



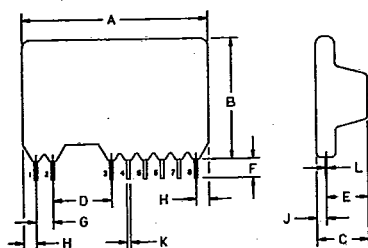
Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272

M57215L
M57215BL

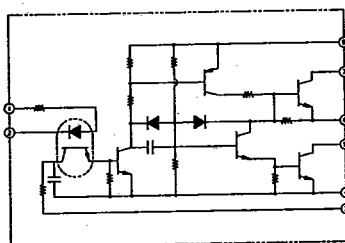
T-41-89

Hybrid IC Base Drive Modules 2 Amperes/ -3, +10 Volts

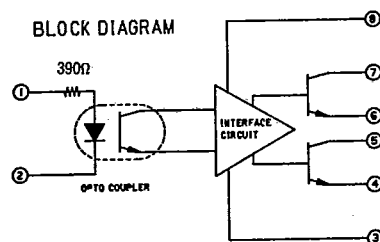
OUTLINE DRAWING



CIRCUIT DIAGRAM

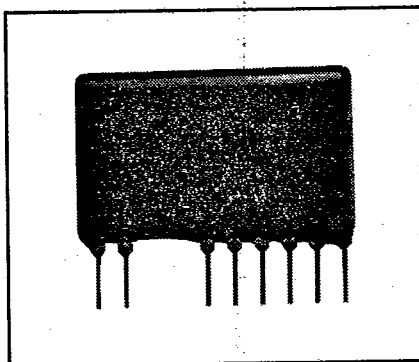


BLOCK DIAGRAM



**-3, +10 Volt M57215L, M57215BL
Outline Drawing**

Dimension	Inches	Millimeters
A	1.142 Max.	29 Max.
B	.748 Max.	19 Max.
C	.315 Max.	8 Max.
D	.300 ± .004	7.62 ± 0.1
E	.295 Max.	7.5 Max.
F	.118 Min.	3 Min.
G	.100 ± .004	2.54 ± 0.1
H	.079 Max.	2 Max.
J	.059 Max.	1.5 Max.
K	.020 ± .004	0.5 ± 0.1
L	.010 ± .004	0.25 ± 0.1



**M57215L
M57215BL
Hybrid IC
Base Drive Modules
2 Amperes/ -3, +10 Volts**

Description

Powerex Hybrid IC's are designed to provide logic compatible drive for transistor modules. The module includes an integral optoisolator for electrical isolation between input and output.

Features:

- ☐ Small, Lightweight
- ☐ Low Power Consumption
- ☐ TTL Logic Compatible
- ☐ Input/Output Electrically Isolated
- ☐ Single In Line Package

Applications:

- ☐ Transistor Base Drive
- ☐ Inverter Circuits

Ordering Information

Example: Select the complete seven or eight digit part number you desire from the table - i.e. M57215BL is a 2500 Volt dielectric drive module suitable for driving 1000 volt transistor modules rated at 15 to 75 Amperes.

Type	Package	Optoisolator
M57215BL	8-pin SIL	Yes
M57215L	8-pin SIL	Yes



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M57215L

M57215BL

Hybrid IC Base Drive Modules

2 Amperes/ -3, +10 Volts

Maximum Ratings $T_s = -20^{\circ}\text{C}$ to 70°C unless otherwise specified

	Symbol	M57215L/M57215BL	Units
Operating Temperature Substrate	T_s	-25 to 100	$^{\circ}\text{C}$
Operating Temperature Ambient	T_A	-20 to 70	$^{\circ}\text{C}$
Supply Voltage	V_{CC}	14	Volts
	V_{EE}	-5	Volts
Input Voltage	V_i	-1 to 5	Volts
"H" Output Current	I_{OH}	1	Amperes
"L" Output Peak Current*	I_{OLP}	-3	Amperes
V Isolation	V_{RMS}	2000/2500	Volts

