

TOSHIBA INSULATED GATE BIPOLAR TRANSISTOR SILICON N CHANNEL IGBT

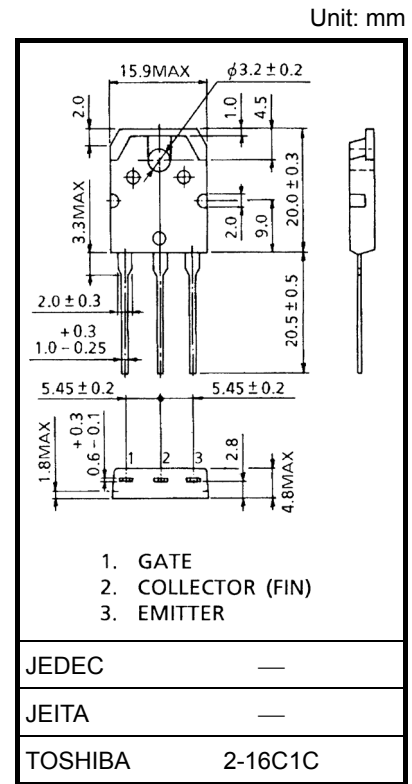
GT20J301

HIGH POWER SWITCHING APPLICATIONS
MOTOR CONTROL APPLICATIONS

- Third-generation IGBT
- Enhancement mode type
- High speed : $t_f = 0.30\mu s$ (Max.)
- Low saturation voltage : $V_{CE(sat)} = 2.7V$ (Max.)
- FRD included between emitter and collector

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ C$)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Emitter Voltage		V_{CES}	600	V
Gate-Emitter Voltage		V_{GES}	± 20	V
Collector Current	DC	I_C	20	A
	1ms	I_{CP}	40	A
Emitter-Collector Forward Current	DC	I_F	20	A
	1ms	I_{FM}	40	A
Collector Power Dissipation ($T_c = 25^\circ C$)		P_C	130	W
Junction Temperature		T_j	150	$^\circ C$
Storage Temperature Range		T_{stg}	$-55 \sim 150$	$^\circ C$

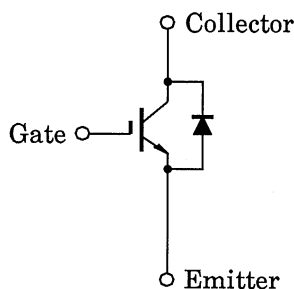


Weight: 4.6 g (typ.)

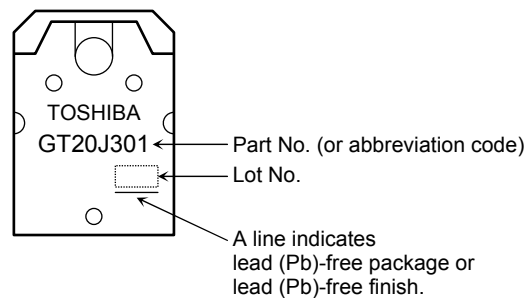
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

