millimeters Max.
ϕD	1.610	1.650	40.89	41.91
ϕD_1	.745	.755	18.92	19.18
ϕD_2	1.420	1.460	36.07	37.08
H	.500	.560	12.70	14.22
ϕJ	.135	.145	3.43	3.68
J_1	.072	.082	1.83	2.08
L	4.000		101.6	
N	.030		.76	

Creep Distance—.34 in. min. (8.64mm)
Strike Distance—.52 in. min. (13.21mm)
(In accordance with NEMA standards.)
Finish—Nickel Plate.
Approx. Weight—2.1 oz. (60g).
1. Dimension "H" is a clamped dimension.
2. Base Lead is No. 14 uninsulated flexible stranded wires.
3. Emitter tab for 3/16 inch fast-on terminal.

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D60T/D62T___40, D60T/D62T___50, D60T/D62T___60
NPN Power Switching Transistors
40-50-60 Amperes/400-500 Volts

D60T Maximum Ratings

Characteristics	Symbol	D60T___40/50/60	Units
Operating and Storage Temperature	T_J/T_{STG}	−65 to 200	°C
Emitter Base Voltage	V_{EBO}	7	Volts
Peak Collector Current	I_C Peak	200	Amperes
Continuous Collector Current①	I_C Cont.	—	Amperes
Continuous Base Current	I_B	20	Amperes
Linear Power Derating Factor from T_C=25°C to T_C=175°C	—	5.88	W/°C
Thermal Resistance Case to Sink, Lubricated	$R_{\theta CS}$	0.12	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.17	°C/W
Power Dissipation T_C=25°C	P_T	885	Watts
Power Dissipation T_C=75°C	P_T	590	Watts
Mounting Torque Non-Lubricated Threads		130	in.-lb.
Mounting Torque Non-Lubricated Threads		14.46	N-M

		D60T4040 D60T4050 D60T4060	D60T4540 D60T4550 D60T4560	D60T5040 D60T5050 D60T5060	
Collector Emitter Sustaining Voltage②	$V_{CEO(SUS)}$	400	450	500	Volts
Collector Base Voltage	V_{CBO}	450	500	550	Volts
Collector Emitter Voltage V_{BE}=−1.5V	V_{CEV}	450	500	550	Volts

① Collector current limited by base current. Base current must not exceed 20 Amperes, RMS, 28 Amperes square wave 50% duty cycle or 40 Amperes peak ½ sine wave.
② $V_{CEO(SUS)}$ must not be measured on a curve tracer.

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D60T/D62T___40, D60T/D62T___50, D60T/D62T___60
NPN Power Switching Transistors
40-50-60 Amperes/400-500 Volts

D62T Maximum Ratings

Characteristics	Symbol	D62T___40/50/60	Units
Operating and Storage Temperature	T_J/T_{STG}	−65 to 200	°C
Emitter Base Voltage	V_{EBO}	7	Volts
Peak Collector Current	I_C Peak	200	Amperes
Continuous Collector Current①	I_C Cont.	—	Amperes
Continuous Base Current	I_B	20	Amperes
Linear Power Derating Factor from T_C=25°C to T_C=175°C	—	11.11	W/°C
Thermal Impedance, Double Sided Cooling Case to Sink, Lubricated	$R_{\theta CS}$	0.05	°C/W
Thermal Impedance, Junction to Case	$R_{\theta JC}$	0.09	°C/W
Power Dissipation T_C=25°C	P_T	1650	Watts
Power Dissipation T_C=75°C	P_T	1100	Watts
Mounting Force		900	lb.
Mounting Force		4.05	kN

		D62T4040 D62T4050 D62T4060	D62T4540 D62T4550 D62T4560	D62T5040 D62T5050 D62T5060	
Collector Emitter Sustaining Voltage②	$V_{CEO(SUS)}$	400	450	500	Volts
Collector Base Voltage	V_{CBO}	450	500	550	Volts
Collector Emitter Voltage V_{BE} = −1.5V	V_{CEV}	450	500	550	Volts

① Collector current limited by base current. Base current must not exceed 20 Amperes, RMS, 28 Amperes square wave 50% duty cycle or 40 Amperes peak ½ sine wave.

② $V_{CEO(SUS)}$ must not be measured on a curve tracer.

