

TOSHIBA POWER MOS FET MODULE SILICON N CHANNEL MOS TYPE (L<sup>2</sup>-π-MOSIII 4 IN 1)

# MP4401

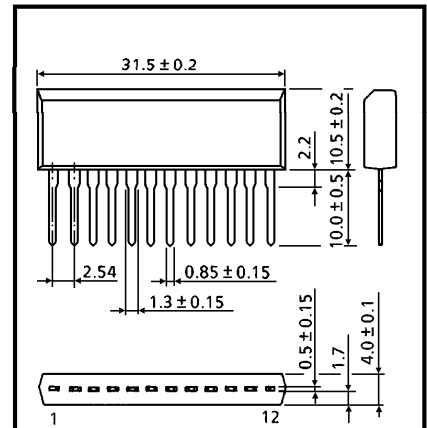
HIGH POWER, HIGH SPEED SWITCHING APPLICATIONS.

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<sub>T</sub> = 28W (T<sub>c</sub> = 25°C)
- Low Drain-Source ON Resistance : R<sub>DS (ON)</sub> = 0.33Ω (Typ.)
- Low Leakage Current : I<sub>GSS</sub> = ±10μA (Max.) (V<sub>GS</sub> = ±16V)  
I<sub>DSS</sub> = 100μA (Max.) (V<sub>DS</sub> = 120V)
- Enhancement-Mode : V<sub>th</sub> = 0.8~2.0V (I<sub>D</sub> = 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	

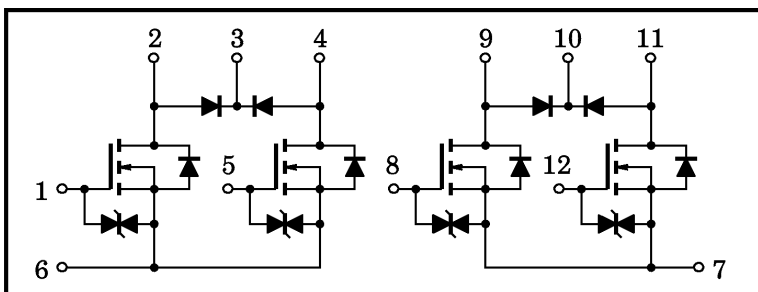
JEDEC	—
EIAJ	—
TOSHIBA	2-32C1D

Weight : 3.9g

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	V <sub>DSS</sub>	120	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	V
Drain Current	I <sub>D</sub>	3	A
Peak Drain Current	I <sub>DP</sub>	12	A
Drain Power Dissipation (1 Device Operation)	P <sub>D</sub>	2.2	W
Drain Power Dissipation (4 Devices Operation)	T <sub>a</sub> = 25°C	4.4	W
	T <sub>c</sub> = 25°C	28	
Channel Temperature	T <sub>ch</sub>	150	°C
Storage Temperature Range	T <sub>stg</sub>	-55~150	°C

