

# M63824GP/KP

7-UNIT 500mA DARLINGTON TRANSISTOR-ARRAY WITH CLAMP DIODE

### DESCRIPTION

The M63824GP/KP 7-channel sinkdriver, consists of 14 NPN transistors connected to form seven high current gain driver pairs.

### FEATURES

- High breakdown voltage ( $BV_{CEO} \geq 50V$ )
- High-current driving ( $I_{C(max)} = 500mA$ )
- With clamping diodes
- 3V micro computer series compatible input
- Wide operating temperature range ( $T_a = -40$  to  $+85^\circ C$ )

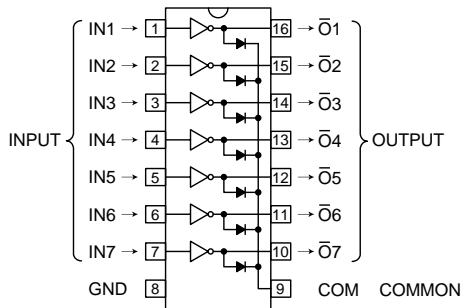
### APPLICATION

Output for 3 voltage microcomputer series and interface with high voltage system. Relay and small printer driver, LED, or incandescent display digit driver.

### FUNCTION

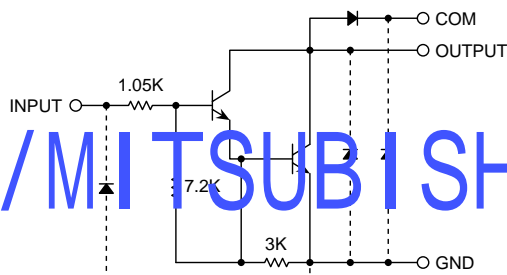
The M63824GP/KP is transistor-array of high active level seven units type which can do direct drive of 3 voltage micro-computer series. A resistor of  $1.05k\Omega$  is connected between the input pin. A clamp diode for inductive load transient suppression is connected for the output pin (collector) and COM pin (pin9). All emitters of the output transistor are connected to GND (pin8). The outputs are capable of driving 500mA and are rated for operation with output voltage up to 50V.

### PIN CONFIGURATION



Package type 16P2S-A(GP)  
 16P2Z-A(KP)

### CIRCUIT DIAGRAM



The seven circuits share the COM and GND

The diode, indicated with the dotted line, is parasitic, and cannot be used.

Unit :  $\Omega$

### ABSOLUTE MAXIMUM RATINGS (Unless otherwise noted, $T_a = -40 \sim +85^\circ C$ )

Symbol	Parameter	Conditions	Ratings	Unit
$V_{CEO}$	Collector-emitter voltage	Output, H	$-0.5 \sim +50$	V
$I_C$	Collector current	Current per circuit output, L	500	mA
$V_i$	Input voltage		$-0.5 \sim +10$	V
$I_F$	Clamping diode forward current		500	mA
$V_R$	Clamping diode reverse voltage		50	V
$P_d$	Power dissipation	$T_a = 25^\circ C$ , when mounted on board	0.80(GP)/0.6(KP)	W
$T_{opr}$	Operating temperature		$-40 \sim +85$	$^\circ C$
$T_{stg}$	Storage temperature		$-55 \sim +125$	$^\circ C$

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**RECOMMENDED OPERATING CONDITIONS** (Unless otherwise noted,  $T_a = -40 \sim +85^\circ\text{C}$ )

Symbol	Parameter	Conditions	Limits			Unit
			min	typ	max	
$V_o$	Output voltage		0	—	50	V
$I_c$	Collector current (Current per 1 circuit when 7 circuits are coming on simultaneously)	Duty Cycle GP : no more than 4% KP : no more than 3%	0	—	400	mA
		Duty Cycle GP : no more than 15% KP : no more than 12%	0	—	200	
$V_{IH}$	"H" input voltage	$I_c \leq 400\text{mA}$	2.4	—	10	V
$V_{IL}$	"L" input voltage		0	—	0.4	V

