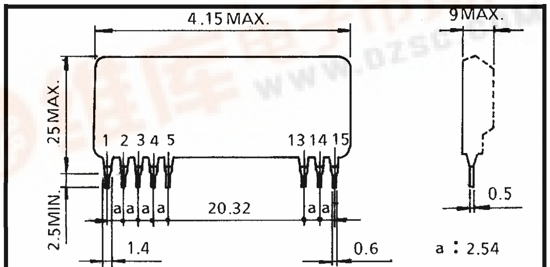
TOSHIBA SOLID STATE IGBT GATE DRIVER MODULE

TF1208

TOSHIBA TF1208 is the IGBT gate driver designed for use with TOSHIBA Insulated Gate Bipolar Transistor Module and it includes the optical isolator and IGBT gate driver circuit. Using this driver, you can design high reliability and compact system.

- Recommended Conditions :
  Input Current : $I_F = 16mA$
  Output Supply Voltage : $V_{CC} = 15V$, $V_{EE} = -15V$
- High Speed Switching Response :
  $t_{pLH} = 1.5\mu s$ (Typ.)
  $t_{pHL} = 0.8\mu s$ (Typ.)
- Small Size and Light Weight
- 2500 VAC Optical Isolation

Unit in mm



1 : OUTPUT 1
2 : V_{CC}
3 : OUTPUT 2
4 : V_{EE}
5 : V_Z
13 : N.C.
14 : INPUT (+)
15 : INPUT (−)

JEDEC	—
EIAJ	—
TOSHIBA	10-42A1A

Weight : 8g

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Input Current	I_F	25	mA
Reverse Input Voltage	V_R	5	V
Output Supply Voltage	V_{CC}	18	V
	V_{EE}	−18	
Output Voltage	V_{OUT}	V_{CC}~V_{EE}	V
High Level Peak Output Current (Note 1)	I_{OHP}	2 (10μs)	A
Low Level Peak Output Current (Note 1)	I_{OLP}	−3 (10μs)	A
Operating Frequency (Note 2)	f	15	kHz
Isolation (Input-Output)	BV_S / AC	2500 (1min)	V
Operating Temperature	T_{opr}	−20~70	°C
Storage Temperature	T_{stg}	−20~85	°C
Lead Soldering Temperature	T_{sol}	260°C (10s)	°C

Note 1 : Exponential Waveform (f = 10kHz, Fig.1)
Note 2 : $I_{OHP} = 2A$ (5μs), $I_{OLP} = -3A$ (5μs), Exponential Waveform (Fig.1)

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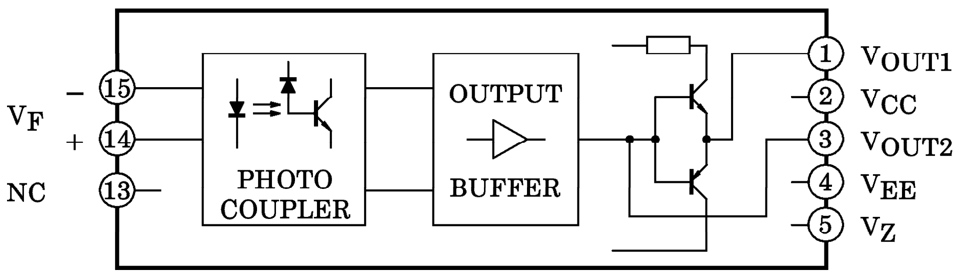
BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS (Ta = 25°C, V_C = 5V, V_{CC} = 15V, V_{EE} = − 15V, R_Z = 500Ω, f = 10kHz)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
High Level Input Voltage	V_{FT}	V_{OUT1} > 0V (Fig.2, 3)	—	1.6	1.65	V
High Level Input Current	I_{FT}	V_{OUT1} > 0V (Fig.2, 3)	—	8.0	16	mA
Reverse Current	I_R	V_R = 5V	—	—	10	μA
High Level Output Voltage	V_{OH}	I_F = 16mA, R_L = 200Ω (Fig.2, 3)	13	13.5	—	V
Low Level Output Voltage	V_{OL}	I_F = 0mA, R_L = 200Ω (Fig.2, 3)	—	−13.5	−13	
High Level Supply Current	I_{CCH}	I_F = 16mA, V_{OUT1} > 0V (Fig.2, 3)	—	11	—	mA
Low Level Supply Current	I_{CCL}	I_F = 0mA, V_{OUT1} < 0V (Fig.2, 3)	—	10	—	
Zener Voltage (Coupler Supply)	V_Z	I_Z = 20mA, 4pin to 5pin	—	5.1	—	V
Propagation Delay Time to High Output Level	t_{pLH}	I_F = 16mA, V_{OUT1} > 0V, R_L = 200Ω (Fig.2, 3)	—	1.5	2.0	μs
Output Rise Time	t_r		—	0.25	—	
Propagation Delay Time to Low Output Level	t_{pHL}	I_F = 0mA, V_{OUT1} < 0V, R_L = 200Ω (Fig.2, 3)	—	0.8	1.5	μs
Output Fall Time	t_f		—	0.10	—	
Isolation Resistance (Input-Output)	R_S	V = 1kV, RH = 40~60%	—	10^{10}	—	Ω