ARRAY CONFIGURATION

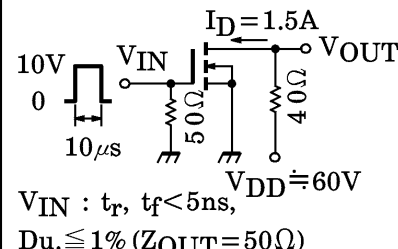


**THERMAL CHARACTERISTICS**

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 <sub>L</sub>	260	°C

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

**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

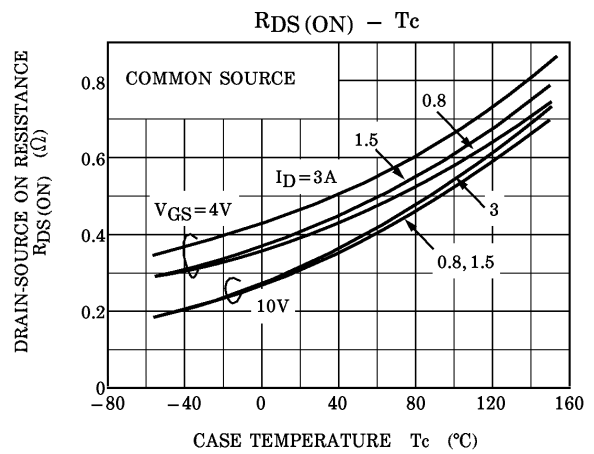
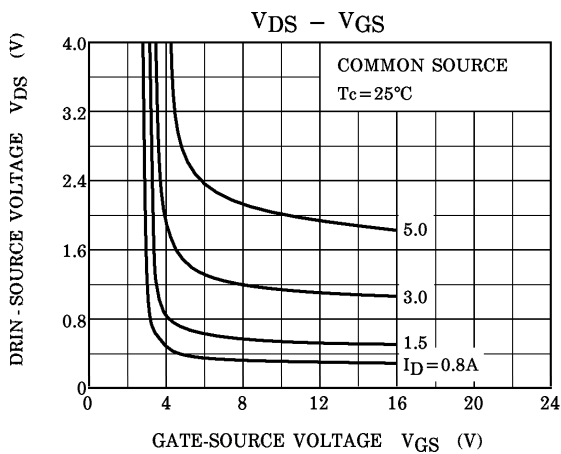
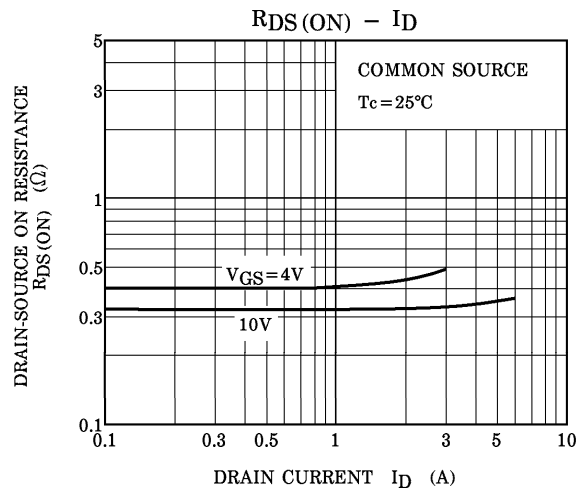
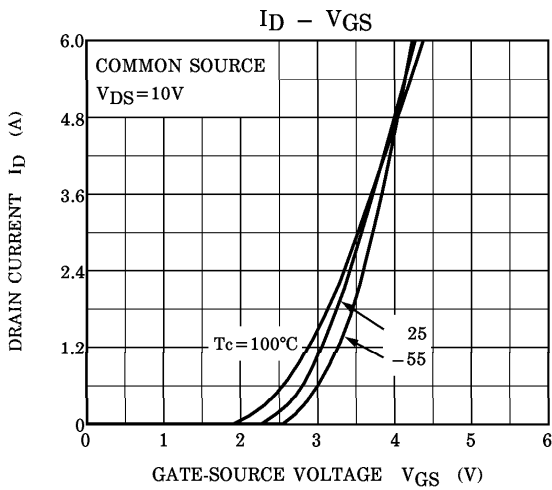
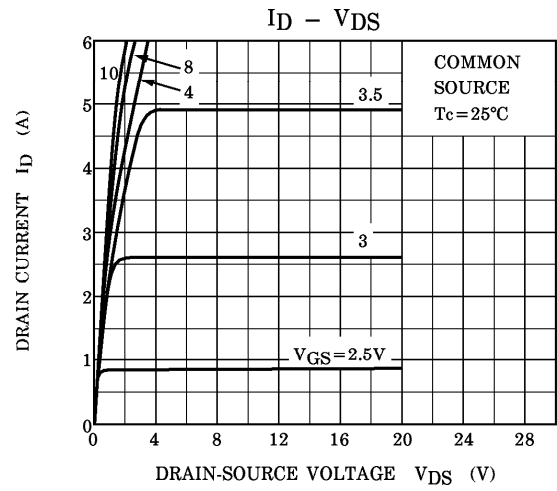
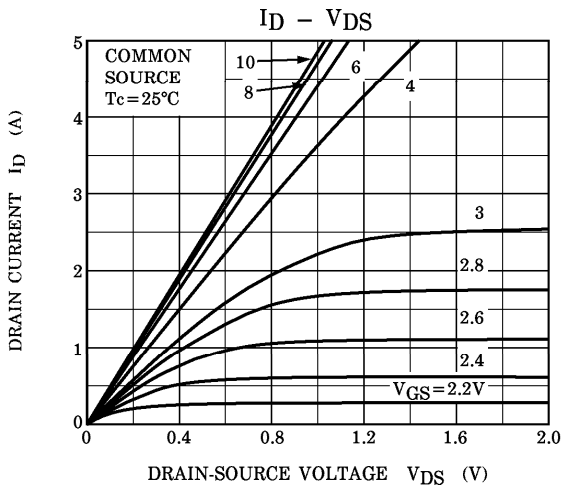
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±16V, V <sub>DS</sub> = 0	—	—	±10	μA	
Drain Cut-off Current	I <sub>DSS</sub>	V <sub>DS</sub> = 120V, V <sub>GS</sub> = 0	—	—	100	μA	
Drain-Source Breakdown Voltage	V (BR) DSS	I <sub>D</sub> = 10mA, V <sub>GS</sub> = 0	120	—	—	V	
Gate Threshold Voltage	V <sub>th</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA	0.8	—	2.0	V	
Forward Transfer Admittance	Y <sub>fs</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1.5A	1.5	3.2	—	S	
Drain-Source ON Resistance	R <sub>D(S) ON</sub>	I <sub>D</sub> = 1.5A, V <sub>GS</sub> = 4V	—	0.42	0.74	Ω	
	R <sub>D(S) ON</sub>	I <sub>D</sub> = 1.5A, V <sub>GS</sub> = 10V	—	0.33	0.45		
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0, f = 1MHz	—	350	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0, f = 1MHz	—	35	—	pF	
Output Capacitance	C <sub>oss</sub>	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0, f = 1MHz	—	155	—	pF	
Switching Time	Rise Time	t <sub>r</sub>		—	6	—	ns
	Turn-on Time	t <sub>on</sub>		—	12	—	
	Fall Time	t <sub>f</sub>		—	40	—	
	Turn-off Time	t <sub>off</sub>		—	100	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Q <sub>g</sub>	I <sub>D</sub> = 3A, V <sub>GS</sub> = 10V, V <sub>DD</sub> = 96V	—	11	—	nC	
Gate-Source Charge	Q <sub>gs</sub>		—	7	—		
Gate-Drain ("Miller") Charge	Q <sub>gd</sub>		—	4	—		

