M63850P/FP

PRELIMINARY
Notice: This is not a final specification.
Some parametric limits are subject to change.

4-UNIT 1.5A DMOS ARRAY WITH CLAMP DIODE

DESCRIPTION

The M63850P/FP is a inverter input power DMOS transistor array that consists of 4 independent output N-channel DMOS transistors.

FEATURES

- 4 circuits of N-channels DMOS
- High breakdown voltage (V_{DS} ≥ 80V)
- High-current driving (I_{DS}(max) = 1.5A)
- With clamping diodes
- Drain-source on-state low resistance (R_{ON} = 0.72Ω, @ = 1.25A)
- Wide operating temperature range (Ta = –40 to +85°C)

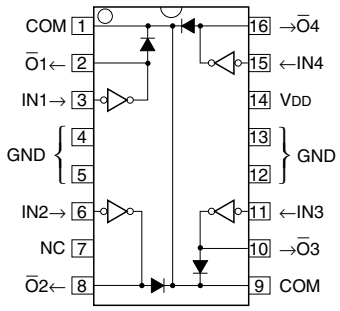
APPLICATION

Drives of relays and printers, digit drives of indication elements (LEDs and lamps)

FUNCTION

The M63850P/FP is consists of 4 independent N-channel DMOS transistors. Each DMOS transistor is connected in a common-source with GND PIN. The clamp diodes for spike killers are connected between the output pin and the COM pin of each DMOS transistor. The maximum of Drain current is 1.5A. The maximum Drain-Source voltage is 80V.

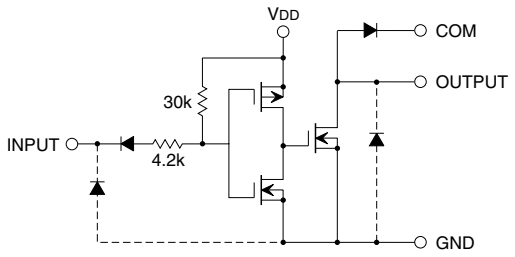
PIN CONFIGURATION



NC : No connection

Package type 16P4(P)
16P2N(FP)

CIRCUIT DIAGRAM



The four circuits share the COM and GND.

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

Unit : Ω

ABSOLUTE MAXIMUM RATINGS (Unless otherwise noted, Ta = –40 ~ +85°C)

Symbol	Parameter	Conditions	Ratings	Unit
V_{DD}	Supply voltage		7	V
V_{DS}	Drain-source voltage	Output, H	–0.5 ~ +80	V
I_{DS}	Drain current	Current per circuit output, L	1.5	A
V_I	Input voltage		–0.5 ~ V_{DD}	V
V_R	Clamping diode reverse voltage		80	V
I_F	Clamping diode forward current		1.5	A
P_d	Power dissipation	Ta = 25°C, when mounted on board	1.47(P)/1.00(FP)	W
T_{opr}	Operating temperature		–40 ~ +85	°C
T_{stg}	Storage temperature		–55 ~ +125	°C

MITSUBISHI ELECTRIC

M63850P/FP

4-UNIT 1.5A DMOS ARRAY WITH CLAMP DIODE

RECOMMENDED OPERATING CONDITIONS (Unless otherwise noted, Ta = –40 ~ +85°C)

Symbol	Parameter	Conditions	Limits			Unit
			min	typ	max	
V_{DD}	Supply voltage		4.5	5.0	5.5	V
V_{DS}	Drain-source voltage		0	—	80	V
I_{DS}	Drain current (Current per 1 circuit when 4 circuits are coming on simultaneously)	V_{DD} = 5V, Duty Cycle P : no more than 4% FP : no more than 2%	0	—	1.25	A
		V_{DD} = 5V, Duty Cycle P : no more than 36% FP : no more than 15%	0	—	0.7	
V_{IH}	"H" input voltage		V_{CC}-1.0	—	V_{CC}	V
V_{IL}	"L" input voltage		0	—	V_{CC}-3.0	V