EQUIVALENT CIRCUIT



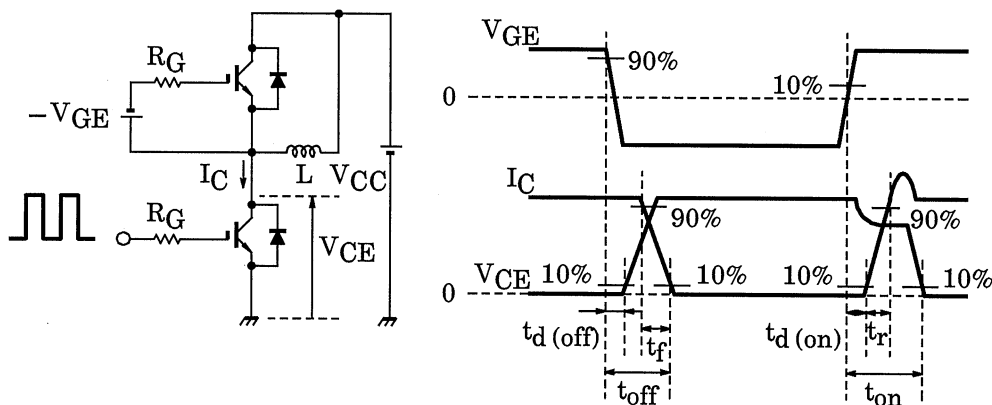
MARKING



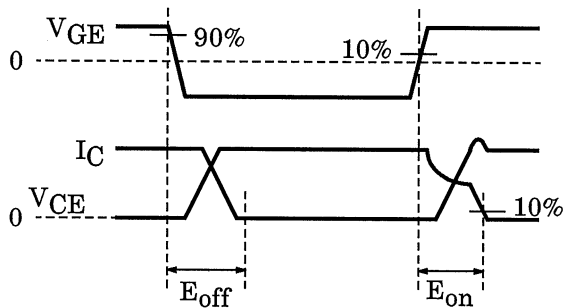
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