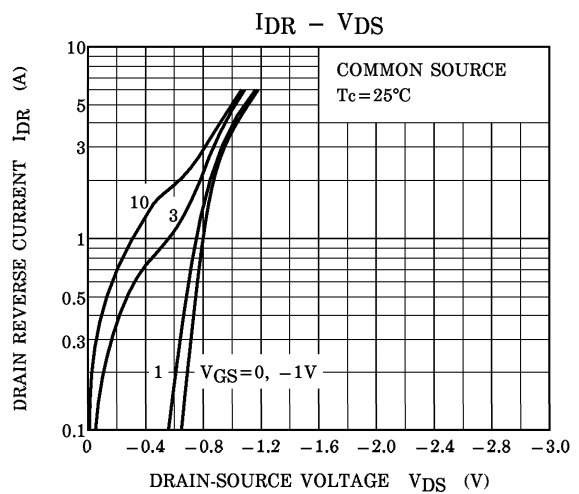
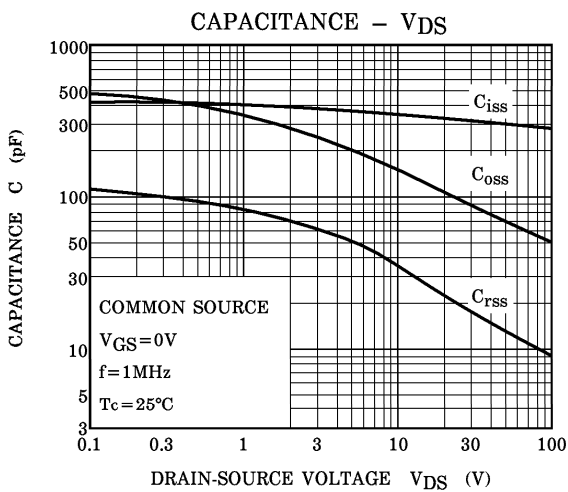
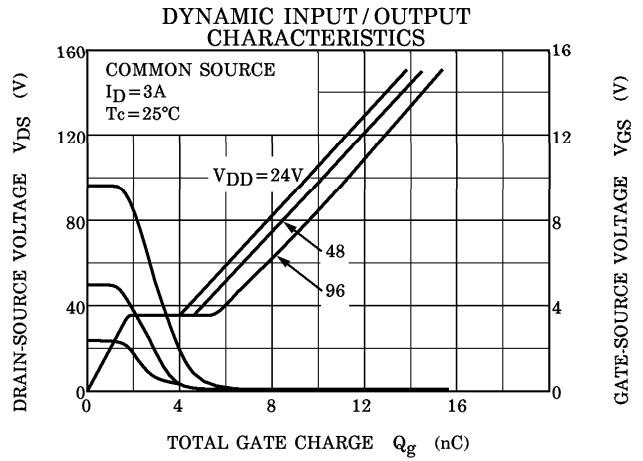
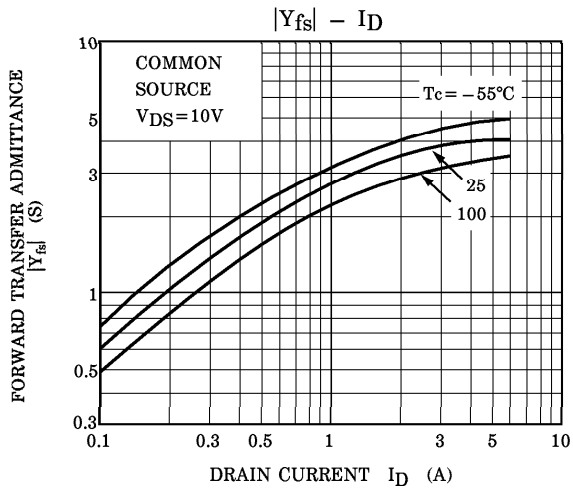
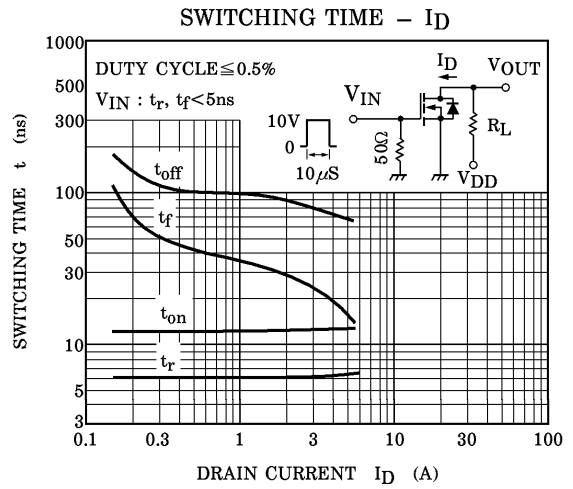
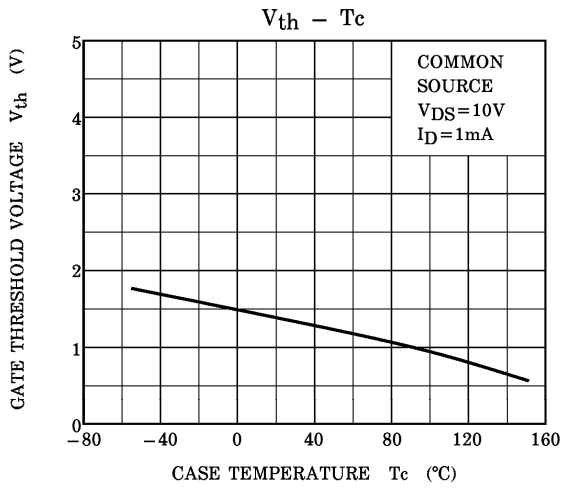
## SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