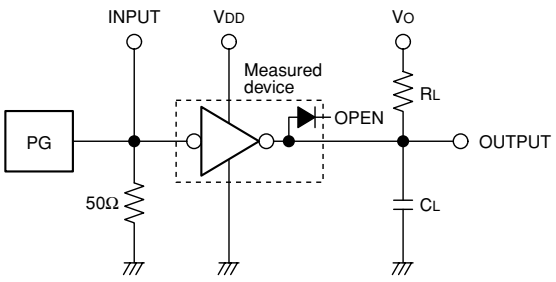
ELECTRICAL CHARACTERISTICS (Unless otherwise noted, Ta = 25°C)

Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
$I_{DD(ON)}$	On supply current	V_{DD} = 5.5V, V_I = 0V, 1 circuit only	—	130	300	μA
$I_{DD(OFF)}$	Off supply current	V_{DD} = 5.5V, V_I = 5.5V	—	—	10	μA
$I_{O(LEAK)}$	Output leak current	V_{DD} = 5.5V, V_I = 5.5V, V_{DS} = 80V	—	—	10	μA
V_{ON}	Output on voltage	V_I = 4.5V, I_{DS} = 0.7A	—	0.45	0.72	V
		V_I = 4.5V, I_{DS} = 1.25A	—	0.9	1.44	
R_{ON}	Output on resistance	V_I = 4.5V, I_{DS} = 1.25A	—	0.72	1.15	Ω
I_{IH}	"H" input current	V_{DD} = 5.5V, V_I = 5.5V	—	—	10	μA
I_{IL}	"L" input current	V_{DD} = 5.5V, V_I = 0V	—	–130	–300	μA
I_R	Clamping diode reverse current	V_R = 80V	—	—	10	μA
V_F	Clamping diode forward voltage	I_F = 1.25A	—	1.3	2.0	V

SWITCHING CHARACTERISTICS (Unless otherwise noted, Ta = 25°C)

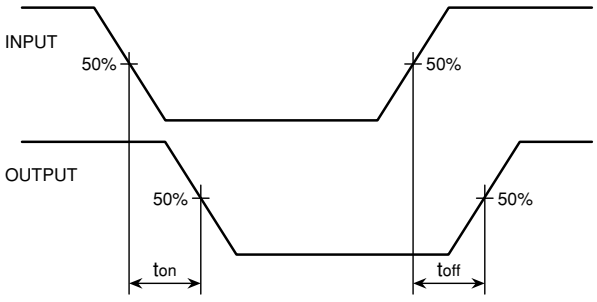
Symbol	Parameter	Test conditions	Limits			Unit
			min	typ	max	
t_{on}	Turn-on time	C_L = 15pF (Note 1)	—	45	—	ns
t_{off}	Turn-off time		—	125	—	ns

Note 1 : TEST CIRCUIT



(1)Pulse generator (PG) characteristics : PRR = 1kHz, tw = 10μs, tr = 6ns, tf = 6ns, Zo = 50Ω, V_{IH} = 5V
(2)Input-output conditions : R_L = 8.3Ω, Vo = 10V, V_{DD} = 4.5V
(3)Electrostatic capacity C_L includes floating capacitance at connections and input capacitance at probes.

TIMING DIAGRAM



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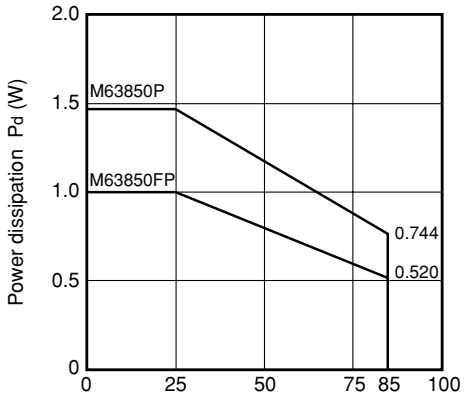
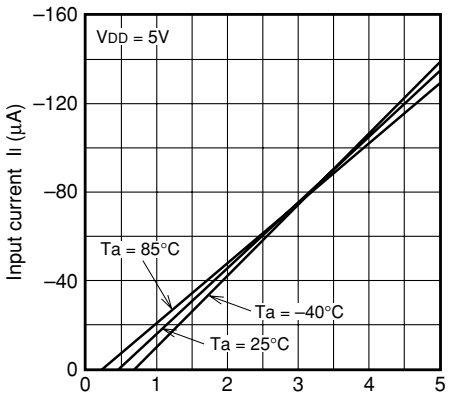
TYPICAL CHARACTERISTICS

