

# BRGB40N65AHA

Rev.A Jan.-2026

## / Descriptions

TO-247

Insulated-Gate Bipolar Transistor in a TO-247 Plastic Package.

## / Features

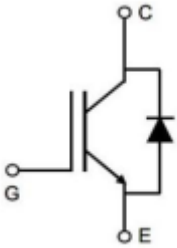
650V 40A

$V_{CE(SAT)} = 1.30V(\text{typ.}) @ V_{GE} = 15V, I_C = 40A$

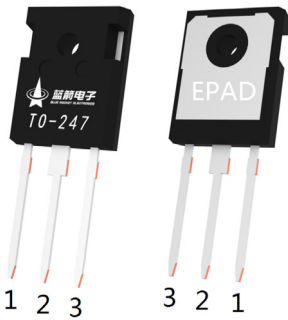
## / Applications

Motor driver, Uninterrupted Power Supply, , Portable power station.

## / Equivalent Circuit



## / Pinning



PIN1 G      PIN 2 EPAD C      PIN 3 E

## / Marking

See Marking Instructions.

/ Absolute Maximum Ratings( $T_a=25$ )

Parameter	Symbol	Rating	Unit	
Collector-Emitter Voltage	$V_{CES}$	650	V	
Gate-Emitter Voltage	$V_{GES}$	$\pm 30$	V	
Continuous Collector Current	$I_C$	$T_C=25$	80	A
		$T_C=100$	40	A
Pulsed Collector Current , Limited by $T_{Jmax}$	$I_{CM}$	160	A	
Continuous Diode Forward Current	$I_F$	$T_C=25$	80	A
		$T_C=100$	40	A
Diode Repetitive Peak Forward Current	$I_{FRM}$	160	A	
Short circuit withstand time	$t_{sc}$	9	$\mu s$	
Power Dissipation	$P_D$	395	W	
Storage Temperature Range	$T_{STG}$	-55 to +175		
Maximum Temperature for Soldering	$T_L$	260		
Maximum Junction-to-Ambient	$R_{JA}$	40	/W	
Maximum IGBT Junction-to-Case	$R_{JC}$	0.38	/W	

/ Electrical Characteristics( $T_c=25$ )

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Emitter Breakdown Voltage	$BV_{CES}$	$I_C=1mA$ $V_{GE}=0V$	650			V
Zero Gate Voltage Collector current	$I_{CES}$	$V_{CE}=650V$ , $V_{GE}=0V$			10	$\mu A$
Gate-Emitter Leakage Current	$I_{GES}$	$V_{CE}=0V$ , $V_{GE}=\pm 20V$			$\pm 200$	nA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=0V$ , $I_C=1mA$	4.3	5.3	6.3	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V$ , $I_C=40A$	$T_J=25$	1.30	1.60	V
			$T_J=125$	1.50		
			$T_J=175$	1.68		
Total Gate Charge	$Q_g$	$V_{GE}=15V$ , $V_{CC}=520V$ $I_C=40A$		320		nC
Gate to Emitter Charge	$Q_{ge}$			30		
Gate to Collector Charge	$Q_{gc}$			35		

## / Electrical Characteristics(Ta=25 )

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
Turn-On Delay Time	$t_{d(on)}$	$V_{GE}=15V,$ $V_{CE}=400V$ $I_C=40A,$ $R_G=5$ Inductive Load	$T_C=25$		32	ns	
			$T_C=175$		30		
Turn-On Rise Time	$t_r$		$T_C=25$		25	ns	
			$T_C=175$		27		
Turn-Off Delay Time	$t_{d(off)}$		$T_C=25$		187	ns	
			$T_C=175$		202		
Turn-Off Fall Time	$t_f$		$T_C=25$		15	ns	
			$T_C=175$		18		
Turn-On Energy	$E_{on}$		$T_C=25$		0.95	mJ	
			$T_C=175$		1.45		
Turn-Off Energy	$E_{off}$	$T_C=25$		0.65	mJ		
		$T_C=175$		1.20			
Total Switching Energy	$E_{ts}$	$T_C=25$		1.60	mJ		
		$T_C=175$		2.65			
Input Capacitance	$C_{ies}$	$V_{GE}=0V,$ $V_{CE}=25V$ $f=1MHz$		5660		pF	
Output Capacitance	$C_{oes}$			260		pF	
Reverse Transfer Capacitance	$C_{res}$			154		pF	
Diode Forward Voltage	$V_F$	$I_F=40A$	$T_J=25$		1.30	1.60	V
			$T_J=150$		1.18		
			$T_C=175$		1.10		
Diode Reverse Recovery Time	$T_{rr}$	$V_R=400V,$ $I_F=40A$ $di_F/dt=200A/us$ $T_C=25$		140		ns	
Diode Reverse Recovery Charge	$Q_{rr}$			580		nC	
Diode Peak Reverse Recovery Current	$I_{rm}$			6		A	