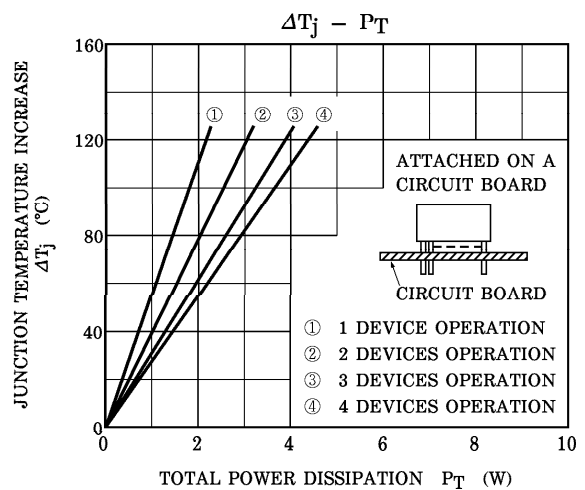
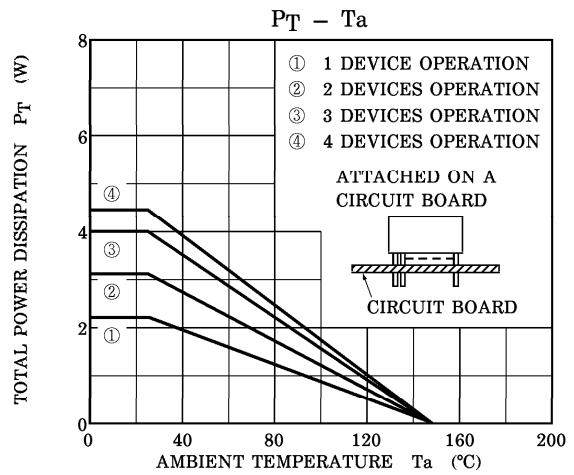
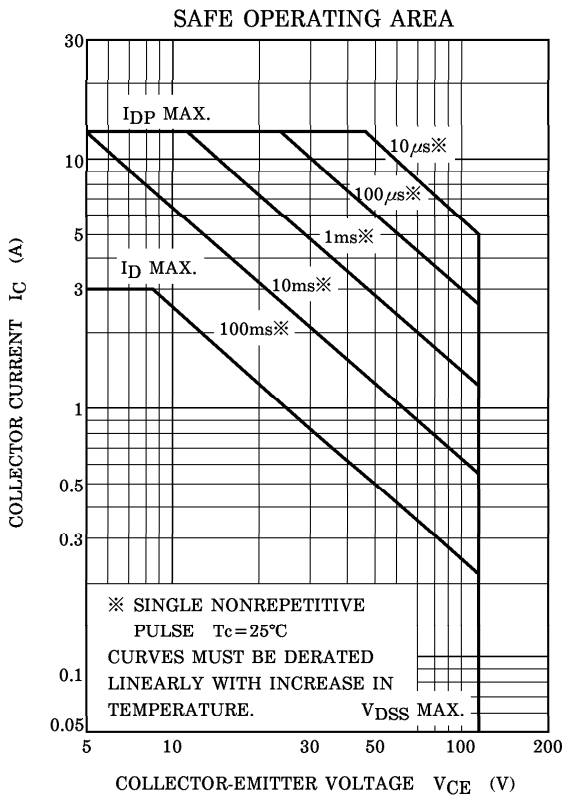
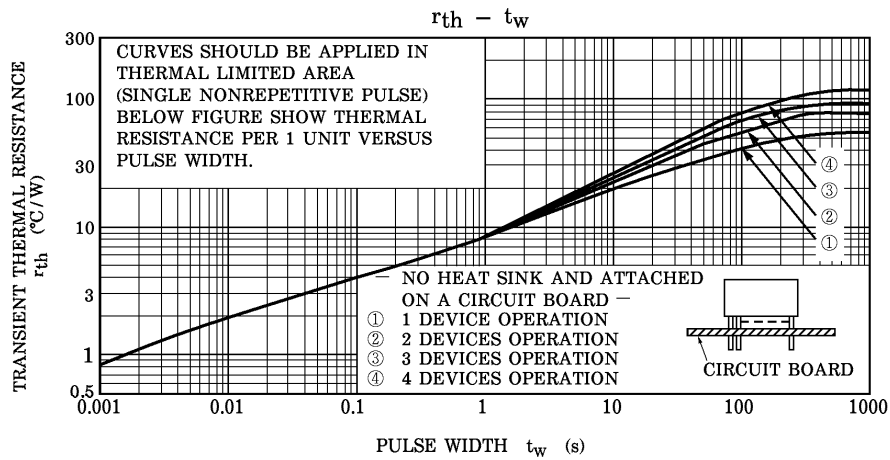
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Drain Reverse Current	$I_{DR}$	—	—	—	3	A
Peak Drain Reverse Current	$I_{DRP}$	—	—	—	12	A
Diode Forward Voltage	$V_{DSF}$	$I_{DR}=3A, V_{GS}=0$	—	-0.9	-1.5	V
Reverse Recovery Time	$t_{rr}$	$I_{DR}=3A, V_{GS}=0,$ $dI_{DR}/dt = -20A/\mu s$	—	130	—	ns
Reverse Recovery Charge	$Q_{rr}$		—	0.14	—	$\mu C$

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Maximum Forward Current	$I_{FM}$	—	—	—	3	A
Reverse Current	$I_R$	$V_R=120V$	—	—	0.4	$\mu A$
Reverse Voltage	$V_R$	$I_R=100\mu A$	120	—	—	V
Forward Voltage	$V_F$	$I_F=0.5A$	—	—	1.8	V







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000707EAA

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