TOSHIBA Power MOS FET Module Silicon N Channel MOS Type (L^2-π-MOSV 4 in 1)

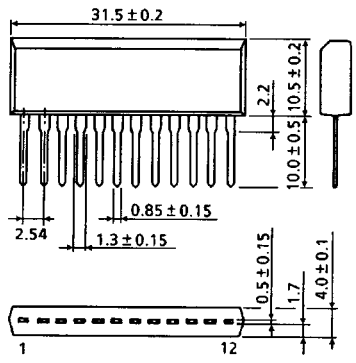
MP4410

Industrial Applications

High Power, High Speed Switching Applications.

Hammer Drive, Pulse Motor Drive and Inductive Load Switching.

Unit: mm



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	—
JEITA	—
TOSHIBA	2-32C1D

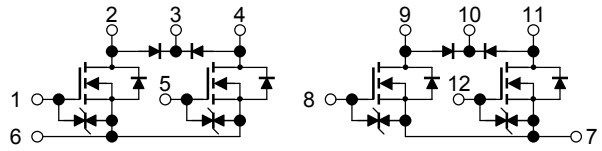
Weight: 3.9 g (typ.)

- 4 V gate drive available
- Small package by full molding (SIP 12 pin)
- High drain power dissipation (4 devices operation)
  : P_T = 28 W (Tc = 25°C)
- Low drain-source ON resistance: $R_{DS\ (ON)}$ = 0.12 Ω (typ.)
- Low leakage current: I_{GSS} = ±10 μA (max) (V_{GS} = ±16 V)
  I_{DSS} = 100 μA (max) (V_{DS} = 60 V)
- Enhancement-mode: V_{th} = 0.8 to 2.0 V (I_D = 1 mA)

Maximum Ratings (Ta = 25°C)

Characteristics		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	A
Drain power dissipation (1 device operation)		P_D	2.2	W
Drain power dissipation (4 devices operation)	Ta = 25°C	P_T	4.4	W
	Tc = 25°C		28	
Channel temperature		T_{ch}	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

Array Configuration

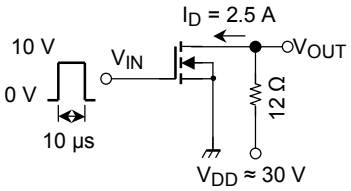


Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance of channel to ambient (4 devices operation, Ta = 25°C)	$\Sigma R_{th\ (ch\text{-}a)}$	28.4	°C/W
Thermal resistance of channel to case (4 devices operation, Tc = 25°C)	$\Sigma R_{th\ (ch\text{-}c)}$	4.46	°C/W
Maximum lead temperature for soldering purposes (3.2 mm from case for 10 s)	T_L	260	°C

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

Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	V_{GS} = ±16 V, V_{DS} = 0 V	—	—	±10	μA
Drain cut-off current		I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V	—	—	100	μA
Drain-source breakdown voltage		$V_{(BR)\ DSS}$	I_D = 10 mA, V_{GS} = 0 V	60	—	—	V
Gate threshold voltage		V_{th}	V_{DS} = 10 V, I_D = 1 mA	0.8	—	2.0	V
Forward transfer admittance		$\|Y_{fs}\|$	V_{DS} = 10 V, I_D = 2.5 A	3.0	5.0	—	S
Drain-source ON resistance		$R_{DS\ (ON)}$	I_D = 2.5 A, V_{GS} = 4 V	—	0.21	0.31	Ω
			I_D = 2.5 A, V_{GS} = 10 V	—	0.12	0.16	
Input capacitance		C_{iss}	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz	—	370	—	pF
Reverse transfer capacitance		C_{rss}		—	60	—	pF
Output capacitance		C_{oss}		—	180	—	pF
Switching time	Rise time	t_r		—	18	—	ns
	Turn-on time	t_{on}		—	25	—	
	Fall time	t_f		—	15	—	
	Turn-off time	t_{off}	V_{IN}: t_r, t_f < 5 ns, dutys cycle ≤ 1%	—	170	—	
Total gate charge (gate-source plus gate-drain)		Q_g	I_D = 5 A, V_{GS} = 10 V, V_{DD} = 48 V	—	12	—	nC
Gate-source charge		Q_{gs}		—	8	—	nC
Gate-drain (“miller”) charge		Q_{gd}		—	4	—	nC

Source-Drain Diode Rating and Characteristics (Ta = 25°C)

Characteristics	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} = 5 A, V_{GS} = 0 V	—		−1.7	V

Flyback-Diode Rating and Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Maximum forward current	I_{FM}	—	—	—	5	A
Reverse current	I_R	V_R = 120 V	—	—	0.4	μA
Reverse voltage	V_R	I_R = 100 μA	120	—	—	V
Forward voltage	V_F	I_F = 1 A	—	—	1.8	V

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