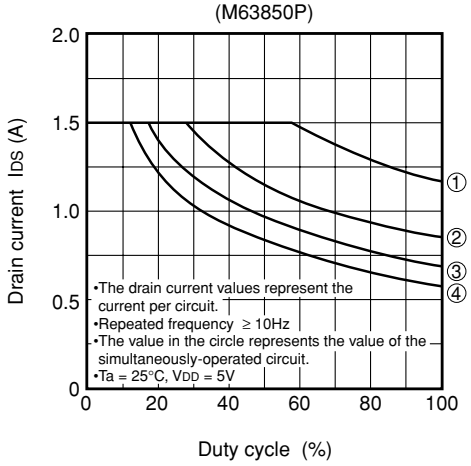
Thermal Derating Factor Characteristics



Input Characteristics



Duty Cycle - Drain Current Characteristics (M63850P)



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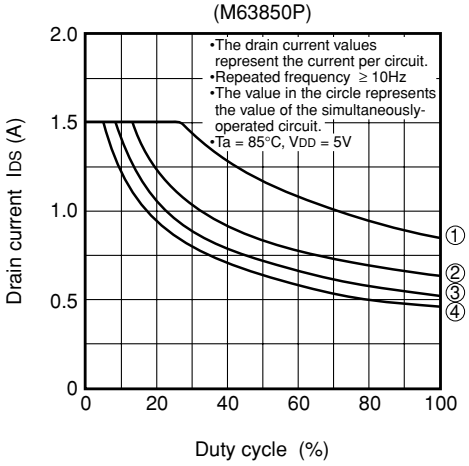
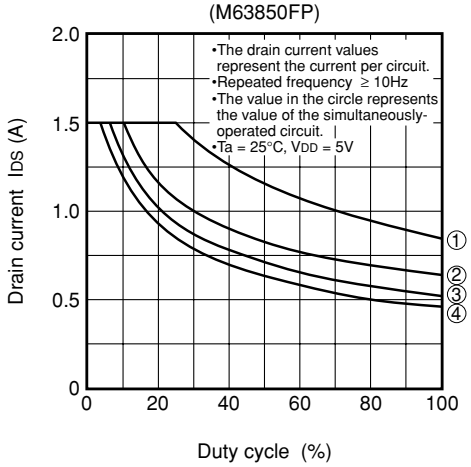


Duty Cycle - Drain Current Characteristics (M63850FP)



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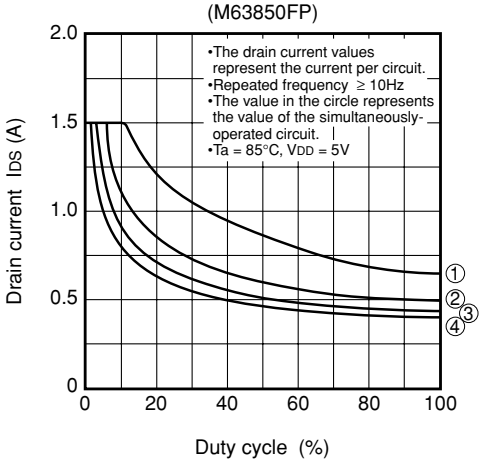
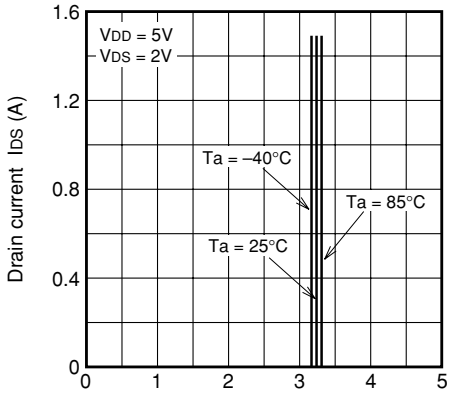
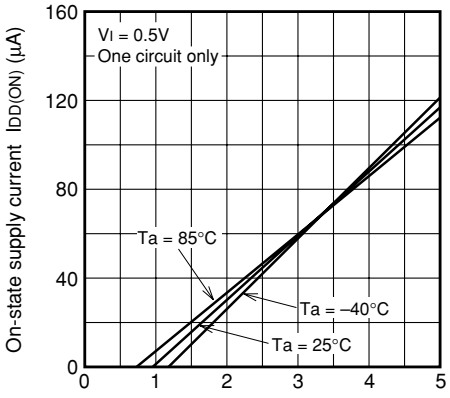