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D60T/D62T___40, D60T/D62T___50, D60T/D62T___60
NPN Power Switching Transistors
40-50-60 Amperes/400-500 Volts

Electrical and Mechanical Characteristics T_C, T_J = 25°C unless otherwise specified

Characteristics		Symbol	Test Conditions	Min.	D60T/D62T___40/50/60 Typ.	Max.	Units
Collector Cutoff Current (Base Emitter Reverse Biased)		I_{CEV}	At Rated V_{CEV}, $V_{BE(OFF)} = -1.5V$	—	0.1	1	mA
Collector Cutoff Current (Base Emitter Reverse Biased)		I_{CEV}	At Rated V_{CEV}, $V_{BE(OFF)} = -1.5V$, $T_J = 150°C$	—	0.8	3	mA
Emitter Cutoff Current		I_{EBO}	$V_{EB} = 7V$	—	2	30	mA
Output Capacitance		C_{OB}	$f_{TEST} = 1$ MHz, $V_{CB} = 10V$	—	2500	—	μμf
Gain-Bandwidth		f_T	$f_{TEST} = 1$ MHz, $I_C = 5A$, $V_{CE} = 10V$	7	10	—	MHz
					D60T/D62T___40		
DC Current Gain		h_{FE}	$I_C = 40A$, $V_{CE} = 2.5V$	10	—	—	—
			$I_C = 40A$, $V_{CE} = 5V$	10	—	—	—
			$I_C = 80A$, $V_{CE} = 2.5V$	—	5	—	—
Collector-Emitter Saturation Voltage		$V_{CE(SAT)}$	$I_C = 40A$, $I_B = 6A$	—	—	1.25	Volts
			$I_C = 40A$, $I_B = 4.8A$	—	—	1.25	Volts
Base-Emitter Saturation Voltage		$V_{BE(SAT)}$	$I_C = 40A$, $I_B = 6A$	—	—	1.50	Volts
			$I_C = 40A$, $I_B = 4.8A$	—	—	1.40	Volts
Resistive Load Switch Times	Turn-On Delay	t_d	$V_{CC} = 250V$, $I_C = 40A$	—	—	110	ns
	Rise Time	t_r	$I_{B1} = -I_{B2} = 6A$	—	0.7	1.0	μs
	Storage Time	t_s	$t_p = 50$ μs	—	1.25	3.0	μs
	Fall Time	t_f	Duty Cycle < 2%	—	0.3	0.5	μs
					D60T/D62T___50		
DC Current Gain		h_{FE}	$I_C = 50A$, $V_{CE} = 2.5V$	10	—	—	—
			$I_C = 100A$, $V_{CE} = 2.5V$	—	5	—	—
Collector-Emitter Saturation Voltage		$V_{CE(SAT)}$	$I_C = 50A$, $I_B = 6A$	—	—	1.25	Volts
Base-Emitter Saturation Voltage		$V_{BE(SAT)}$	$I_C = 50A$, $I_B = 6A$	—	—	1.50	Volts
Resistive Load Switch Times	Turn-On Delay	t_d	$V_{CC} = 250V$, $I_C = 50A$	—	—	120	ns
	Rise Time	t_r	$I_{B1} = -I_{B2} = 7.5A$	—	0.8	1.10	μs
	Storage Time	t_s	$t_p = 50$ μs	—	1.75	3.0	μs
	Fall Time	t_f	Duty Cycle < 2%	—	0.35	0.5	μs
					D60T/D62T___60		
DC Current Gain		h_{FE}	$I_C = 60A$, $V_{CE} = 2.5V$	10	—	—	—
			$I_C = 120A$, $V_{CE} = 2.5V$	—	5	—	—
Collector-Emitter Saturation Voltage		$V_{CE(SAT)}$	$I_C = 60A$, $I_B = 6A$	—	—	1.25	Volts
Base-Emitter Saturation Voltage		$V_{BE(SAT)}$	$I_C = 60A$, $I_B = 6A$	—	—	1.60	Volts
Resistive Load Switch Times	Turn-On Delay	t_d	$V_{CC} = 250V$, $I_C = 60A$	—	—	150	ns
	Rise Time	t_r	$I_{B1} = -I_{B2} = 9A$	—	0.85	1.20	μs
	Storage Time	t_s	$t_p = 50$ μs	—	2.0	3.0	μs
	Fall Time	t_f	Duty Cycle < 2%	—	0.35	0.5	μs

POWEREX

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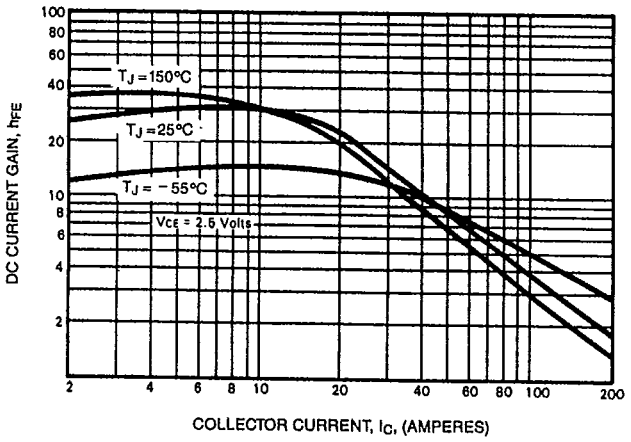
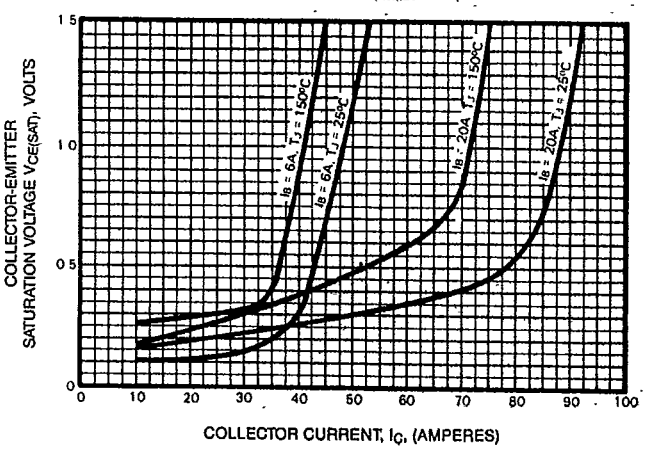
D60T/D62T___40, D60T/D62T___50, D60T/D62T___60
NPN Power Switching Transistors
40-50-60 Amperes/400-500 Volts

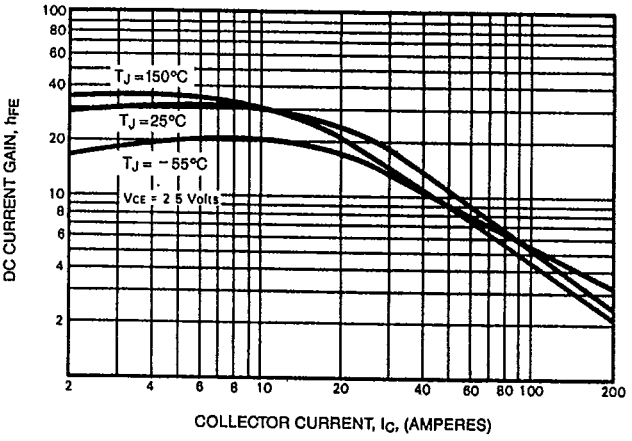
DC CURRENT GAIN (TYPICAL)
D60T/D62T___40



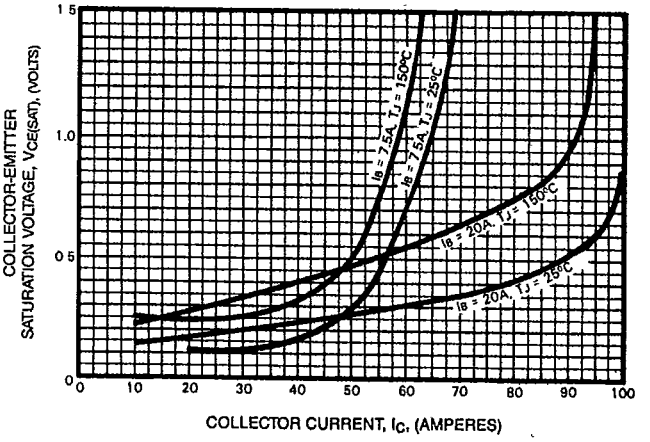
SATURATION VOLTAGE (TYPICAL)
D60T/D62T___40



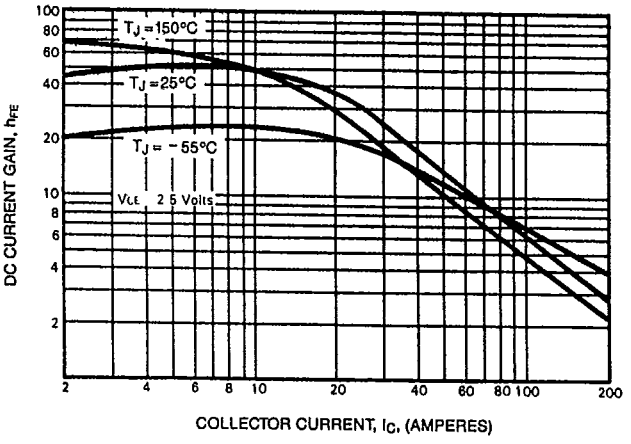
DC CURRENT GAIN (TYPICAL)
D60T/D62T___50



