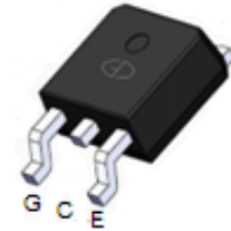


6A,650V Insulated Gate Bipolar Transistor

Features

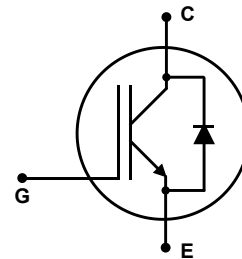
- Trench epi-Fs Technology
- High speed switching
- Low gate charge and $V_{CE(sat)}$
- High ruggedness, temperature stable behavior
- Maximum junction temperature 150°C



TO-252(D-PAK)

Applications

- Home Appliance Applications
- Fan, Pumps, Vacuum Cleaner
- Motor drives
- Other Hard Switching Applications



Absolute Maximum Ratings (@ $T_J=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Collector-Emitter Voltage	V_{CES}	650	V
Gate- Emitter Voltage	V_{GES}	± 30	V
Collector Current	I_C	12	A
Collector Current @ $T_C = 100^{\circ}\text{C}$		6	
Pulsed Collector Current, tp limited by T_{Jmax}	I_{Cpuls}	35	A
Diode Continuous Forward Current @ $T_C = 25^{\circ}\text{C}$	I_F	12	A
Diode Continuous Forward Current @ $T_C = 100^{\circ}\text{C}$		6	
Power Dissipation @ $T_C = 25^{\circ}\text{C}$	P_D	69	W
Power Dissipation @ $T_C = 100^{\circ}\text{C}$		28	
Operating Junction	T_J	-55 to +150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 to +150	$^{\circ}\text{C}$

Thermal Characteristics			
Parameter	Symbol	Max	Unit
Thermal Resistance ,Junction-to-Ambient	$R_{\theta JA}$	40	°C/W
Thermal Resistance Junction-to-Case for IGBT	$R_{\theta JC}$	1.8	°C/W
Thermal Resistance Junction-to-Case for Diode	$R_{\theta JC}$	2.2	°C/W

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Emitter Breakdown Voltage	V _{(BR)CES}	V _{GE} =0V, I _{CE} =1mA	650	--	--	V
Collector-Emitter Saturation Voltage	V _{CE(sat)}	I _C =6A, V _{GE} =15V	--	1.69	2.0	V
Gate Threshold Voltage	V _{GE(th)}	I _C =1mA, V _{CE} =5V	4.5	--	6.5	V
Collector-Emitter Leakage Current	I _{CES}	V _{GE} =0V, V _{CE} =650V	--	--	10	μA
Gate to Emitter Reverse Leakage	I _{GES}	V _{GE} =30V, V _{CE} =0V	--	--	100	nA
		V _{GE} =-30V, V _{CE} =0V	--	--	-100	
Input capacitance	C _{ies}	V _{GS} = 0V, V _{DS} = 25V f = 1MHz	--	258	--	pF
Output capacitance	C _{oes}		--	18	--	
Reverse transfer capacitance	C _{res}		--	5	--	
Turn-on delay time	t _{d(on)}	V _{CC} =400V, I _C =6A, V _{GE} =0/15V, R _g =10Ω	--	5	--	ns
Rise time	t _r		--	13	--	
Turn-Off delay time	t _{d(off)}		--	53	--	
Fall time	t _f		--	90	--	
Turn-On Switching Loss	E _{on}		--	0.19	--	mJ
Turn-Off Switching Loss	E _{off}		--	0.11	--	
Total Switching Loss	E _{ts}		--	0.3	--	
Total Gate Charge	Q _g	V _{CC} =520V, I _C =6A, V _{GE} =15V	--	10	--	nC
Gate to Emitter Charge	Q _{ge}		--	3	--	
Gate to Collector Charge	Q _{gc}		--	4	--	
Short circuit collector current Max.1000 short circuits Time between short circuits: ≥1.0s	I _{C(SC)}	V _{GE} =15V, V _{CC} ≤400V, t _{sc} ≤5μs	--	30	--	A

Electrical Characteristics of the Diode (@T_J=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Diode Forward Voltage	V _{FM}	I _F =6A	--	1.92	2.3	V
Reverse Recovery Time	t _{rr}	I _F =6A, V _R =400V V _{GE} =0.0/15.0V	--	70	--	ns
Reverse Recovery Charge	Q _{rr}		--	0.32	--	μC
Diode Peak Reverse Recovery Current	I _{RRM}		--	8	--	A

