

TENTATIVE

TOSHIBA INSULATED GATE BIPOLAR TRANSISTOR

ST1000EX21

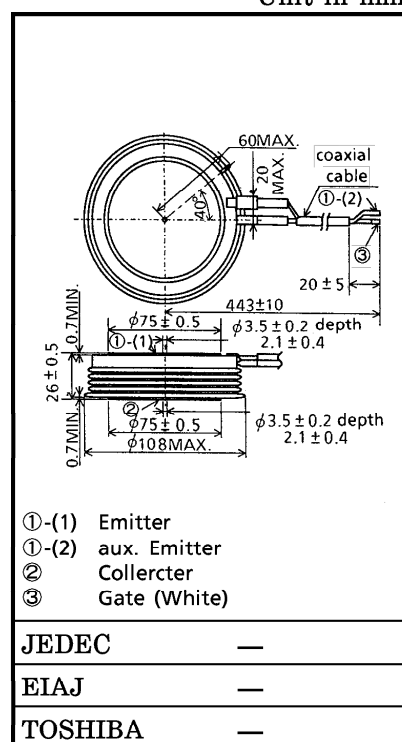
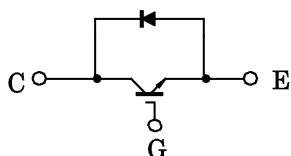
HIGH POWER SWITCHING APPLICATIONS

MOTOR CONTROL APPLICATIONS

Unit in mm

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

EQUIVALENT CIRCUIT



Weight : 1250g

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Emitter Voltage		V _{CES}	2500	V
Gate-Emitter Voltage		V _{GES}	±20	V
Collector Current	DC	I _C	1000	A
	1ms	I _{CP}	2000	A
Forward Current	DC	I _F	1000	A
	1ms	I _{FM}	2000	A
Collector Power Dissipation (T _c = 25°C)		P _C	5550	W
Operating Junction Temperature		T _j	−20~125	°C
Storage Temperature Range		T _{stg}	−40~125	°C
Mounting Force		—	31.5±3.2	kN

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ELECTRICAL CHARACTERISTICS ($T_c = 125^\circ\text{C}$ without R_{th})

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GES}	$V_{GE} = \pm 20\text{V}$, $V_{CE} = 0\text{V}$	—	—	± 1	μA
Collector Cut-Off Current		I_{CES}	$V_{CE} = 2500\text{V}$, $V_{GE} = 0\text{V}$	—	—	200	mA
Gate-Emitter Cut-Off Voltage		$V_{GE(\text{off})}$	$V_{CE} = 5\text{V}$, $I_C = 1\text{A}$	3.0	4.5	6.0	V
Collector-Emitter Saturation Voltage		$V_{CE(\text{sat})}$	$I_C = 1000\text{A}$, $V_{GE} = 15\text{V}$	—	5.5	6.0	V
Input Capacitance		C_{ies}	$V_{CE} = 10\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$	—	170	—	nF
Switching Times	Rise Time	t_r	Inductive load, $V_{CC} = 1500\text{V}$, $I_C = 1000\text{A}$, $V_{GG} = \pm 15\text{V}$, $R_G = 5.0\Omega$	—	0.3	—	μs
	Turn-On Time	t_{on}		—	2.2	—	μs
	Fall Time	t_f		—	0.5	—	μs
	Turn-Off Time	t_{off}		—	1.7	—	μs
Forward Voltage of Diode		V_F	$I_F = 1000\text{A}$, $V_{GE} = 0\text{V}$	—	2.7	3.2	V
Reverse Recovery Time		t_{rr}	$I_F = 1000\text{A}$, $V_{GG} = -15\text{V}$, $di/dt = 2600\text{A}/\mu\text{s}$	—	0.6	—	μs
Thermal Resistance	Transistor Part	$R_{th(j-f)E}$	Junction-Emitter side	—	—	47.5	$^\circ\text{C}/\text{kW}$
		$R_{th(j-f)C}$	Junction-Collector side	—	—	29.0	$^\circ\text{C}/\text{kW}$
		$R_{th(j-f)D}$	Junction-double side	—	—	18.0	$^\circ\text{C}/\text{kW}$
	Diode Part	$R_{th(j-f)A}$	Junction-Anode side	—	—	125	$^\circ\text{C}/\text{kW}$
		$R_{th(j-f)K}$	Junction-Cathode side	—	—	70.3	$^\circ\text{C}/\text{kW}$
		$R_{th(j-f)D}$	Junction double side	—	—	45.0	$^\circ\text{C}/\text{kW}$