/ Electrical Characteristic Curve

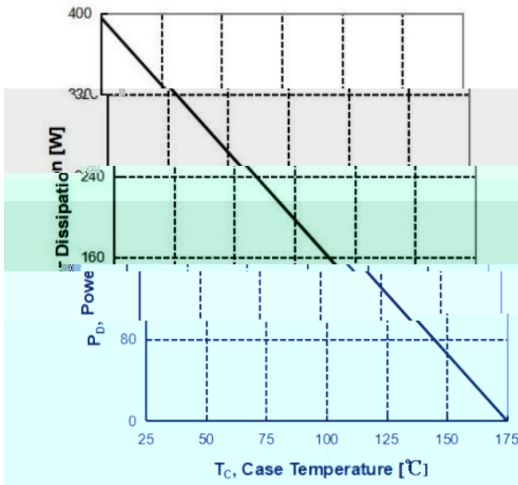


Fig. 1 TYP. Power Dissipation

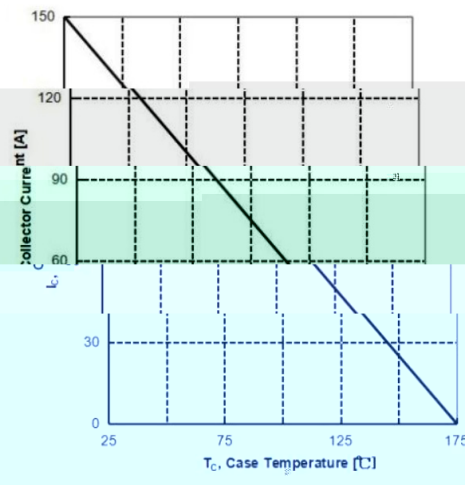


Fig. 2 Collector Current vs. Case Temperature

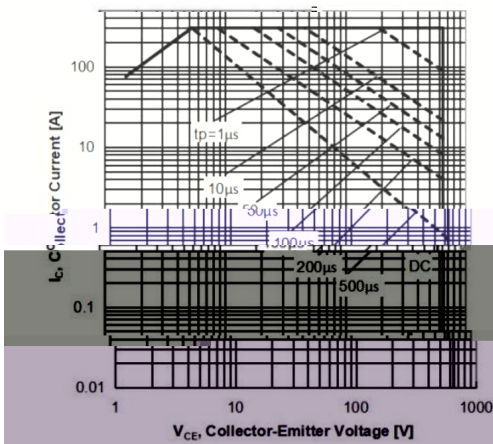


Fig. 3 Safe Operation Area

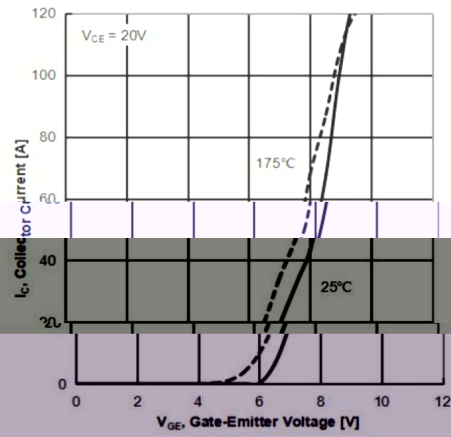


Fig. 4 TYP. Transfer Characteristics

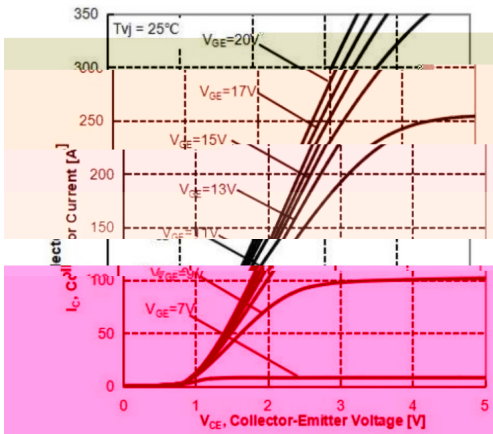


Fig. 5 TYP. Output Characteristics

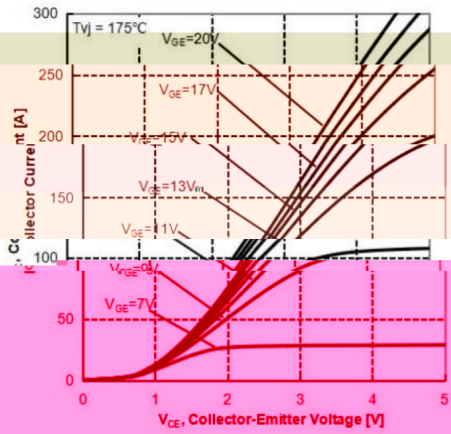


Fig. 6 Output Characteristics

## / Electrical Characteristic Curve

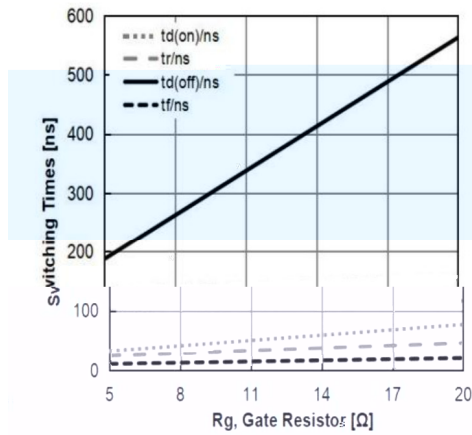
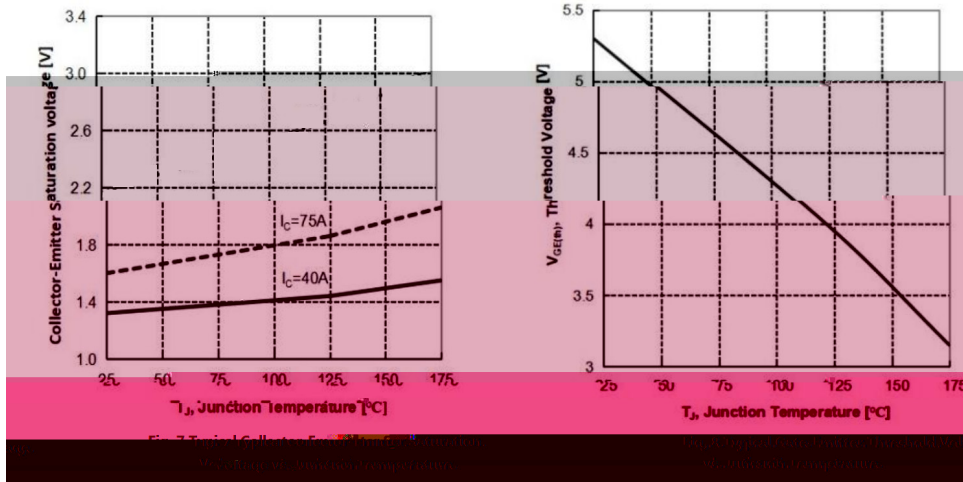


Fig. 9 TYP. Switching Times vs. Gate Resistor  
 ( $T_J = 25^\circ C, V_{CE} = 400V, V_{GE} = 15V, I_C = 40A$ )