Ratings and Characteristics Curves

($T_A = 25^\circ\text{C}$ unless otherwise noted)

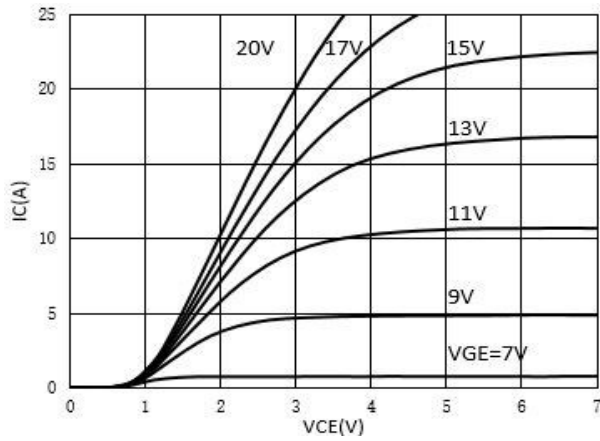


Figure1. Typical Output Characteristics

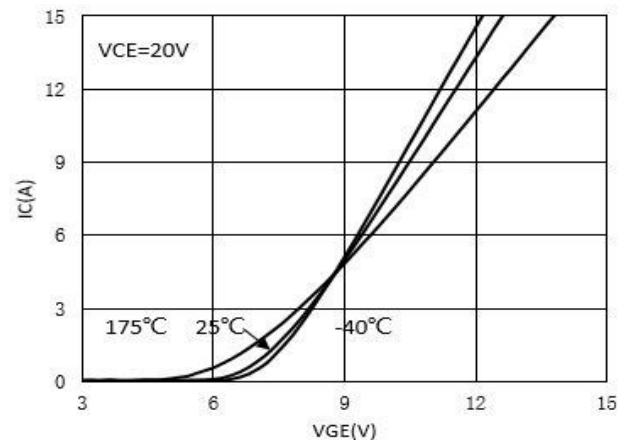


Figure2. Typical Transfer Characteristics

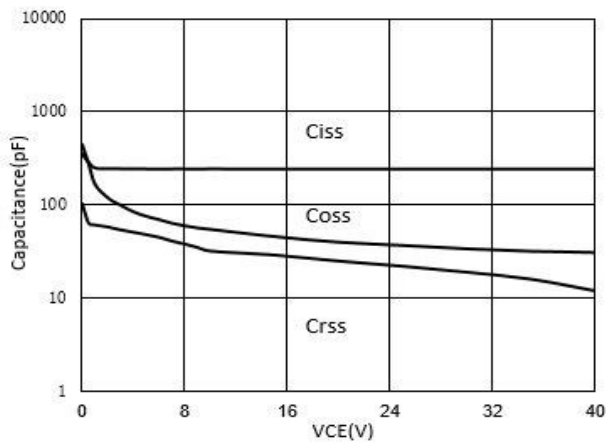


Figure3. Typical Capacitance

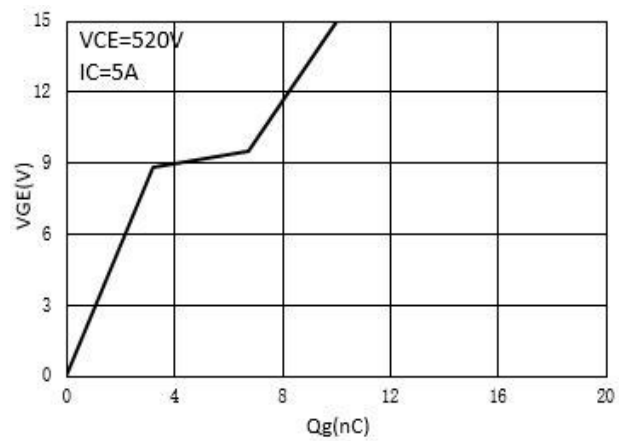


Figure4. Typical Gate Charge

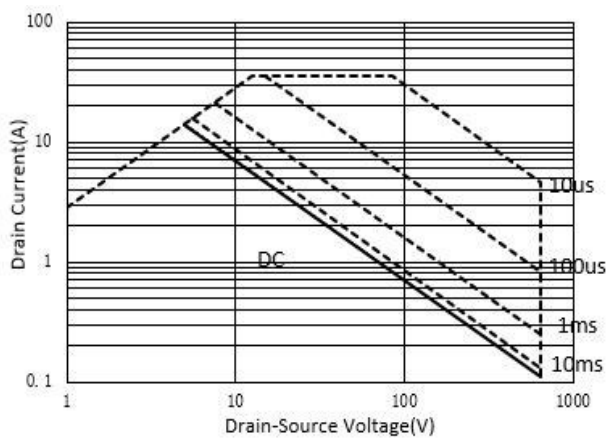