*Pulse Width $10\mu\text{s}$, $f=2\text{kHz}$

Electrical Characteristics $T_s = 25^{\circ}\text{C}$, $V_{CC} = 10\text{V}$, $V_{EE} = -3\text{V}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	M57215L/M57215BL			Units
			Min.	Typ.	Max.	
"H" Input Current	I_{IH}	$V_i = 5\text{V}$	—	10	—	mA
"H" Output Current	I_{OH}	$V_O = 1.6\text{V}$, $R_{ext} = 9\Omega$	—	0.9	—	A
"L" Output Peak Current	I_{OLP}	$R_2 = 1\Omega$, $C_{ext} = 10\mu\text{f}$	—	-2	—	A
"L" - "H" Propagation Delay	t_{PLH}	$T_s = 100^{\circ}\text{C}$, $V_{in} = 0 \rightarrow 4\text{V}$	—	—	10	μs
"L" - "L" Rise Time	t_r	$T_s = 100^{\circ}\text{C}$, $V_{in} = 0 \rightarrow 4\text{V}$	—	—	1	μs
"H" - "L" Propagation Delay	t_{PHL}	$T_s = 100^{\circ}\text{C}$, $V_{in} = 5 \rightarrow 0\text{V}$	—	—	15	μs
"H" - "L" Fall Time	t_f	$T_s = 100^{\circ}\text{C}$, $V_{in} = 5 \rightarrow 0\text{V}$	—	—	3	μs
Internal Power Dissipation	P_D	$I_{OH} = 0.9\text{A}$, $I_{OLP} = -2\text{A}$ $f = 2\text{kHz}$, Duty = 50%	—	0.33	—	W

Recommended Operating Conditions (Refer to Typical Application Circuit)

Symbol	KD245A1, KD24502			KD224503			KD224505			KD224575			Units
	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
V_{CC}	9	10	11	9	10	11	9	10	11	9	10	11	V
V_{EE}	-2.5	-3	-4	-2.5	-3	-4	-2.5	-3	-4	-2.5	-3	-4	V
V_{IH}	4	—	5	4	—	5	4	—	5	4	—	5	V
V_{OH}	1.4	1.6	2.1	1.4	1.6	2.1	1.4	1.6	2.1	1.4	1.6	2.1	V
V_{OL}	-2	—	—	-2	—	—	-2	—	—	-2	—	—	V
R_{ext}	—	27	—	—	20	—	—	12	—	—	9	—	Ω
R_1	—	150	—	—	150	—	—	150	—	—	150	—	Ω
R_2	—	3.3	—	—	2.2	—	—	1	—	—	1	—	Ω
D_z	—	1N4372A	—	—	1N4372A	—	—	1N4372A	—	—	1N4372A	—	—
C_{ext} *	—	10	—	—	22	—	—	22	—	—	47	—	μF
C_1	—	2200	—	—	3300	—	—	4700	—	—	4700	—	μF
C_2	—	470	—	—	470	—	—	470	—	—	470	—	μF
f	—	2	—	—	2	—	—	2	—	—	2	—	kHz

NOTES 1. When using KD___1K___, use M57215BL and set at the above conditions.

2. When using transistor modules at 100A and above, (i.e. KD324510, KD324515, KS324520 etc.), also use Drive Module KS031K01.

* The equivalent series resistance ESR of this capacitor decreases the sink current I_{OLP} , especially at low temperature. A low ESR capacitor is recommended for C_{ext} .

