

TOSHIBA POWER MOS FET MODULE SILICON N CHANNEL MOS TYPE (L²-π-MOS \bar{V} 4 IN 1)

MP4410

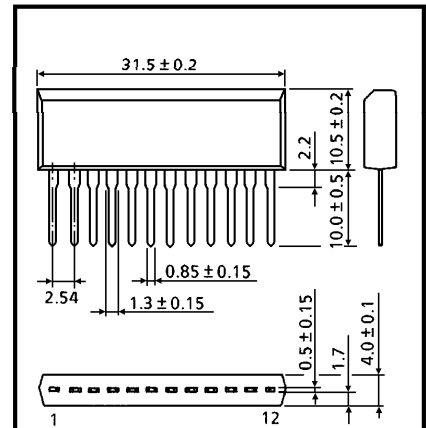
HIGH POWER, HIGH SPEED SWITCHING APPLICATIONS

HAMMER DRIVE, PULSE MOTOR DRIVE AND INDUCTIVE LOAD SWITCHING

INDUSTRIAL APPLICATIONS

Unit in mm

- 4-Volt Gate Drive Available
- Small Package by Full Molding (SIP 12 Pin)
- High Drain Power Dissipation (4 Devices Operation)
: $P_T = 28W$ ($T_c = 25^\circ C$)
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.12\Omega$ (Typ.)
- Low Leakage Current : $I_{GSS} = \pm 10\mu A$ (Max.) ($V_{GS} = \pm 16V$)
 $I_{DSS} = 100\mu A$ (Max.) ($V_{DS} = 60V$)
- Enhancement-Mode : $V_{th} = 0.8 \sim 2.0V$ ($I_D = 1mA$)



MOS FET	DIODE
1, 5, 8, 12 GATE	2, 4, 9, 11 ANODE
2, 4, 9, 11 DRAIN	3, 10 CATHODE
6, 7 SOURCE	

JEDEC —

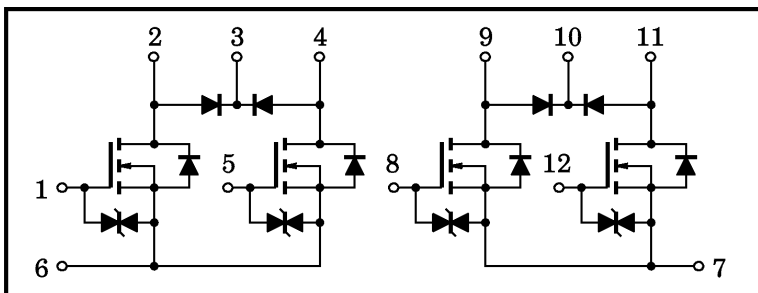
EIAJ —

TOSHIBA 2-32C1D

MAXIMUM RATINGS ($T_a = 25^\circ C$)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	V_{DSS}	60	V
Gate-Source Voltage	V_{GSS}	± 20	V
Drain Current	I_D	5	A
Peak Drain Current	I_{DP}	20	
Drain Power Dissipation (1 Device Operation)	P_D	2.2	W
Drain Power Dissipation (4 Devices Operation)	$T_a = 25^\circ C$	4.4	W
	$T_c = 25^\circ C$	28	
Channel Temperature	T_{ch}	150	$^\circ C$
Storage Temperature Range	T_{stg}	$-55 \sim 150$	$^\circ C$

ARRAY CONFIGURATION



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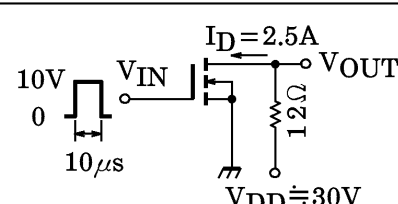
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THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance of Channel to Ambient (4 Devices Operation, Ta=25°C)	$\Sigma R_{th(ch-a)}$	28.4	°C / W
Thermal Resistance of Channel to Case (4 Devices Operation, Tc=25°C)	$\Sigma R_{th(ch-c)}$	4.46	°C / W
Maximum Lead Temperature for Soldering Purposes (3.2mm from Case for 10s)	T _L	260	°C

This Transistor is an Electrostatic Sensitive Device. Please Handle with Caution.

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I _{GSS}	V _{GS} = ±16V, V _{DS} = 0	—	—	±10	μA
Drain Cut-off Current		I _{DSS}	V _{DS} = 60V, V _{GS} = 0	—	—	100	μA
Drain-Source Breakdown Voltage		V(BR) _{DSS}	I _D = 10mA, V _{GS} = 0	60	—	—	V
Gate Threshold Voltage		V _{th}	V _{DS} = 10V, I _D = 1mA	0.8	—	2.0	V
Forward Transfer Admittance		Y _{fs}	V _{DS} = 10V, I _D = 2.5A	3.0	5.0	—	S
Drain-Source ON Resistance		R _{DS(ON)}	I _D = 2.5A, V _{GS} = 4V	—	0.21	0.31	Ω
			I _D = 2.5A, V _{GS} = 10V	—	0.12	0.16	
Input Capacitance		C _{iss}	V _{DS} = 10V, V _{GS} = 0, f = 1MHz	—	370	—	pF
Reverse Transfer Capacitance		C _{rss}		—	60	—	
Output Capacitance		C _{oss}		—	180	—	
Switching Time	Rise Time	t _r	 <p>V_{IN} : t_r, t_f < 5ns, Duty Cycle ≤ 1%</p>	—	18	—	ns
	Turn-on Time	t _{on}		—	25	—	
	Fall Time	t _f		—	15	—	
	Turn-off Time	t _{off}		—	170	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q _g	I _D = 5A, V _{GS} = 10V, V _{DD} = 48V	—	12	—	nC
Gate-Source Charge		Q _{gs}		—	8	—	
Gate-Drain ("Miller") Charge		Q _{gd}		—	4	—	

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SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Drain Reverse Current	I_{DR}	—	—	—	5	A
Peak Drain Reverse Current	I_{DRP}	—	—	—	20	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = 5A, V_{GS} = 0$	—	—	-1.7	V

FLYBACK-DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Maximum Forward Current	I_{FM}	—	—	—	5	A
Reverse Current	I_R	$V_R = 120V$	—	—	0.4	μA
Reverse Voltage	V_R	$I_R = 100\mu A$	120	—	—	V
Forward Voltage	V_F	$I_F = 1A$	—	—	1.8	V