Figure5. Forward Bias Safe Operating Area

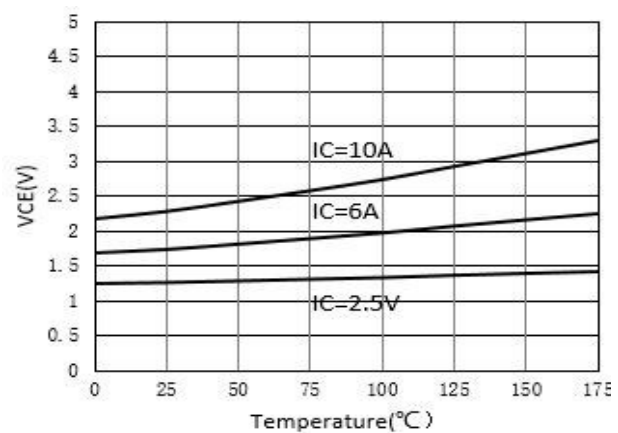


Figure6. Collector-Emitter Saturation Voltage vs. Temperature

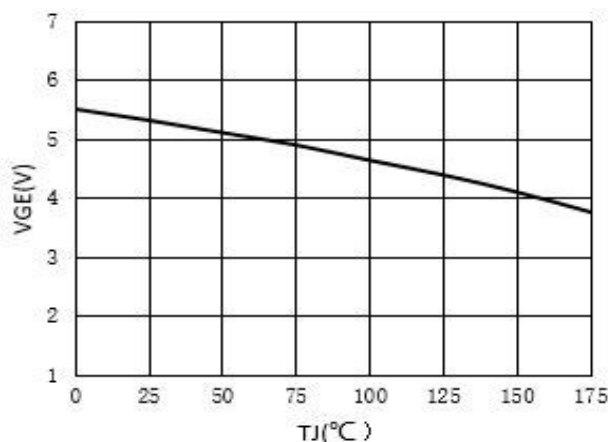


Figure7. Gate Threshold Voltage vs. Temperature

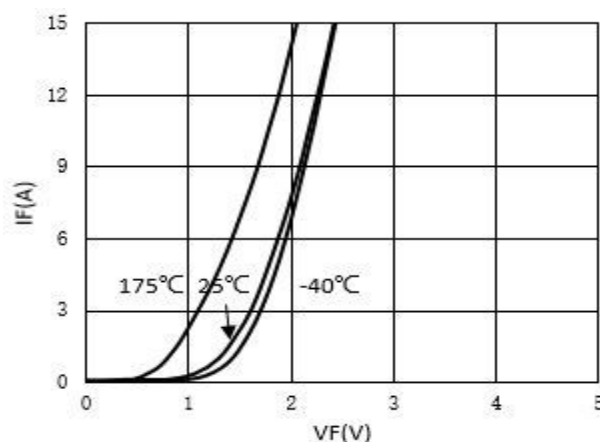


Figure8. Diode Characteristic

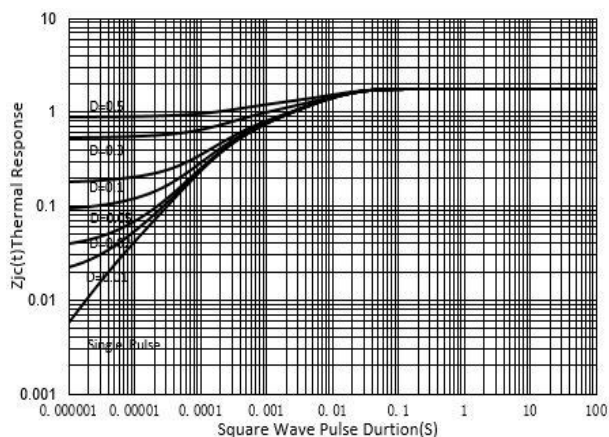


Figure9. IGBT transient thermal resistance ($D = t_p/T$)