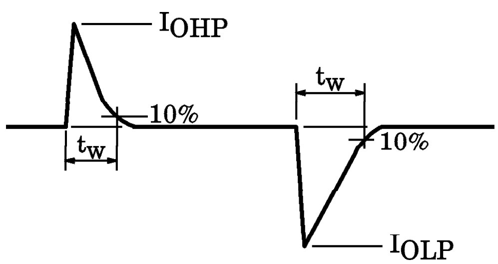


Fig.1 EXPONENTIAL WAVEFORM

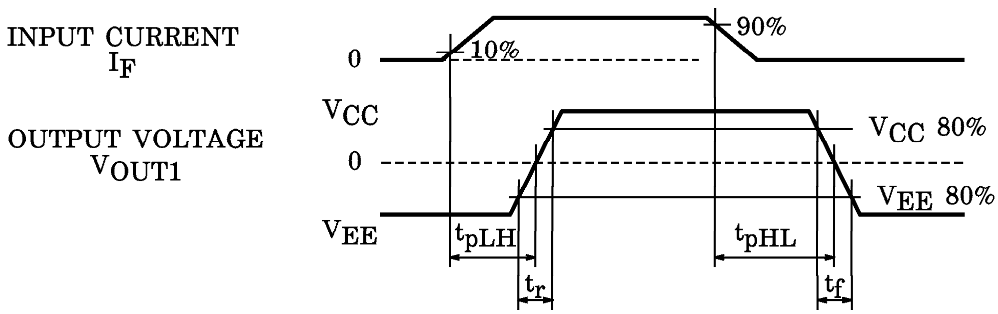


Fig.2 SWITCHING TIME TEST CONDITION

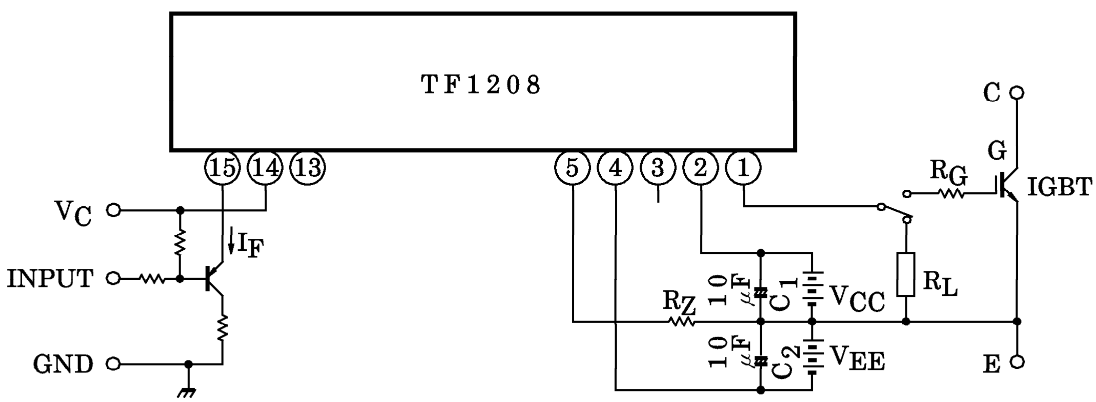
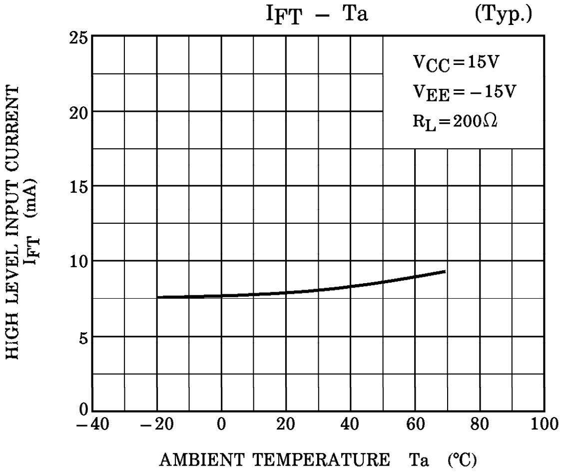
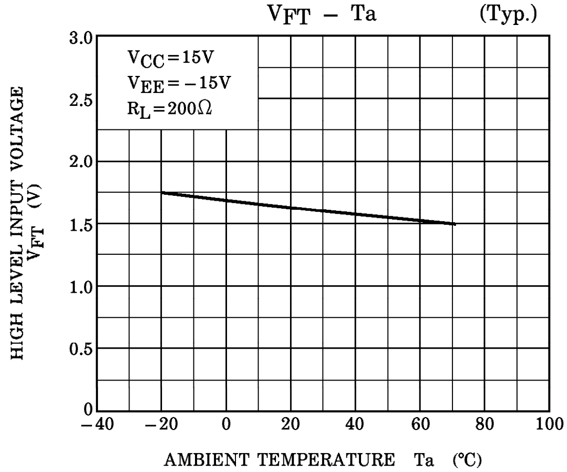


