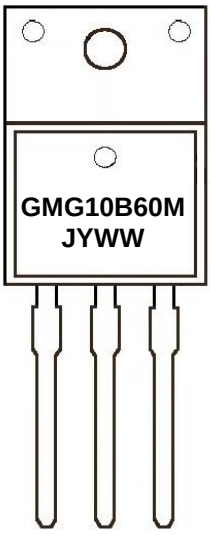
Features

- Trench Field Stop technology
- Low $V_{CE,SAT}$
- Fast Switching Characteristics
- Short Circuit Withstand Duration: 10μs
- Low Turnoff Voltage Spike
- Ultrafast Recovery Didoe embeded
- Low Forward Voltage
- Low Leakage Current

Applications

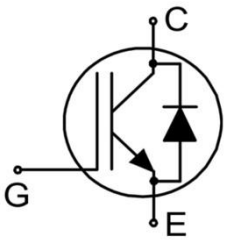
- Frequency Conversion Applicances
- Industrial Sewing Machine
- General PurposeFrequency Conversion

Marking Information and Pin Assignment (Top View)



Gate 1 2 3 Emitter

Collector



J: Assembly / Test Site Code
Y: Year
WW: Week

Order Information

Ordering Number	Package	Shipping
GMG10B60MTBF3T	TO-220F Full Pack	50 Units/Tube. 40 Tubes/Box, 4 Boxes/Carton

Absolute Maximum Ratings (Note 1)

SYMBOL	PARAMETER		RATINGS	UNITS
V_{CES}	Collector to Emitter Voltage		600	V
I_C (Note 2)	Collector Current	T_C = 25°C	20	A
		T_C = 100°C	10	
I_{CP} (Note 3)	Collector Pulse Current		30	A
I_{RBSOA} (Note 2)	RBSOA Current V_{CE}≤600V, T_J ≤ 150°C		30	A
I_F	Diode Forward Current	T_C = 25°C	20	A
		T_C = 100°C	10	
I_{FP}	Diode Pulse Current		30	A
V_{GE}	Gate-Emmiter Voltage		± 20	V
t_{SC}	Short Circuit Withstand Duration, V_{GE}=15V, V_{CC}=400V, T_J ≤ 150°C		10	μs
P_{TOT}	Power dissipation, T_C = 25°C		25	W
T_J	Maximum IGBT Junction Temperature		-55 ~ 150	°C
T_{stg}	Storage Temperature Range		-55 ~ 150	°C

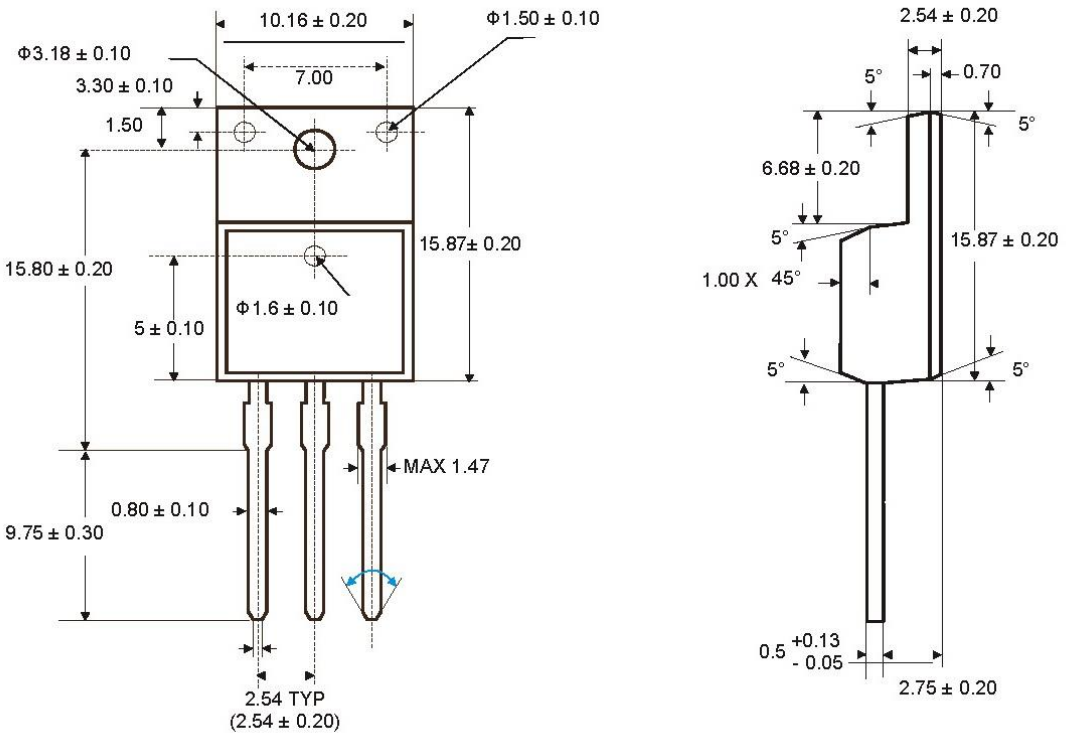
Note 1 Compliance to JESD-022
Note 2 Limitted by maximum temperature limit.
Note 3 Pulse width limited by maximum temperature limit
Note 3 Short Circuit < 1000 times, Short Circuit Interval: > 1s