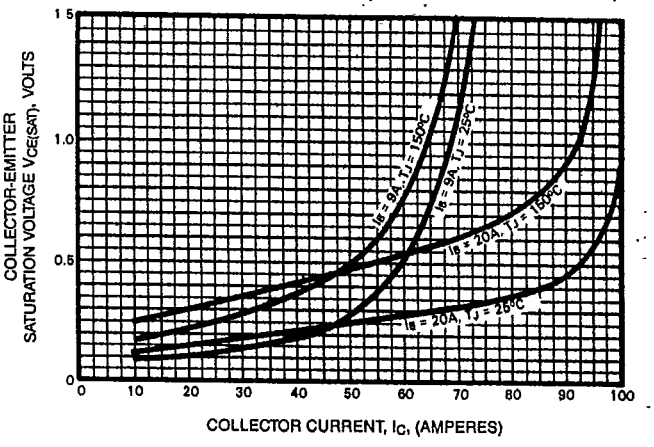
SATURATION VOLTAGE (TYPICAL)
D60T/D62T___50



DC CURRENT GAIN (TYPICAL)
D60T/D62T___60



SATURATION VOLTAGE (TYPICAL)
D60T/D62T___60



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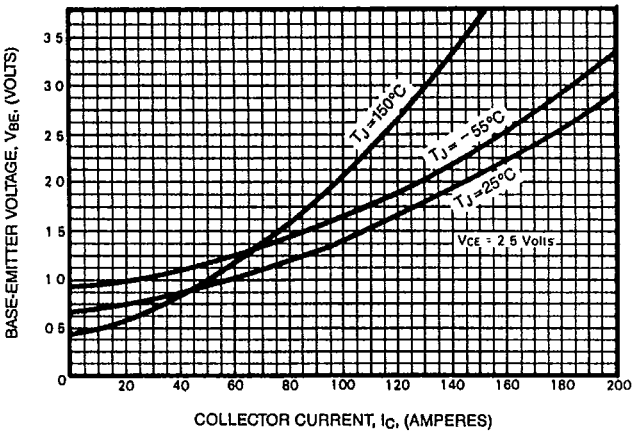
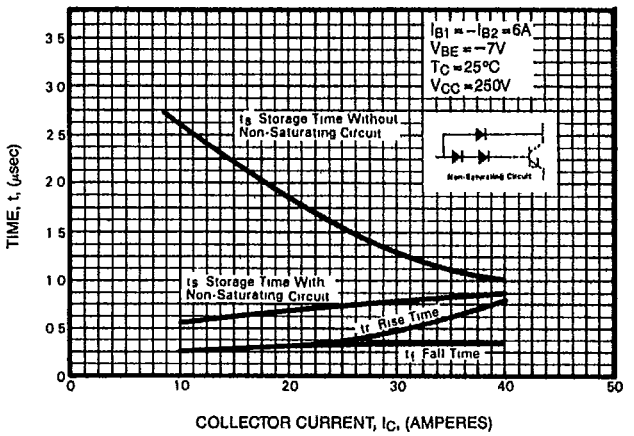
D60T/D62T___40, D60T/D62T___50, D60T/D62T___60
NPN Power Switching Transistors
40-50-60 Amperes/400-500 Volts

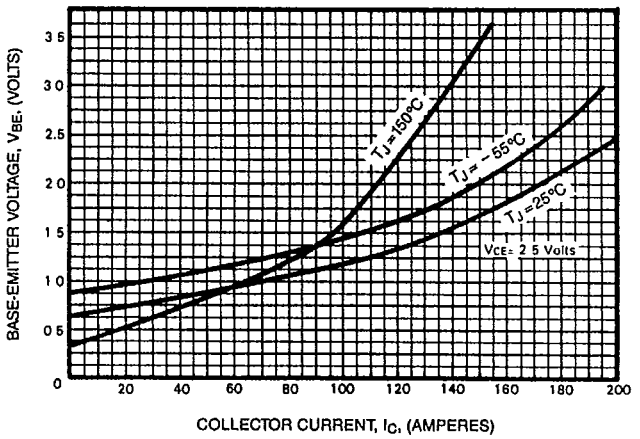
TRANSFER CHARACTERISTICS (TYPICAL)
D60T/D62T___40



