

TENTATIVE

TOSHIBA INSULATED GATE BIPOLAR TRANSISTOR

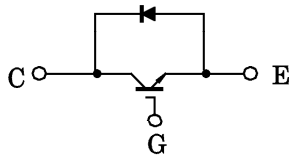
# ST1000EX21

HIGH POWER SWITCHING APPLICATIONS

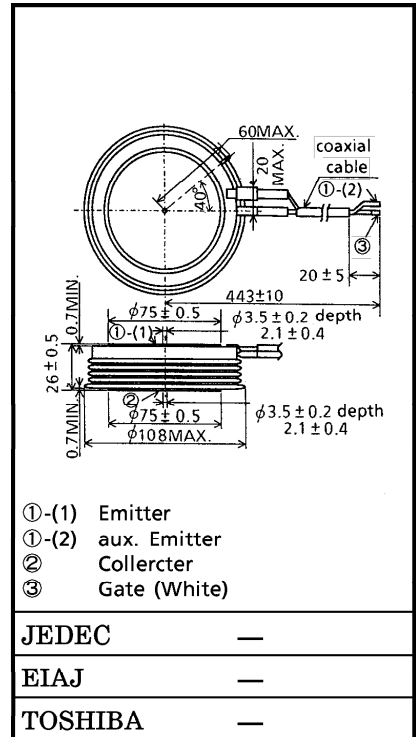
MOTOR CONTROL APPLICATIONS

- All Electric contacts by Pressure Structure and Airtight Package
- Anti-Parallel Fast Recovery Diode in This Package
- Enhancement Mode IGBT

EQUIVALENT CIRCUIT



Unit in mm



Weight : 1250g

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Emitter Voltage		V <sub>CES</sub>	2500	V
Gate-Emitter Voltage		V <sub>GES</sub>	±20	V
Collector Current	DC	I <sub>C</sub>	1000	A
	1ms	I <sub>CP</sub>	2000	A
Forward Current	DC	I <sub>F</sub>	1000	A
	1ms	I <sub>FM</sub>	2000	A
Collector Power Dissipation (T <sub>c</sub> = 25°C)		P <sub>C</sub>	5550	W
Operating Junction Temperature		T <sub>j</sub>	-20~125	°C
Storage Temperature Range		T <sub>stg</sub>	-40~125	°C
Mounting Force		—	31.5 ± 3.2	kN

961001EAA1

- TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

ELECTRICAL CHARACTERISTICS (T<sub>c</sub> = 125°C without R<sub>th</sub>)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I <sub>GES</sub>	V <sub>GE</sub> = ±20V, V <sub>CE</sub> = 0V	—	—	±1	μA
Collector Cut-Off Current		I <sub>CES</sub>	V <sub>CE</sub> = 2500V, V <sub>GE</sub> = 0V	—	—	200	mA
Gate-Emitter Cut-Off Voltage		V <sub>GE (off)</sub>	V <sub>CE</sub> = 5V, I <sub>C</sub> = 1A	3.0	4.5	6.0	V
Collector-Emitter Saturation Voltage		V <sub>CE (sat)</sub>	I <sub>C</sub> = 1000A, V <sub>GE</sub> = 15V	—	5.5	6.0	V
Input Capacitance		C <sub>ies</sub>	V <sub>CE</sub> = 10V, V <sub>GE</sub> = 0V, f = 1MHz	—	170	—	nF
Switching Times	Rise Time	t <sub>r</sub>	Inductive load, V <sub>CC</sub> = 1500V, I <sub>C</sub> = 1000A, V <sub>GG</sub> = ±15V, R <sub>G</sub> = 5.0Ω	—	0.3	—	μs
	Turn-On Time	t <sub>on</sub>		—	2.2	—	μs
	Fall Time	t <sub>f</sub>		—	0.5	—	μs
	Turn-Off Time	t <sub>off</sub>		—	1.7	—	μs
Forward Voltage of Diode		V <sub>F</sub>	I <sub>F</sub> = 1000A, V <sub>GE</sub> = 0V	—	2.7	3.2	V
Reverse Recovery Time		t <sub>rr</sub>	I <sub>F</sub> = 1000A, V <sub>GG</sub> = -15V, di / dt = 2600A / μs	—	0.6	—	μs
Thermal Resistance	Transistor Part	R <sub>th (j-f) E</sub>	Junction-Emitter side	—	—	47.5	°C / kW
		R <sub>th (j-f) C</sub>	Junction-Collector side	—	—	29.0	°C / kW
		R <sub>th (j-f) D</sub>	Junction-double side	—	—	18.0	°C / kW
	Diode Part	R <sub>th (j-f) A</sub>	Junction-Anode side	—	—	125	°C / kW
		R <sub>th (j-f) K</sub>	Junction-Cathode side	—	—	70.3	°C / kW
		R <sub>th (j-f) D</sub>	Junction double side	—	—	45.0	°C / kW