Fig.3 SWITCHING TIME TEST CIRCUIT

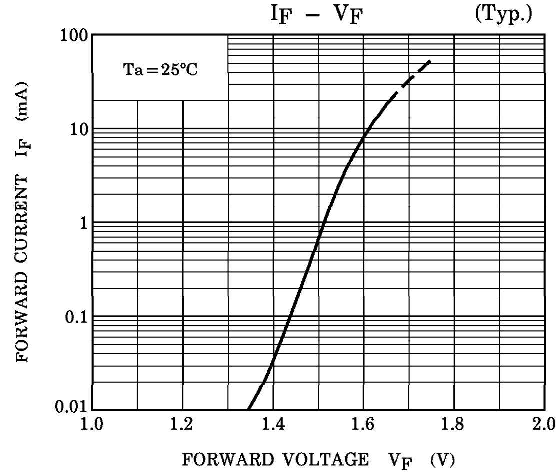
I_{FT} – Ta (Typ.)



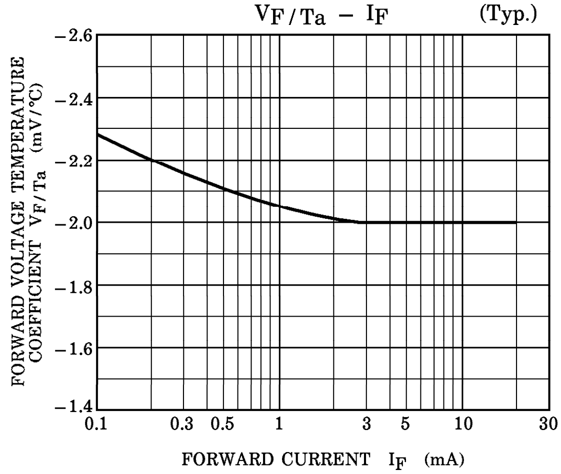
V_{FT} – Ta (Typ.)



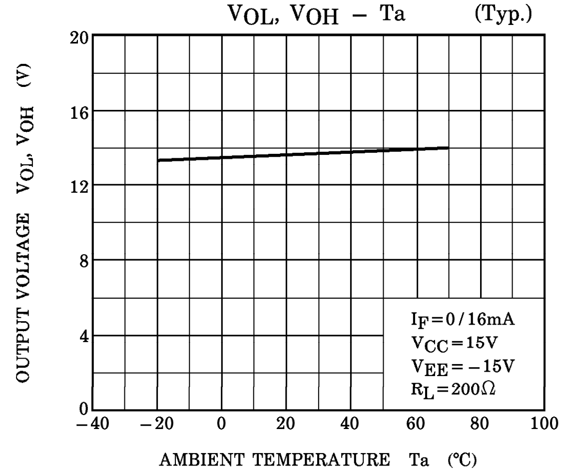
I_F – V_F (Typ.)



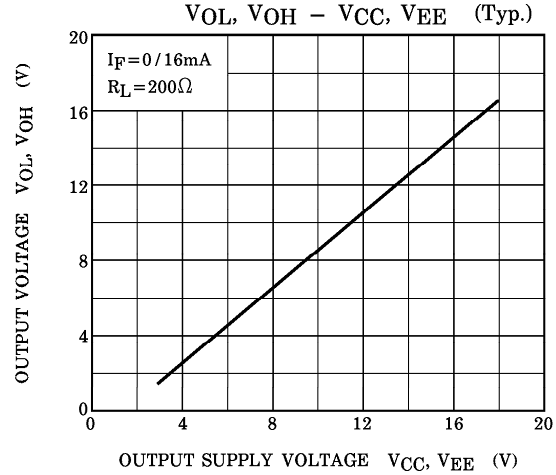
$\Delta V_F / \Delta Ta$ – I_F (Typ.)

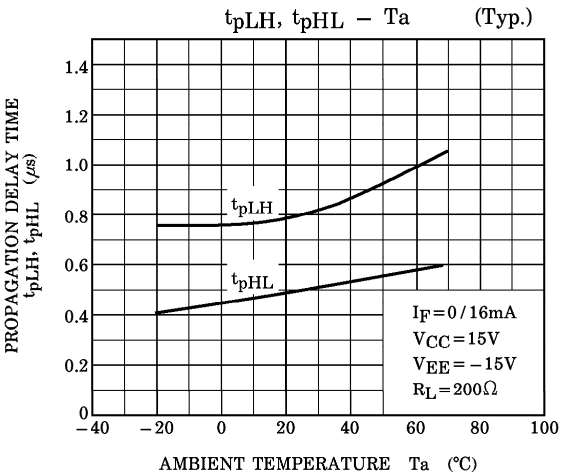


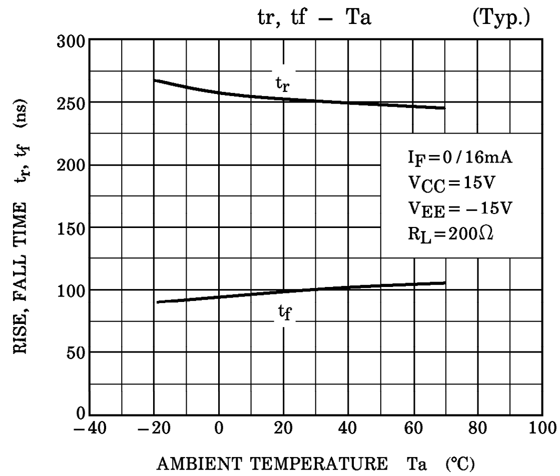
V_{OL}, V_{OH} – Ta (Typ.)

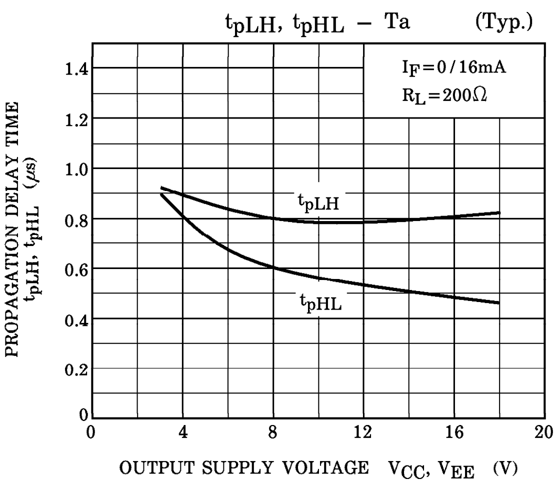


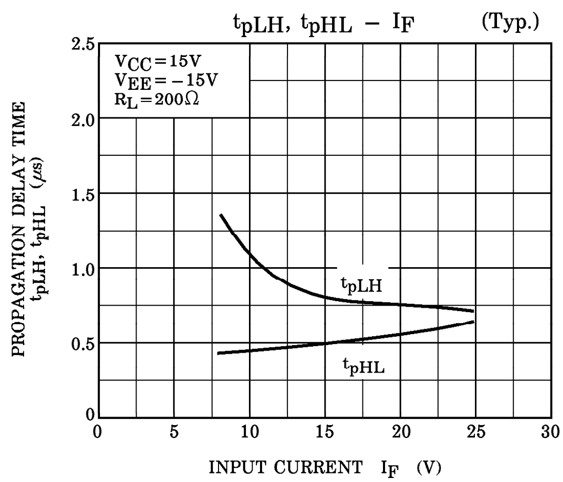
V_{OL}, V_{OH} – V_{CC}, V_{EE} (Typ.)




tpLH, tpHL – Ta (Typ.)
PROPAGATION DELAY TIME tpLH, tpHL (μs)
AMBIENT TEMPERATURE Ta (°C)
tpLH
tpHL
IF = 0 / 16mA
VCC = 15V
VEE = −15V
RL = 200Ω


tr, tf – Ta (Typ.)
RISE, FALL TIME tr, tf (ns)
AMBIENT TEMPERATURE Ta (°C)
tr
tf
IF = 0 / 16mA
VCC = 15V
VEE = −15V
RL = 200Ω


tpLH, tpHL – Ta (Typ.)
PROPAGATION DELAY TIME tpLH, tpHL (μs)
OUTPUT SUPPLY VOLTAGE VCC, VEE (V)
tpLH
tpHL
IF = 0 / 16mA
RL = 200Ω


tpLH, tpHL – IF (Typ.)
PROPAGATION DELAY TIME tpLH, tpHL (μs)
INPUT CURRENT IF (V)
tpLH
tpHL
VCC = 15V
VEE = −15V
RL = 200Ω