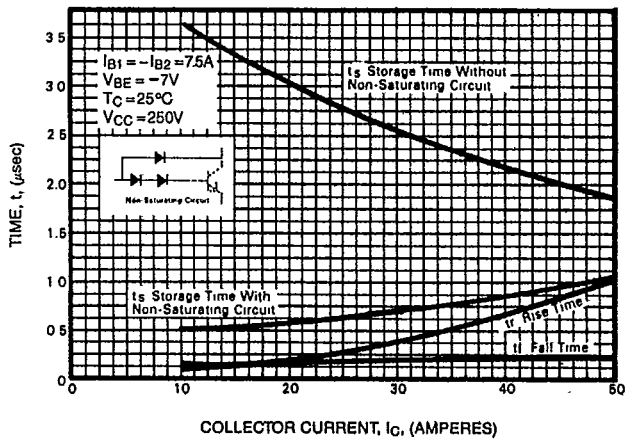
RESISTIVE SWITCHING (TYPICAL)
D60T/D62T___40



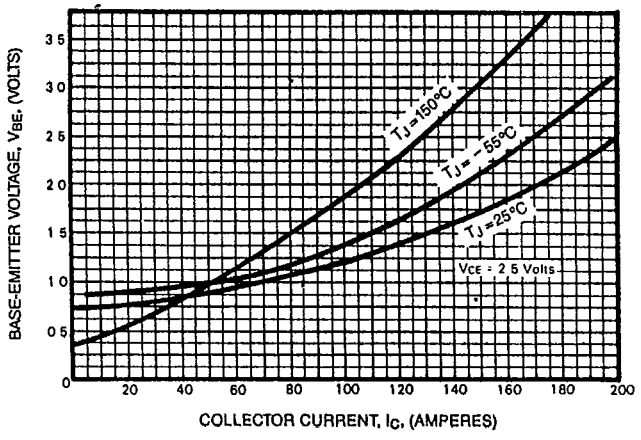
TRANSFER CHARACTERISTICS (TYPICAL)
D60T/D62T___50



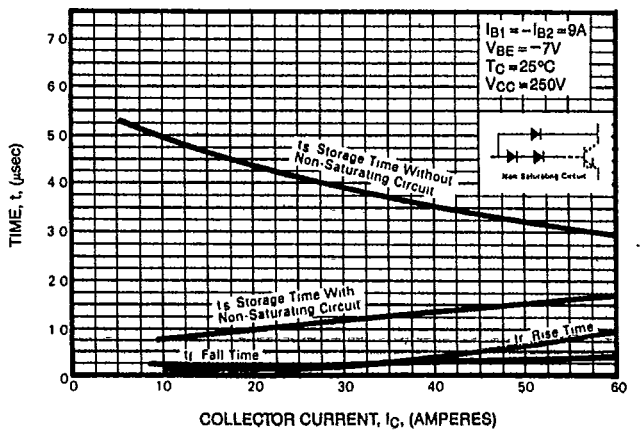
RESISTIVE SWITCHING (TYPICAL)
D60T/D62T___50



TRANSFER CHARACTERISTICS (TYPICAL)
D60T/D62T___60



RESISTIVE SWITCHING (TYPICAL)
D60T/D62T___60



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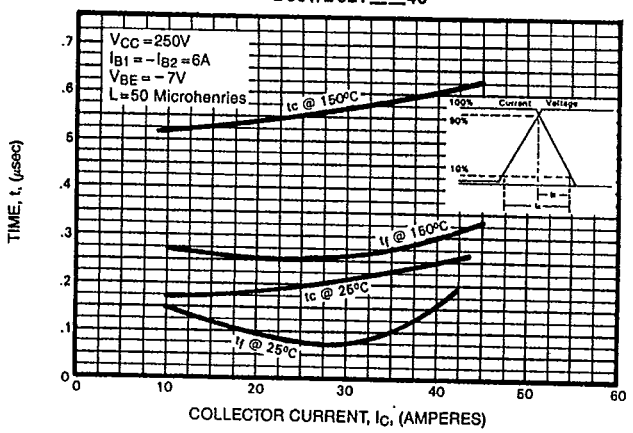
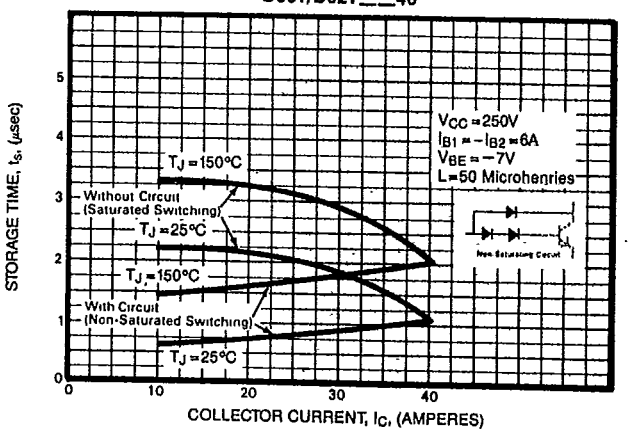
D60T/D62T___40, D60T/D62T___50, D60T/D62T___60
NPN Power Switching Transistors
40-50-60 Amperes/400-500 Volts