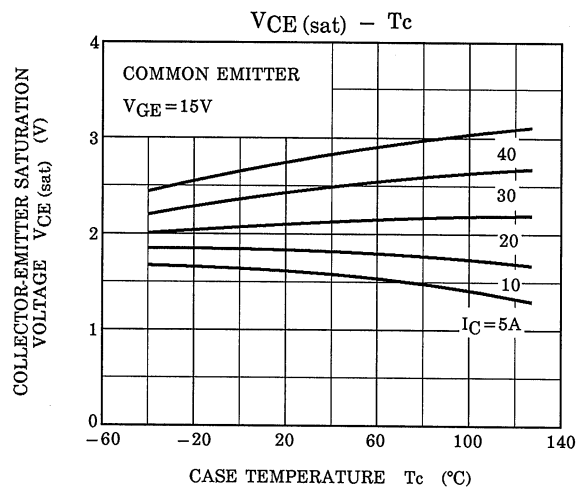
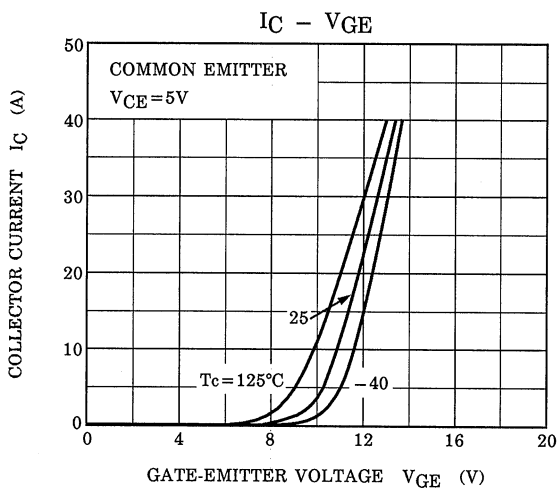
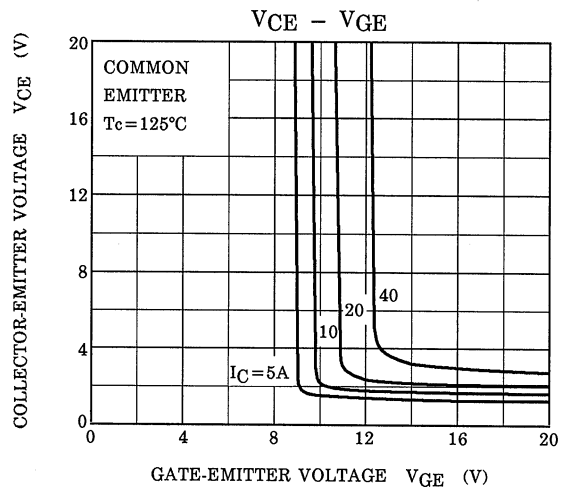
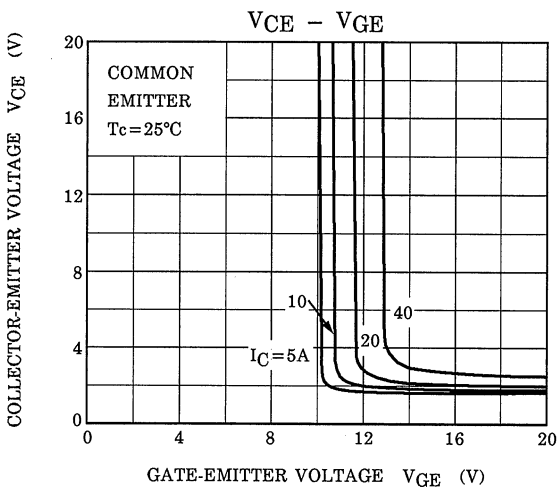
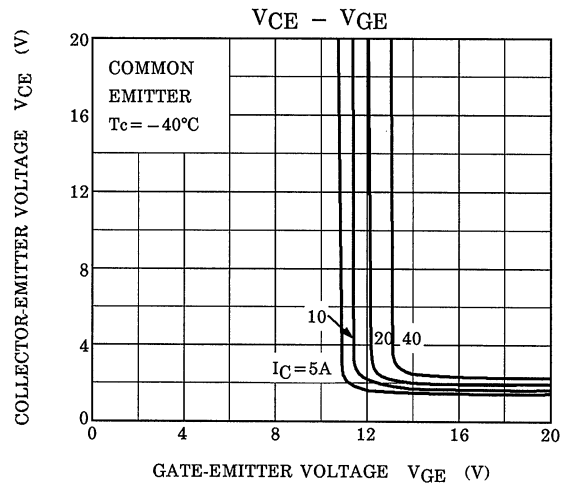
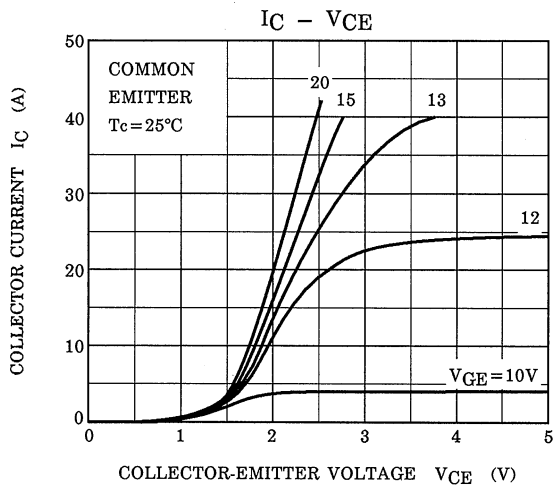
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Gate Leakage Current		I_{GES}	$V_{GE} = \pm 20V, V_{CE} = 0$	—	—	± 500	nA
Collector Cut-Off Current		I_{CES}	$V_{CE} = 600V, V_{GE} = 0$	—	—	1.0	mA
Gate-Emitter Cut-Off Voltage		$V_{GE (OFF)}$	$I_C = 2mA, V_{CE} = 5V$	5.0	—	8.0	V
Collector-Emitter Saturation Voltage		$V_{CE (sat)}$	$I_C = 20A, V_{GE} = 15V$	—	2.1	2.7	V
Input Capacitance		C_{ies}	$V_{CE} = 20V, V_{GE} = 0, f = 1MHz$	—	1450	—	pF
Switching Time	Rise Time	t_r	Inductive Load $V_{CC} = 300V, I_C = 20A$ $V_{GG} = \pm 15V, R_G = 56\Omega$ (Note)	—	0.12	—	μs
	Turn-On Time	t_{on}		—	0.40	—	
	Fall Time	t_f		—	0.15	0.30	
	Turn-Off Time	t_{off}		—	0.70	—	
Peak Forward Voltage		V_F	$I_F = 20A, V_{GE} = 0$	—	—	2.0	V
Reverse Recovery Time		t_{rr}	$I_F = 20A, di/dt = -100A/\mu s$	—	—	200	ns
Thermal Resistance (IGBT)		$R_{th (j-c)}$	—	—	—	0.96	$^{\circ}C/W$
Thermal Resistance (Diode)		$R_{th (j-c)}$	—	—	—	2.5	$^{\circ}C/W$