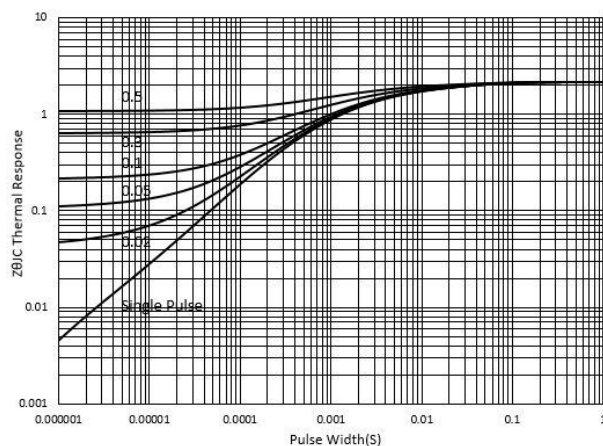


Figure10. Diode transient thermal impedance as a function of pulse width ($D = t_p/T$)

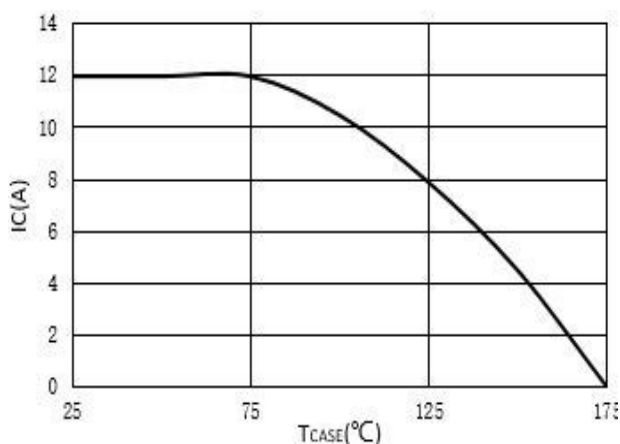


Figure11. Current De-rating

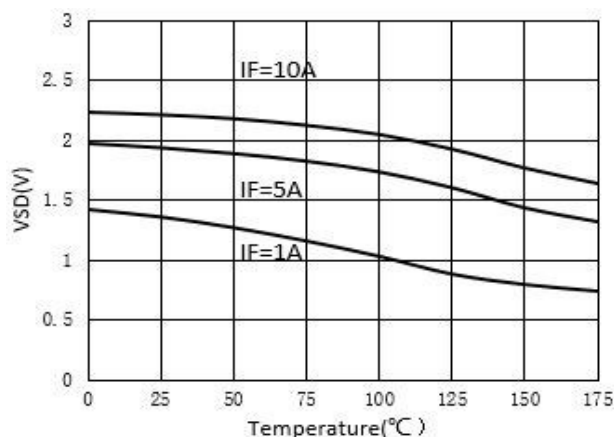
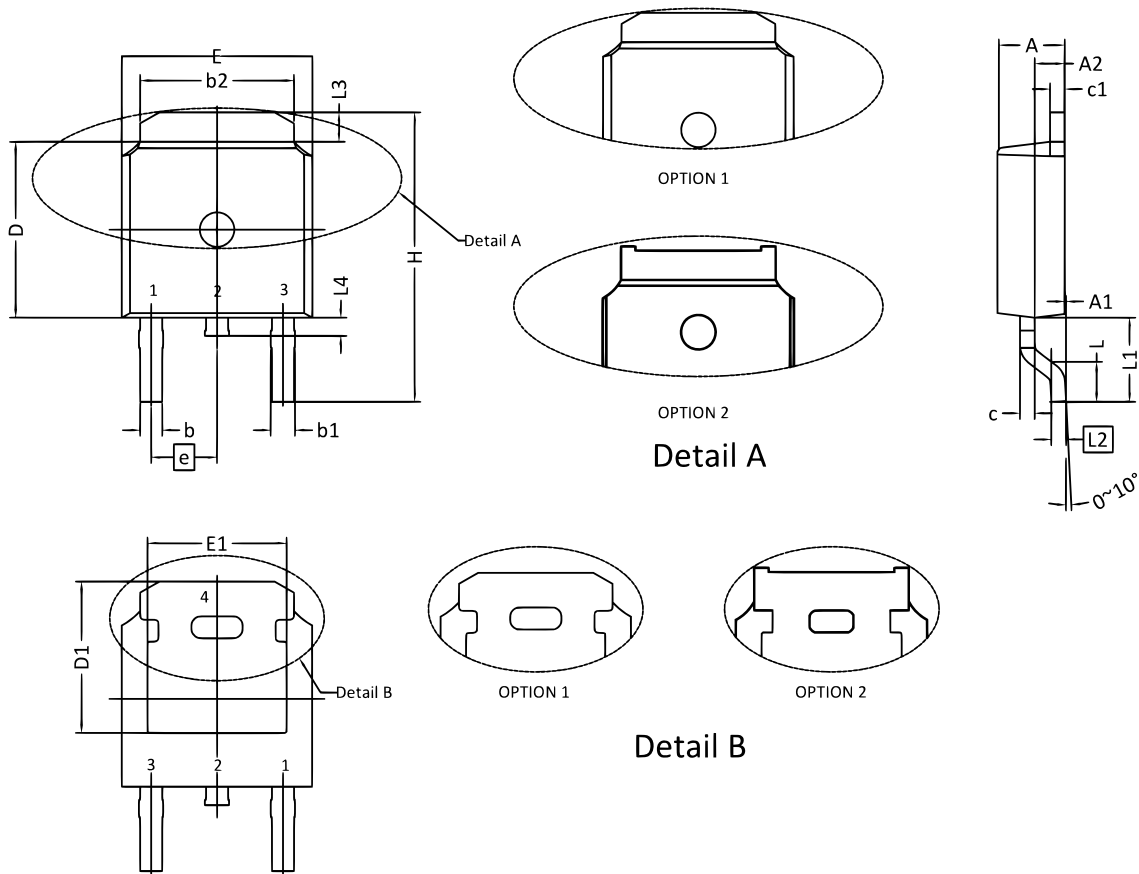