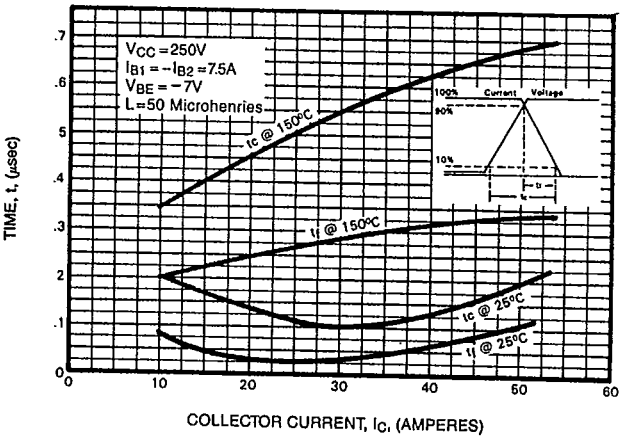
TURN-OFF TIME FOR CLAMPED INDUCTIVE SWITCHING (TYPICAL) D60T/D62T___40



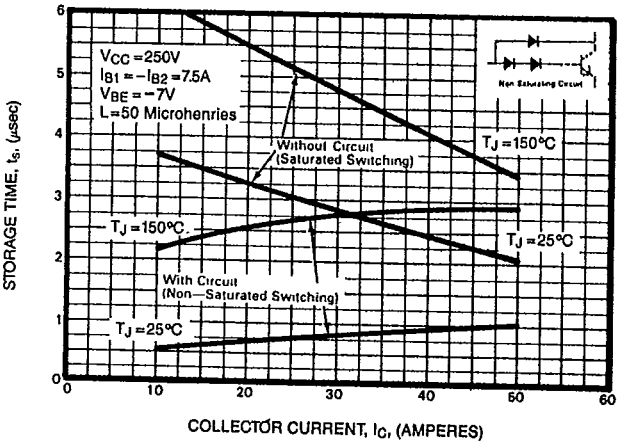
STORAGE TIME FOR CLAMPED INDUCTIVE SWITCHING (TYPICAL) D60T/D62T___40