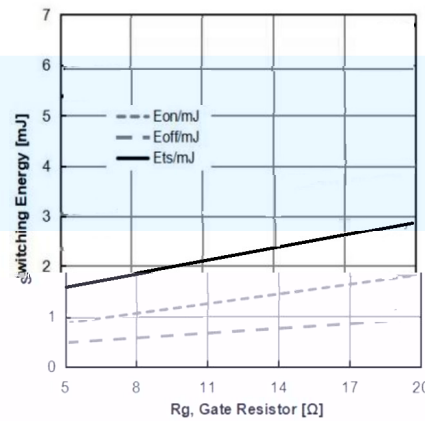


Fig. 10 TYP. Switching Energy vs. Gate Resistor  
 ( $T_J = 25^\circ C, V_{CE} = 400V, V_{GE} = 15V, I_C = 40A$ )

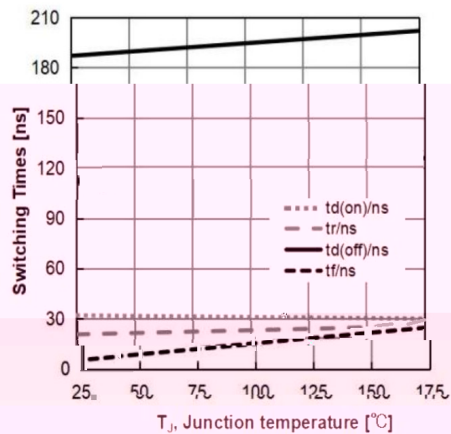


Fig. 11 TYP. Switching Times vs. Junction Temperature  
 ( $V_{CE} = 400V, V_{GE} = 15V, I_C = 40A, R_g = 5\Omega$ )