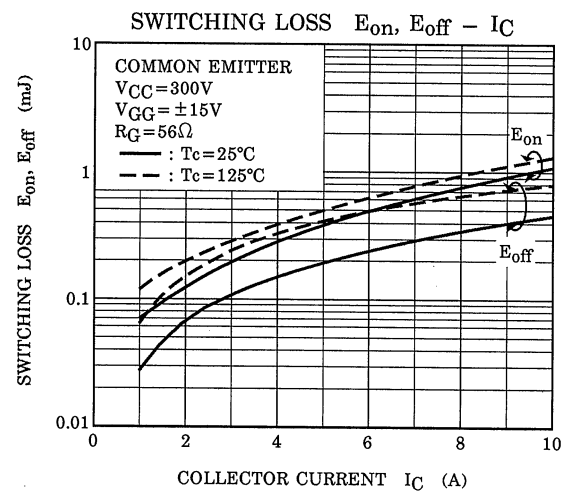
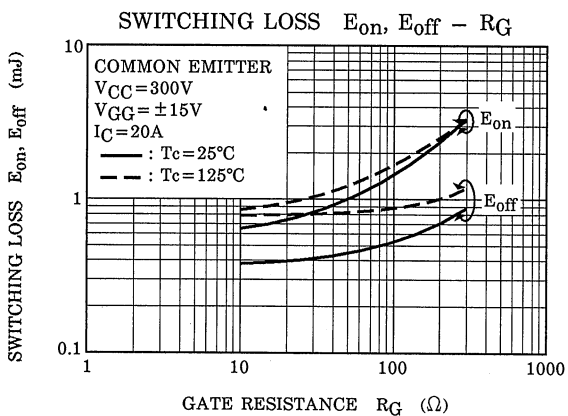
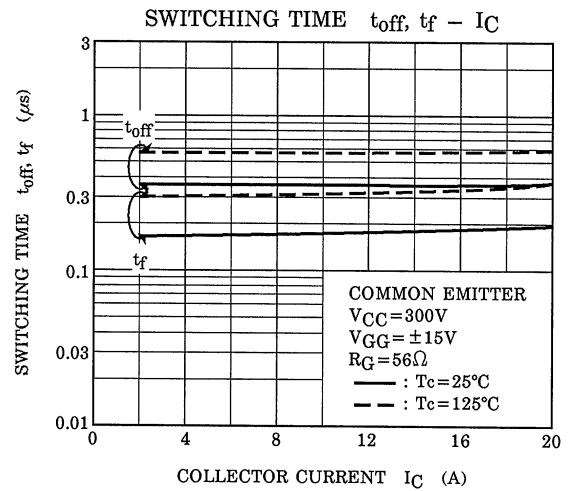
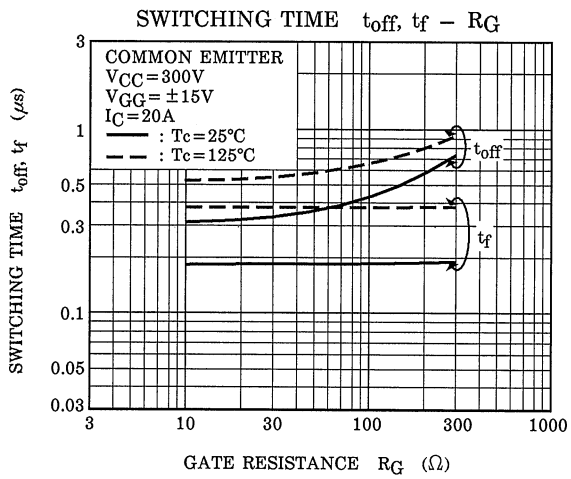
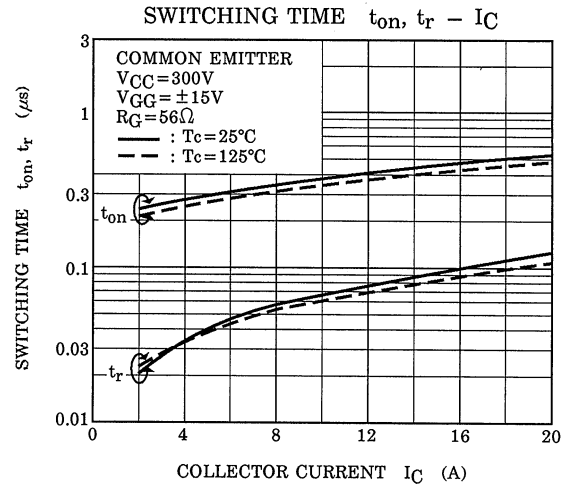
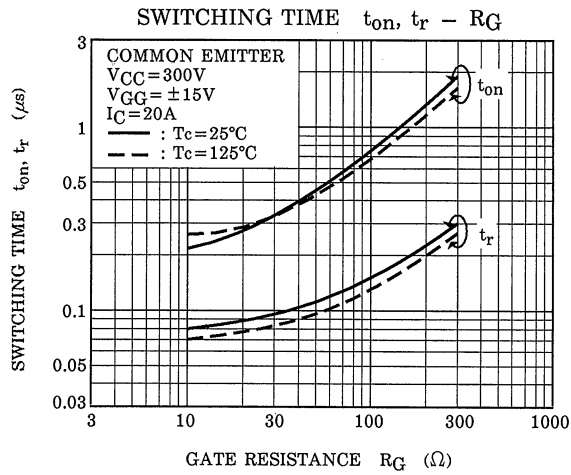
Note : Switching time measurement circuit and input / output waveforms