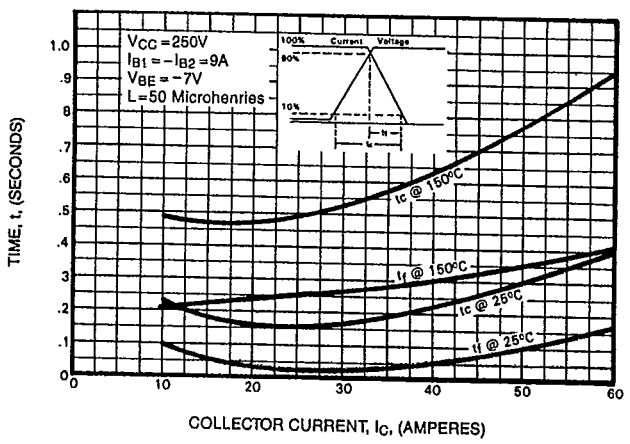
TURN-OFF TIME FOR CLAMPED INDUCTIVE SWITCHING (TYPICAL) D60T/D62T___50



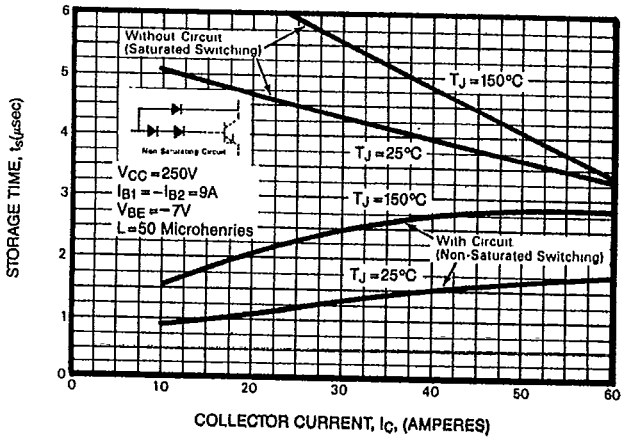
STORAGE TIME FOR CLAMPED INDUCTIVE SWITCHING (TYPICAL) D60T/D62T___50



TURN-OFF TIME FOR CLAMPED INDUCTIVE SWITCHING (TYPICAL) D60T/D62T___60



STORAGE TIME FOR CLAMPED INDUCTIVE SWITCHING (TYPICAL) D60T/D62T___60



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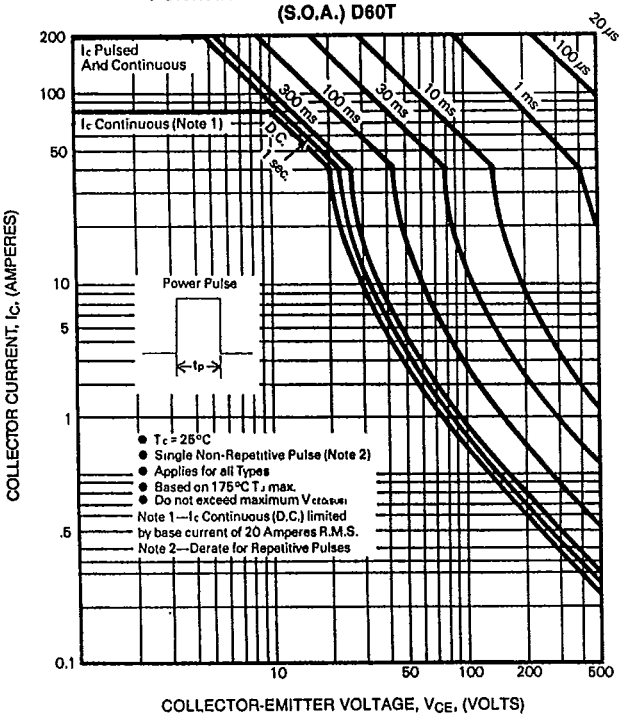
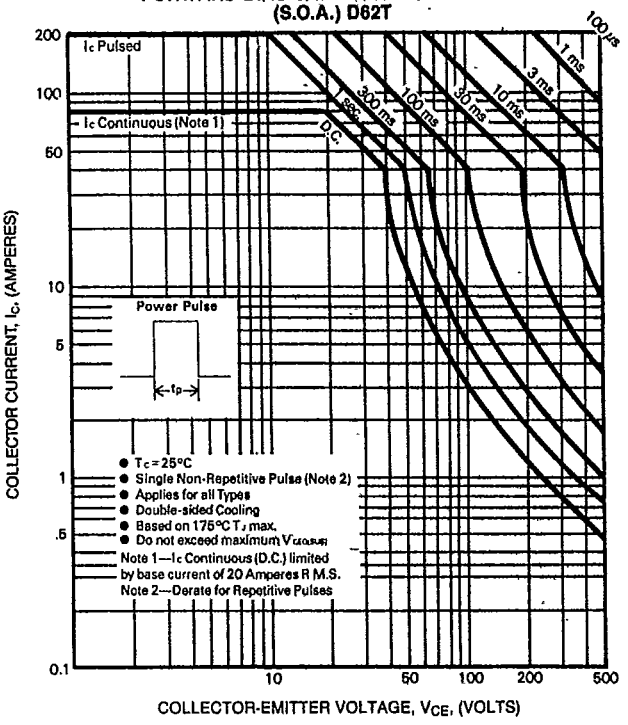
Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272

D60T/D62T___40, D60T/D62T___50, D60T/D62T___60
NPN Power Switching Transistors
40-50-60 Amperes/400-500 Volts