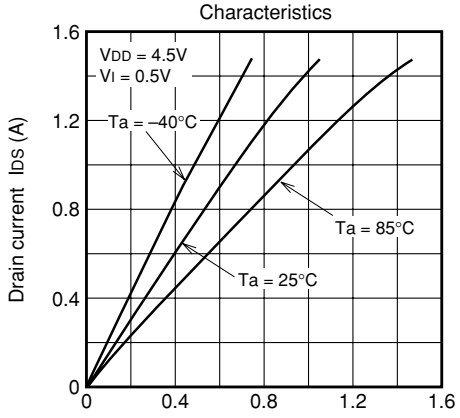
Input Voltage - Drain Current Characteristics



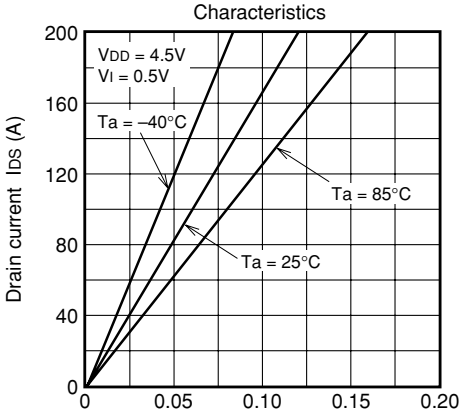
Supply Voltage - On Supply Current Characteristics



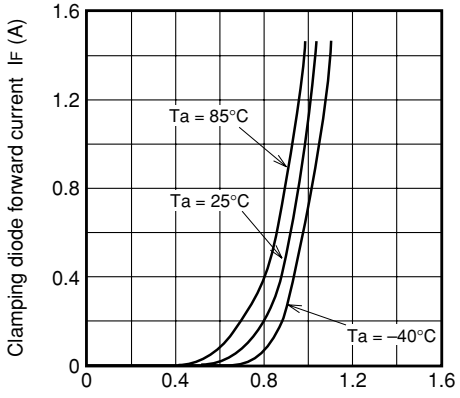
Output On Voltage - Drain Current Characteristics



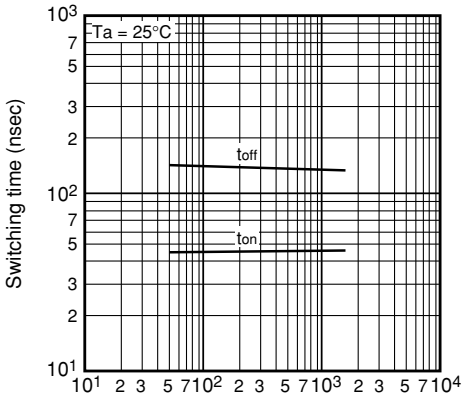
Output On Voltage - Drain Current Characteristics



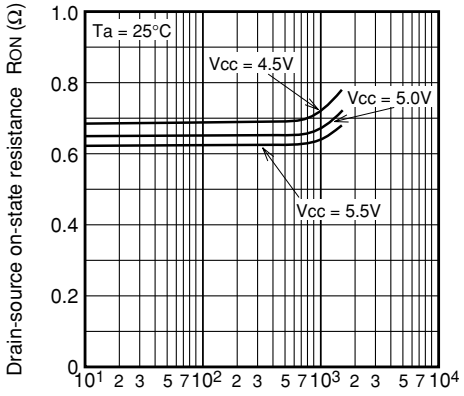
Clamping Diode Characteristics



Switching Characteristics



Drain Current - Output On Resistance Characteristics



Output On Resistance - Ambient Temperature Characteristics