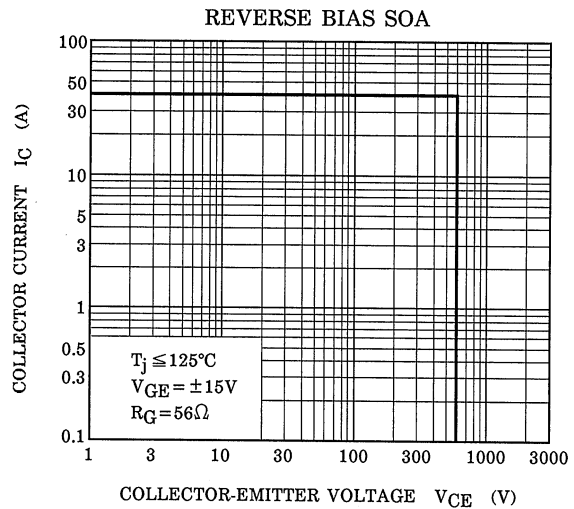
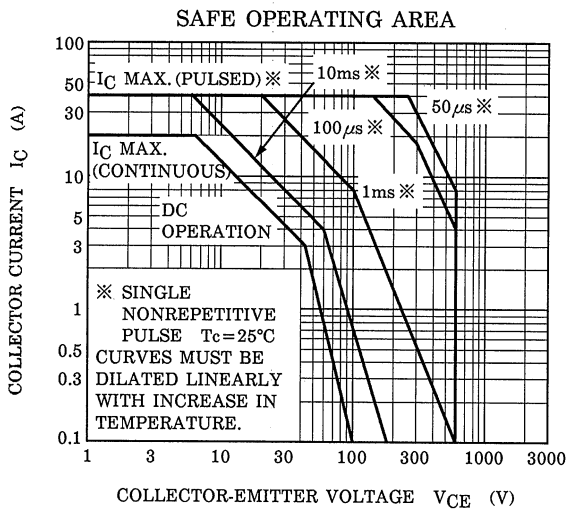
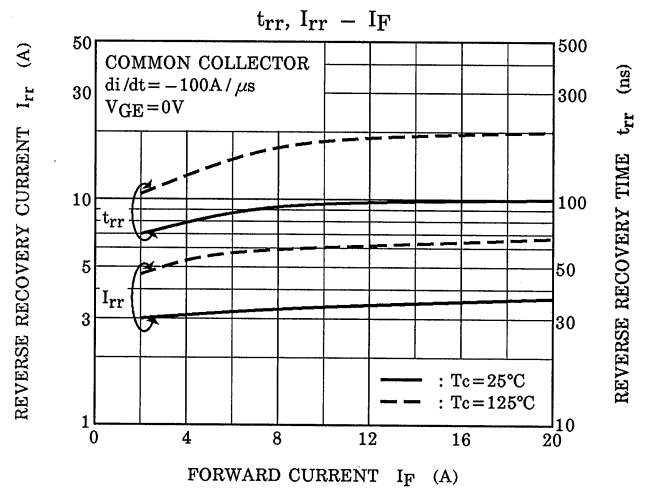
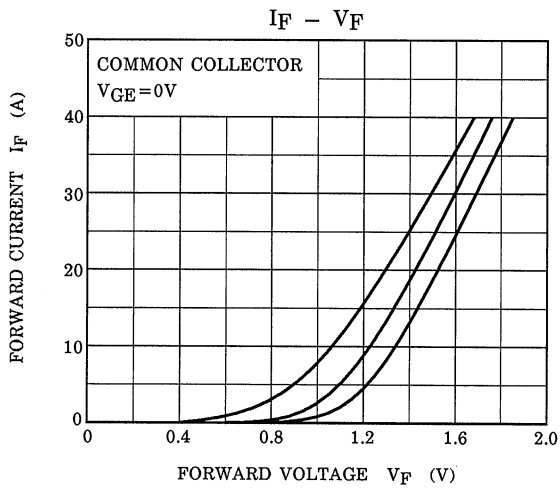
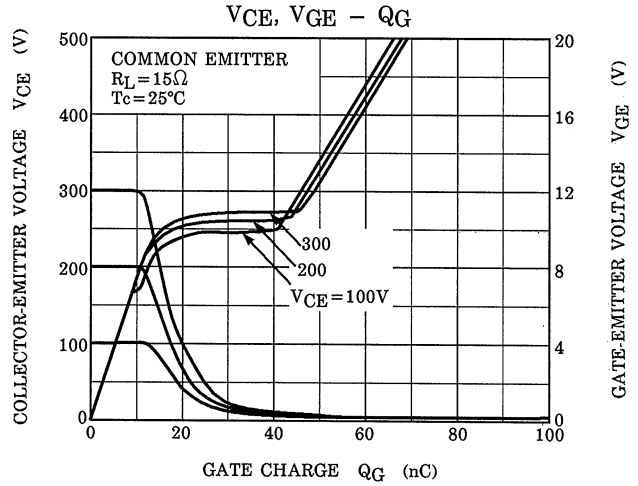
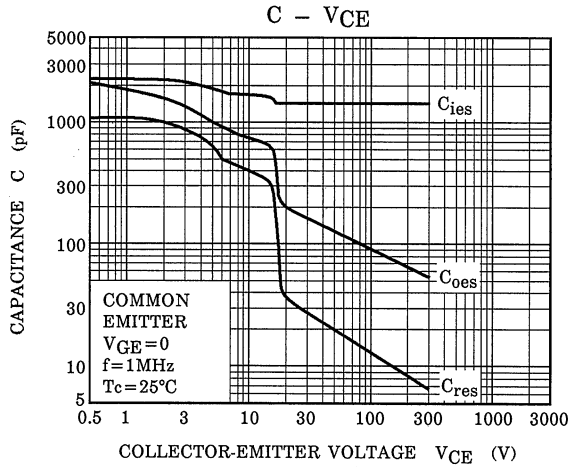


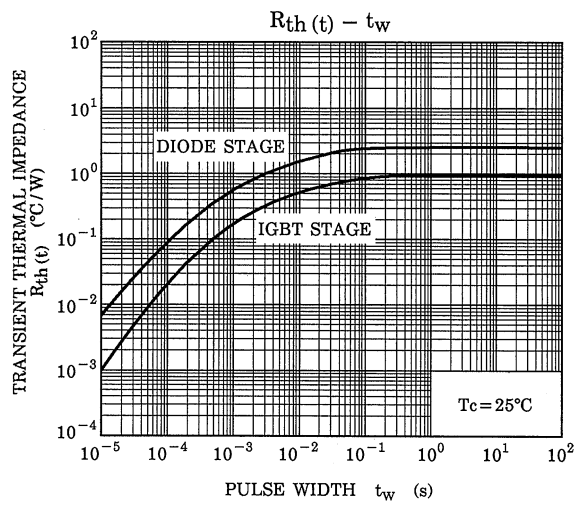
Switching loss measurement waveforms











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