**ELECTRICAL CHARACTERISTICS** (Unless otherwise noted,  $T_a = 25^\circ\text{C}$ )

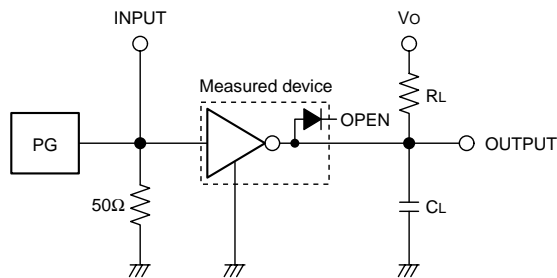
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	$I_{CEO} = 100\mu\text{A}$	50	—	—	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	$I_i = 500\mu\text{A}, I_c = 350\text{mA}$	—	1.2	1.6	V
		$I_i = 350\mu\text{A}, I_c = 200\text{mA}$	—	1.0	1.3	
		$I_i = 250\mu\text{A}, I_c = 100\text{mA}$	—	0.9	1.1	
$I_i$	Input current	$V_i = 3\text{V}$	—	1.5	2.4	mA
$V_F$	Clamping diode forward voltage	$I_F = 350\text{mA}$	—	1.4	2.0	V
$I_R$	Clamping diode reverse current	$V_R = 50\text{V}$	—	—	100	$\mu\text{A}$
$h_{FE}$	DC amplification factor	$V_{CE} = 2\text{V}, I_c = 350\text{mA}$	1000	2500	—	—

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**SWITCHING CHARACTERISTICS** (Unless otherwise noted,  $T_a = 25^\circ\text{C}$ )

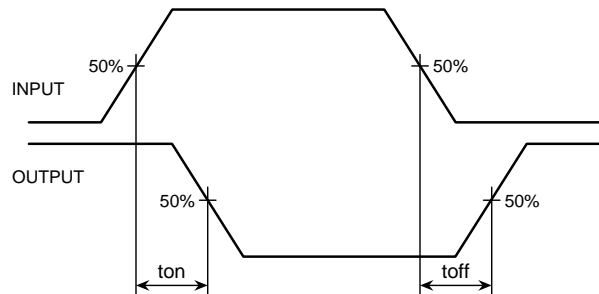
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
$t_{on}$	Turn-on time	$C_L = 15\text{pF}$ (note 1)	—	15	—	ns
$t_{off}$	Turn-off time		—	350	—	ns

**NOTE 1 TEST CIRCUIT**



- (1) Pulse generator (PG) characteristics : PRR=1kHz,  
 $t_w = 10\mu\text{s}, t_r = 6\text{ns}, t_f = 6\text{ns}, Z_o = 50\Omega$   
 $V_i = 0 \sim 3\text{V}$
- (2) Input-output conditions :  $R_L = 25\Omega, V_o = 10\text{V}$
- (3) Electrostatic capacity  $C_L$  includes floating capacitance at connections and input capacitance at probes