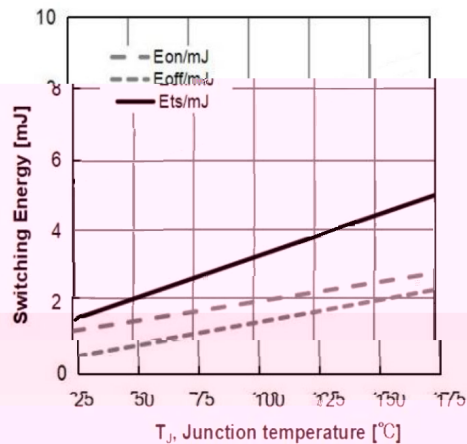
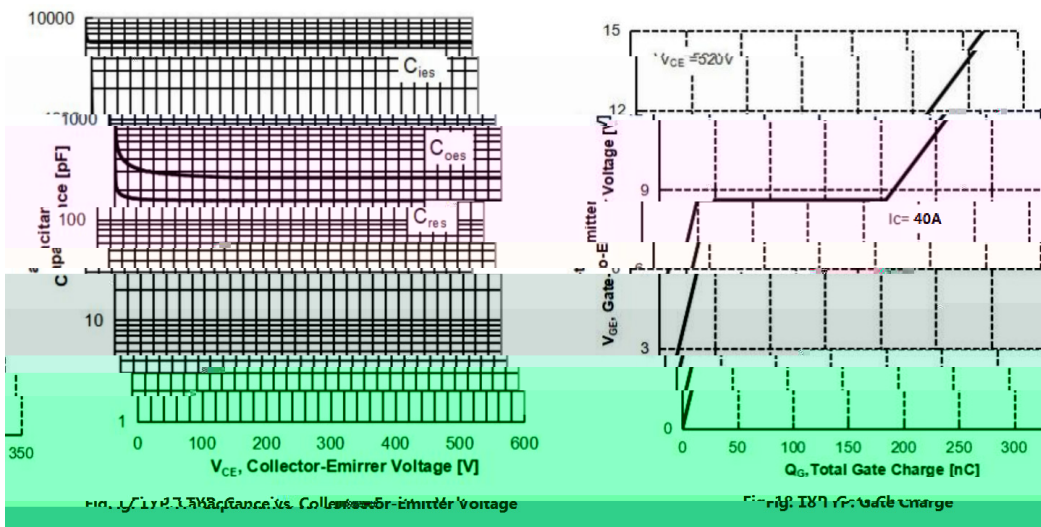
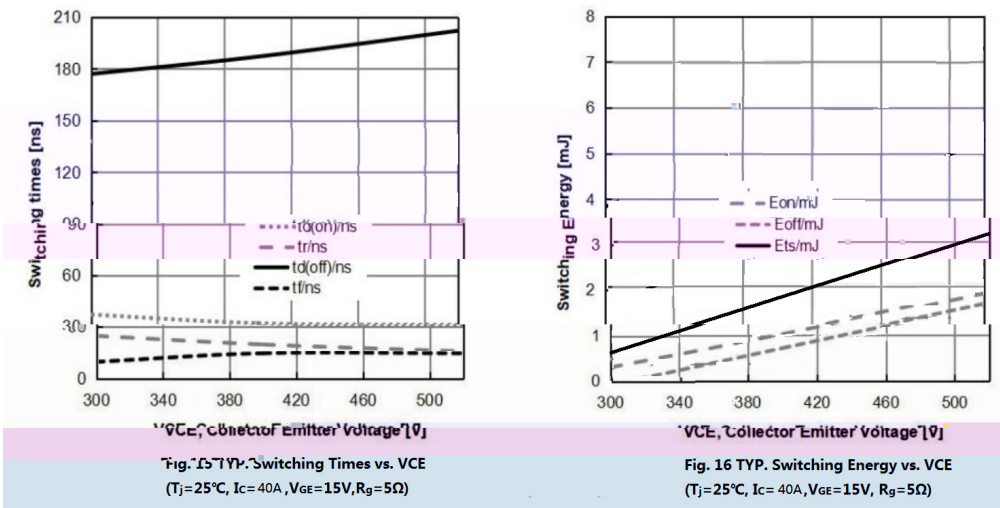