POWEREX

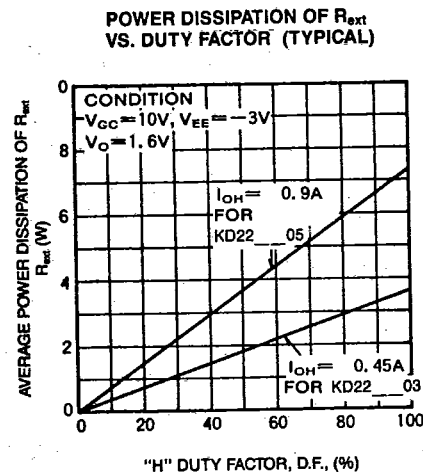
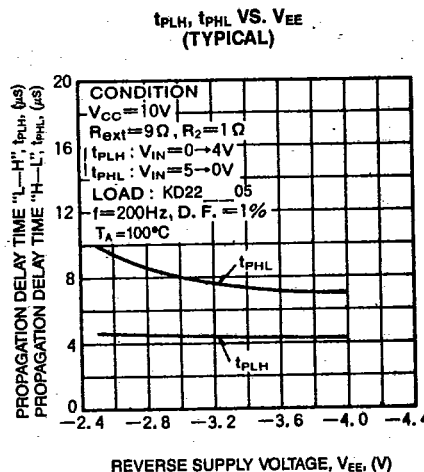
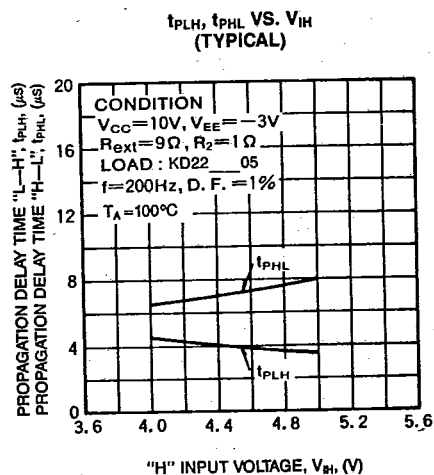
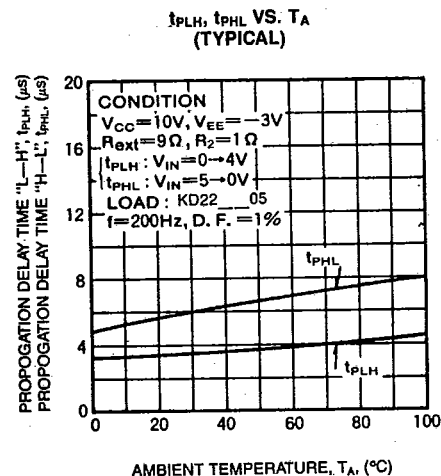
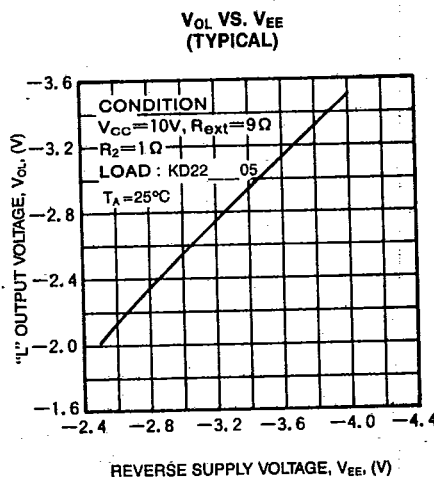
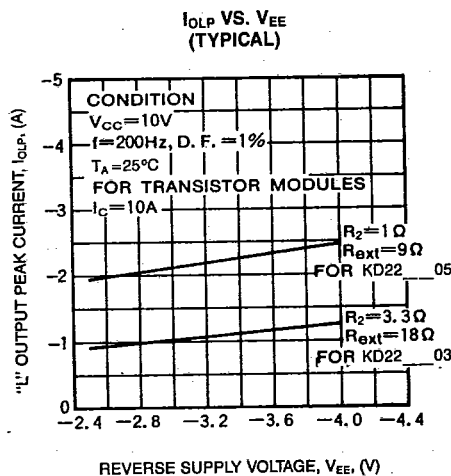
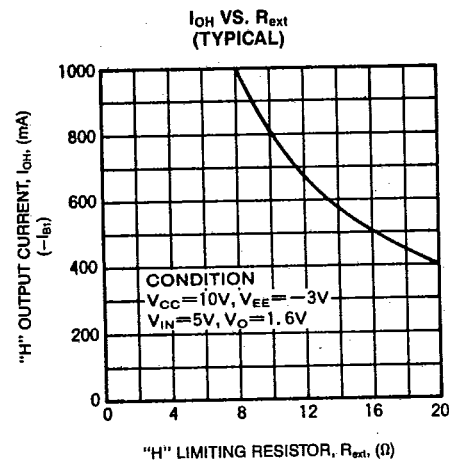
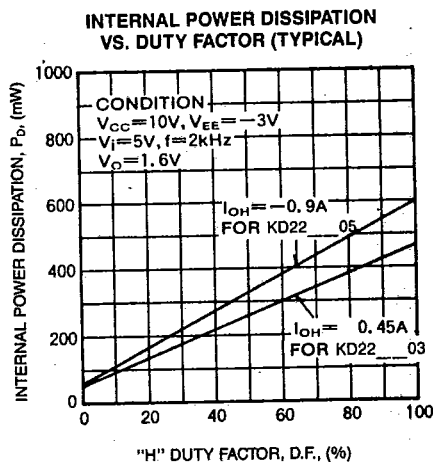
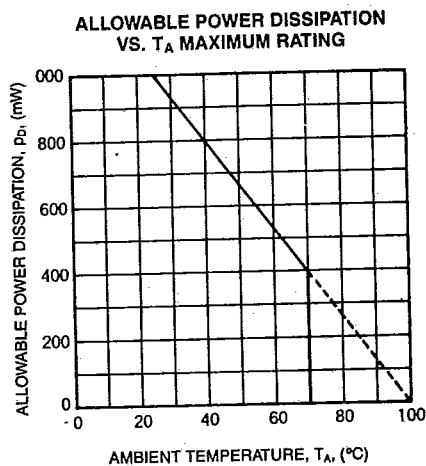
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M57215L