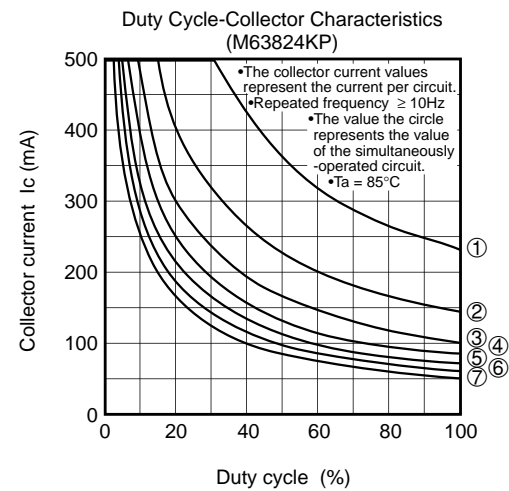
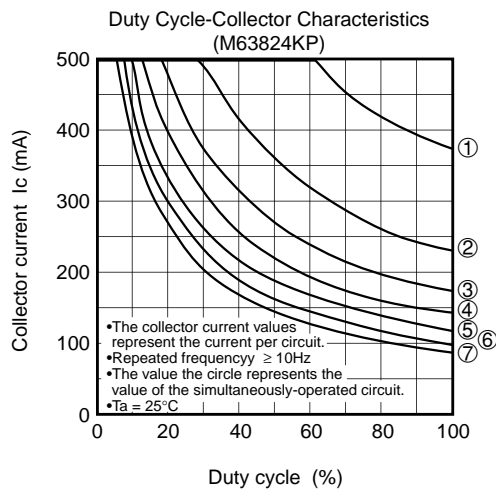
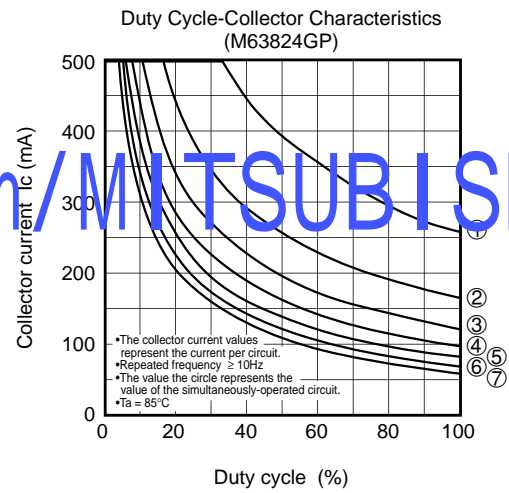
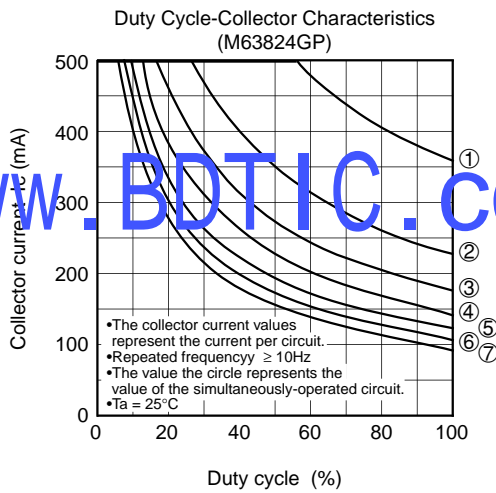
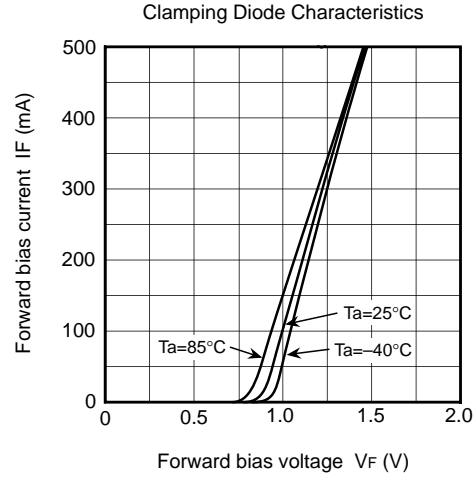
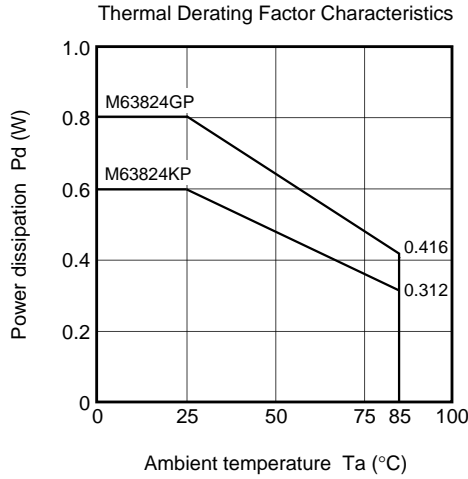
**TIMING DIAGRAM**