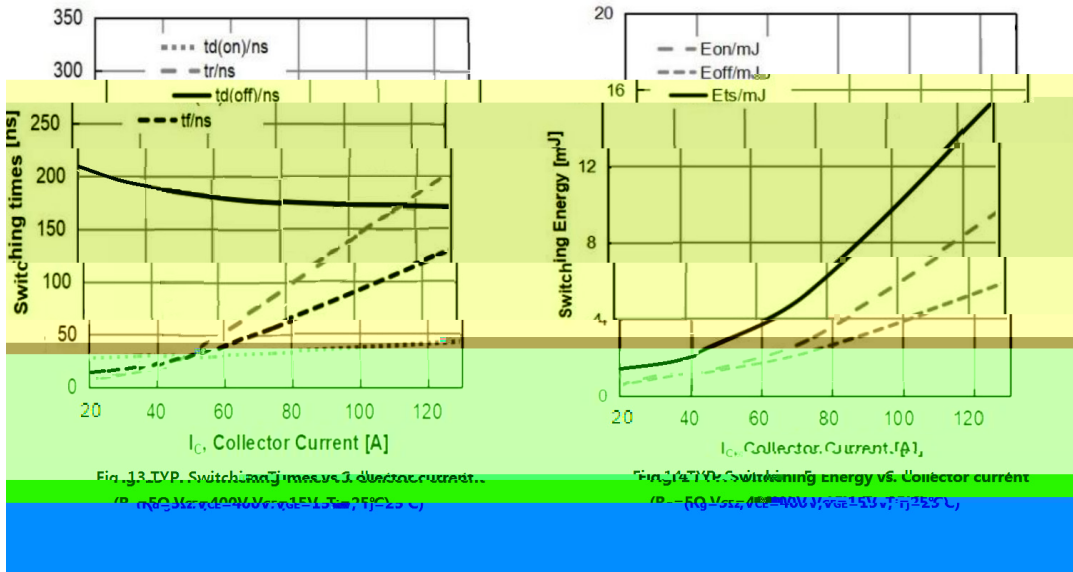
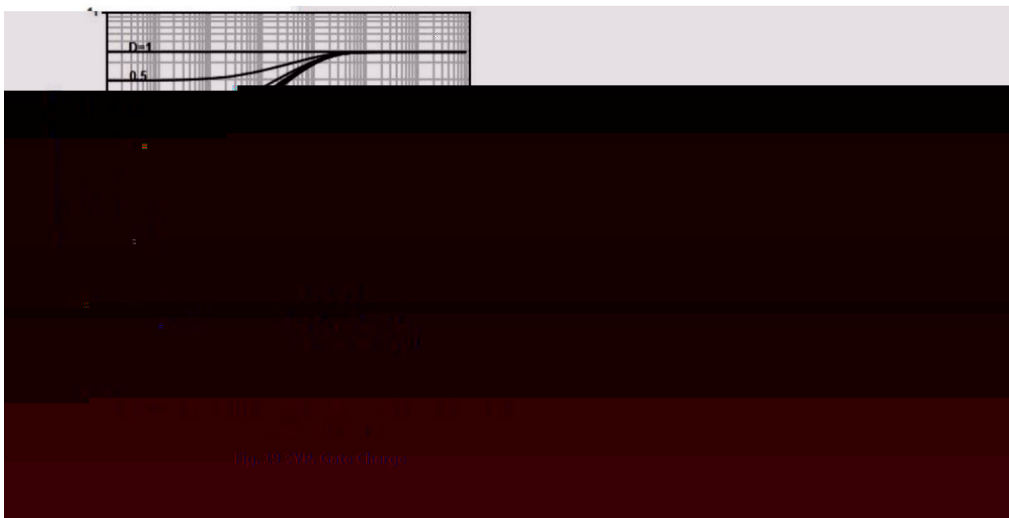