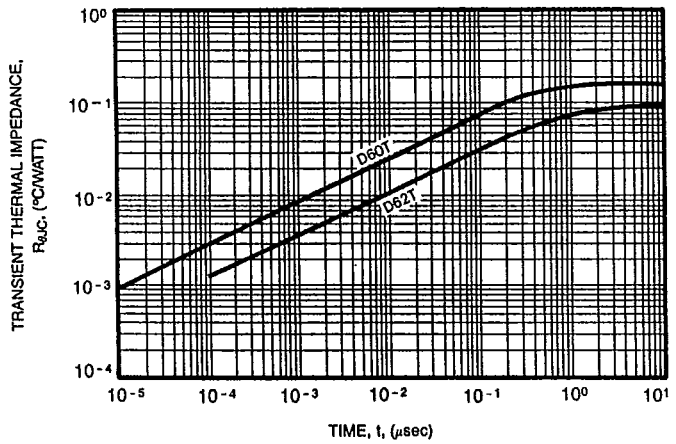
FORWARD BIAS SAFE OPERATING AREA (S.O.A.) D60T



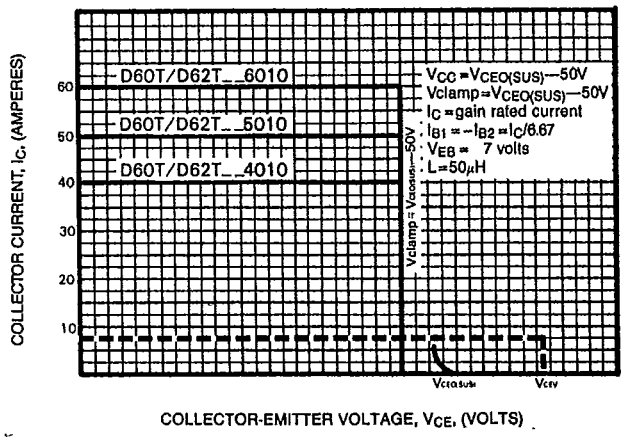
FORWARD BIAS SAFE OPERATING AREA (S.O.A.) D62T



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS D60T/D62T



REVERSE BIAS SAFE OPERATING AREA (R.B.S.O.A.) D60T/D62T



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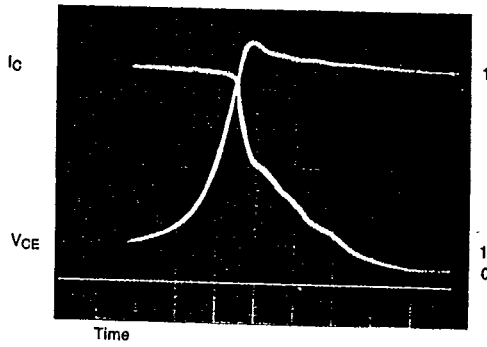
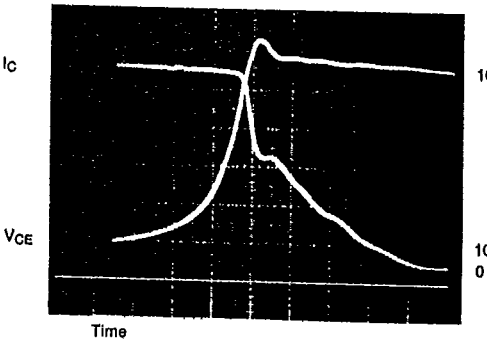
D60T/D62T___40, D60T/D62T___50, D60T/D62T___60
NPN Power Switching Transistors
40-50-60 Amperes/400-500 Volts

Typical Turn-Off Waveforms for Clamped Inductive Switching*



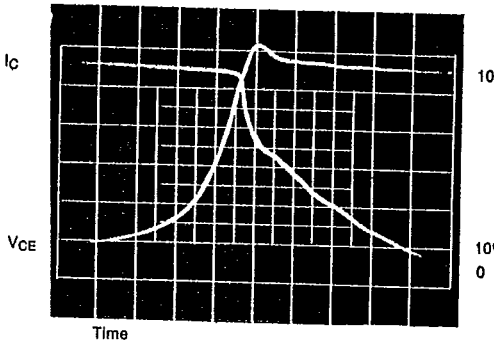
D60T___40
D62T___40

V_{CE} =250V, 50V/cm
I_C =40A, scale not calibrated
$I_{B1} = -I_{B2}$ =6A, V_{EB} =7V
Time=100 ns/cm
T=150°C



D60T___50
D62T___50

V_{CE} =250V, 50V/cm
I_C =50A, 10A/cm
$I_{B1} = -I_{B2}$ =7.5A, V_{EB} =7V
Time=100 ns/cm
T=150°C



D60T___60
D62T___60

V_{CE} =250V, 50V/cm
I_C =60A, scale not calibrated
$I_{B1} = -I_{B2}$ =9A, V_{EB} =7V
Time=100 ns/cm
T=150°C

*Shown above are actual photographs taken during 150°C inductive switching measurements