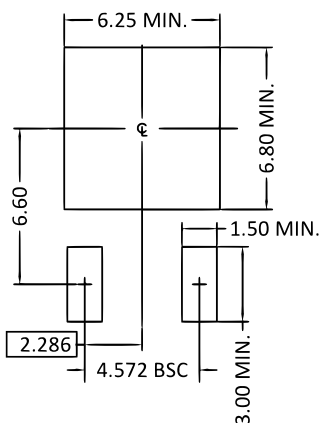
Figure12. Diode Forward Voltage vs. Junction

Package Outline Dimensions (Unit: millimeters)

TO-252



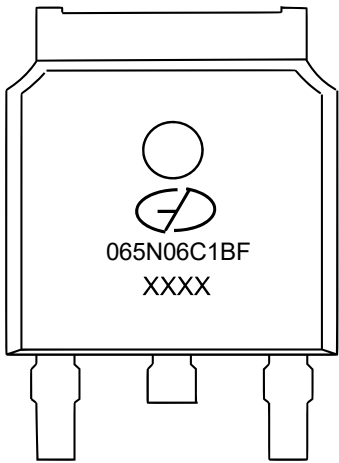
RECOMMENDED LAND PATTERN



UNIT: mm

SYMBOLS	DIMENSION IN MM			DIMENSION IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	2.184	2.286	2.400	0.086	0.090	0.094
A1	0.000	---	0.200	0.000	---	0.008
A2	0.889	1.041	1.170	0.035	0.041	0.046
b	0.635	0.762	0.889	0.025	0.030	0.035
b1	0.680	0.840	1.143	0.027	0.033	0.045
b2	4.953	5.340	5.500	0.195	0.210	0.217
c	0.450	0.508	0.610	0.018	0.020	0.024
c1	0.450	0.508	0.630	0.018	0.020	0.025
D	5.969	6.096	6.223	0.235	0.240	0.245
D1	5.210	5.249	5.380	0.205	0.207	0.212
E	6.350	6.604	6.800	0.250	0.260	0.268
E1	4.318	4.826	4.920	0.170	0.190	0.194
e	2.286 BSC			0.090 BSC		
e1	4.572 BSC			0.180 BSC		
H	9.398	10.033	10.500	0.370	0.395	0.413
L	1.270	1.520	2.032	0.050	0.060	0.080
L1	2.921 REF.			0.115 REF.		
L2	0.408	0.508	0.608	0.016	0.020	0.024
L3	0.889	1.016	1.270	0.035	0.040	0.050
L4	0.600	---	1.016	0.024	---	0.040

Marking Outline



Part Name: GIT065N06C1BF

1. Logo Mark: 
2. P/N Mark: 065N06C1BF
3. Date Code: XXXX

Revision History

Version	Date	Major Changes
Rev.A	2024.02.14	Official Release

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