M57215BL

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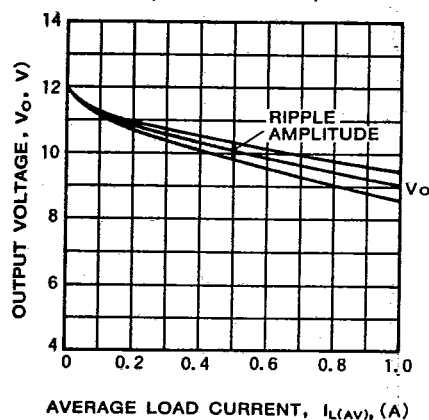
M57215L

M57215BL

Hybrid IC Base Drive Modules

2 Amperes/ -3, +10 Volts

OUTPUT CHARACTERISTIC OF FULL
WAVE RECTIFYING CIRCUIT WITH
CENTER-TAPPED TRANSFORMER
(FOR REFERENCE)



Explanation of Function

1. With low input level, ($V_{in} = 0 \sim 1V$)

Tr1...OFF, Tr2...ON

The base terminal of the transistor module is reverse biased with respect to its emitter by reverse power supply V_{EE} .

2. With high input level, ($V_{in} = 4 \sim 5V$)

Tr1...ON, Tr2...OFF

The base terminal of the transistor module is forward biased and driven by the current I_{OH} through the resistor R_{ext} .

3. With low input level, ($V_{in} = 0 \sim 1V$)

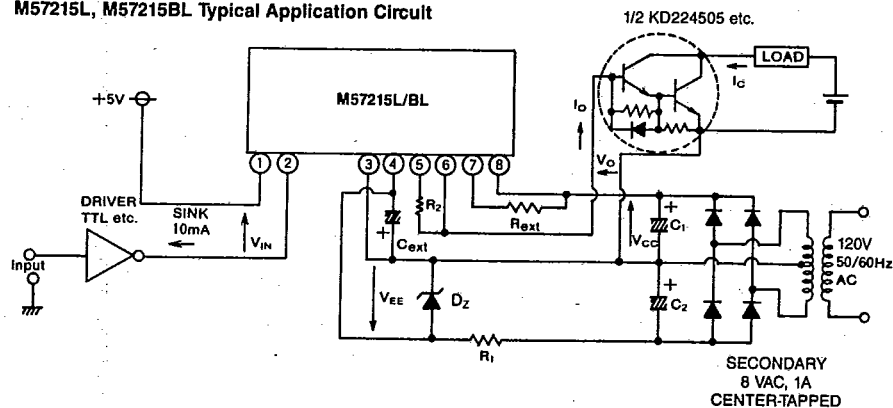
Tr1...OFF, Tr2...ON

The base terminal of transistor module is reverse biased as stated in (1) after conducting reverse recovery pulse current I_{OLP} . The steady reverse base current is limited by the internal base-emitter resistor R_{BE} of the transistor module.

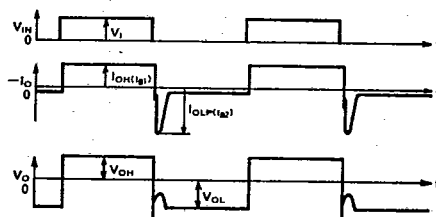
Advice on PCB Pattern Layout

1. The auxiliary resistor R_{ext} and R_1 dissipate a large amount of power. Care should be taken not to heat M57215L, M57215BL by radiant heat from these hot devices.
2. The capacitor C_{ext} should be arranged close to pin 3 and pin 4 to avoid false operation, which may be induced by abrupt change of the load impedance.

M57215L, M57215BL Typical Application Circuit



M57215L, M57215BL Typical Operating Waveform



Note: I_{OH} and I_{OLP} correspond to base forward current I_{B1} and base reverse current I_{B2} of the transistor module to be driven respectively.