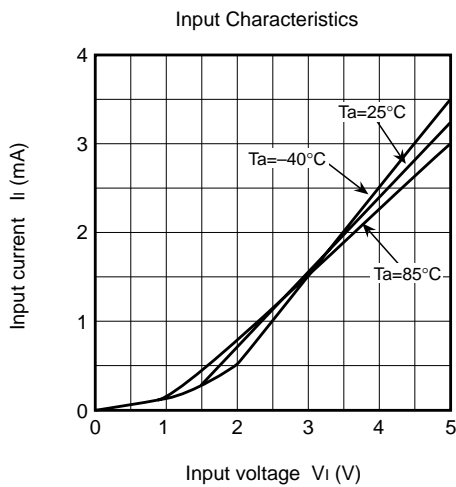
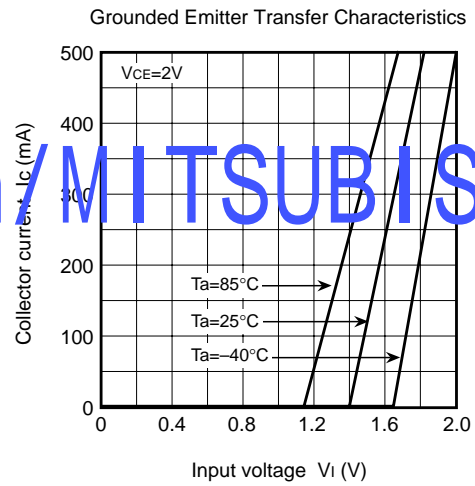
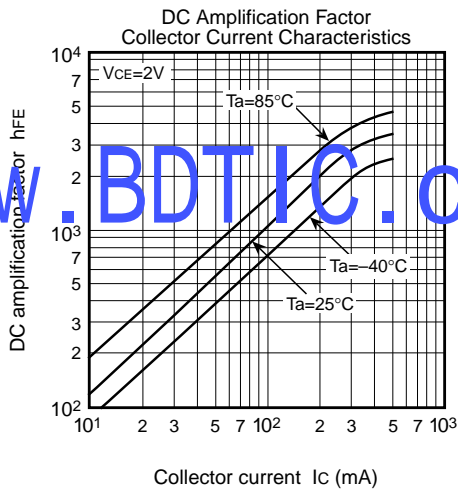
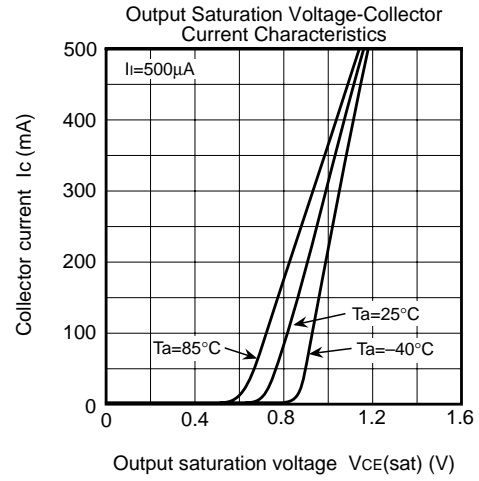
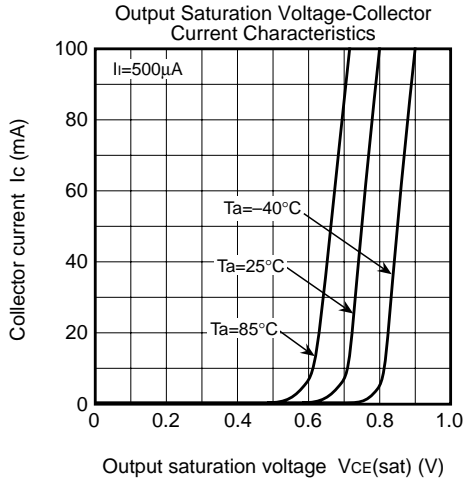
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TYPICAL CHARACTERISTICS



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