Fig. 12 TYP. Switching Energy vs. Junction Temperature  
 ( $V_{CE} = 400V, V_{GE} = 15V, I_C = 40A, R_g = 5\Omega$ )

/ Electrical Characteristic Curve



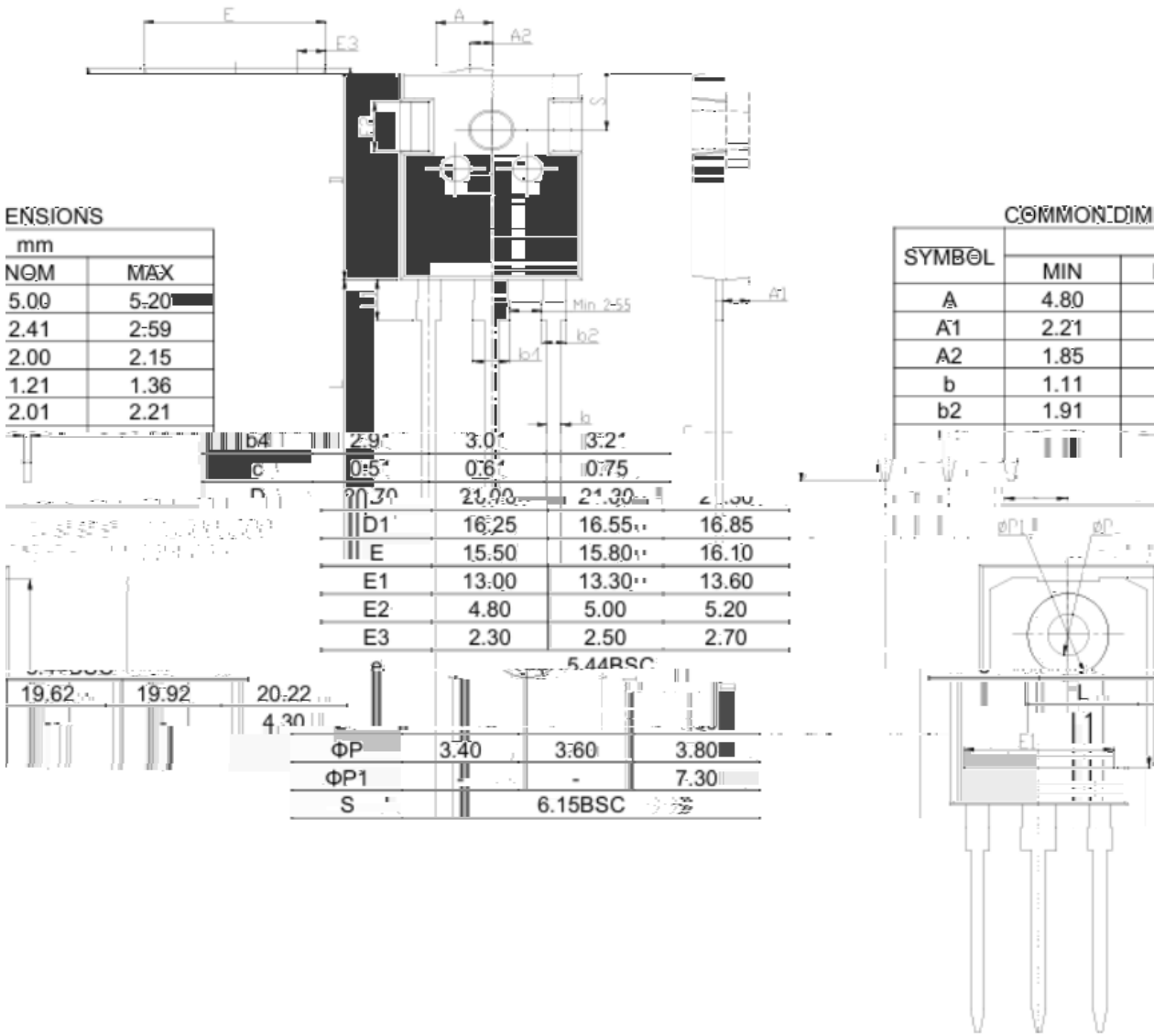
## / Electrical Characteristic Curve



# BRGB40N65AHA

Rev.A Jan.-2026

## / Package Dimensions



## / Marking Instructions



BR

GB40N 65A HA

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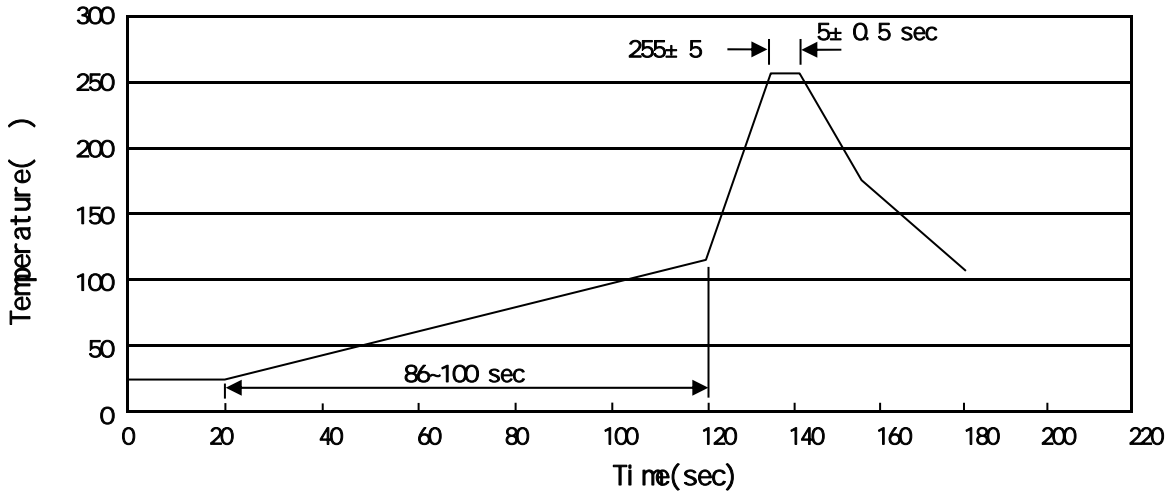
Note:

BR: Company Code

GB40N65AHA: Product Type Code

\*\*\*\*: Lot No. Code, code change with Lot No.

( ) / Temperature Profile for Dip Soldering(Pb-Free)



Note:

- |   |          |             |  |
|---|----------|-------------|--|
| 1 | 25 ~ 150 | 60 ~ 90sec; | 1. Preheating: 25~150 , Time: 60~90sec.    |
| 2 | 255±5    | 5±0.5sec;   | 2. Peak Temp.: 255±5 , Duration: 5±0.5sec. |
| 3 | 2 ~ 10   | /sec.       | 3. Cooling Speed: 2~10 /sec.               |

/ Resistance to Soldering Heat Test Conditions

270±5                      10±1 sec.                      Temp.: 270±5                      Time: 10±1 sec

/ Packaging SPEC.

/ TUBE

Package Type	Units					Dimension (unit mm <sup>3</sup> )		
	Units/Tube	Tubes/Inner Box	Units/Inner Box	Inner Boxes/Outer Box	Units/Outer Box	Tube	Inner Box	Outer Box
TO-247	30	15	450	5	2250	520×44×6	580×158×55	595 300 178

/ Notices

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