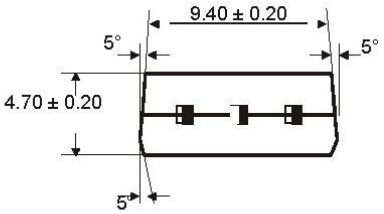
Electrical Characteristics (T_J = 25°C, unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Statistic Characteristic						
Collector to Emitter Breakdown Voltage	$V_{BR,CE}$	V_{GE}=0V, I_C=250μA	600			V
Collector to Emitter Saturation Voltage	$V_{CE,SAT}$	I_C=10A, V_{GE}=15V		1.8	2.2	V
		I_C=10A, V_{GE}=15V, T_J=150°C		2.3		
Diode Forward Voltage	V_F	V_{GE}=0V I_F=10A		1.4		V
		V_{GE}=0V I_F=10A, T_J=150°C		1.1		
Gate Threshold Voltage	V_{GE}	V_{CE}=V_{GE}, I_C=250μA	4.5	5.4	6.0	V
Collector Leakage Current	I_{CES}	V_{CE}=600V, V_{GE}=0V			0.1	mA
		V_{CE}=600V, V_{GE}=0V, T_J=150°C			1	
Gate Leakage Current	I_{GES}	V_{CE}=0V, V_{GE}=20V			200	nA
Transconductance	g_{FS}	V_{CE}=20V, I_C=10A		3.4		S
Dynamic Characteristic						
Input Capacitance	C_{ISS}	V_{CE}=25V, V_{GE}=0V, f=1MHz		611		pF
Output Capacitance	C_{OSS}			63		pF
Reverse Transfer Capacitance	C_{RES}			24		pF
Gate Charge	Q_G	V_{CC}=480V, I_C=10A, V_{GE}=15V		44		nC
Short Circuit Current	$I_{C(SC)}$	V_{GE}=15V, V_{CC}=400V, tsc≤10μs,		60		A
IGBT Switching Characteristic						
Turn ON Delay time	$t_{D(ON)}$	V_{CC}=400V, I_C=10A, V_{GE}=0/15V, R_G=10Ω, inductive load		7		ns
Rise Time	t_r			23		
Turn OFF delay time	$t_{D(OFF)}$			48		
Fall Time	t_f			79		
Turn ON Energy Loss	E_{ON}			0.15		mJ
Turn OFF Energy Loss	E_{OFF}			0.17		
Switching Energy Loss	E_{ts}			0.32		
Turn ON Delay time	$t_{D(ON)}$	V_{CC}=400V, I_C=10A, V_{GE}=0/15V, R_G=10Ω, inductive load, T_J=150°C		8		ns
Rise Time	t_r			26		
Turn OFF delay time	$t_{D(OFF)}$			67		
Fall Time	t_f			109		
Turn ON Energy Loss	E_{ON}			0.17		mJ
Turn OFF Energy Loss	E_{OFF}			0.24		
Switching Energy Loss	E_{ts}			0.41		
Diode Switching Characteristic						
Reverse Recovery Time	t_{rr}	V_R=400V, I_F=10A, di_F/dt = 300A/μs		47		ns
Reverse Recovery Charge	Q_{rr}			176		nC
Reverse Recovery Peak Current	I_{rrm}			7.5		A

Package Dimension – TO220F

Unit: mm





Unit: mm

Unit: mm

Ordering Number

GM	G	10B60M	TBF3	T
APM Gamma Micro	Product Category	Short Description	Package Type	Shipping Type
	Discrete IGBT	10: I_C = 10A 65: V_{CE} = 650V	TBF3: 3L TO220F Full Pack	T: Tube

Note:

Green products:

- Halogen free(Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight)