

5 é / Descriptions

:5 .> / / x Õ € I E , ≥ } íoû Insulated-Gate Bipolar Transistor in a TO-247 Plastic Package.

□^a / Features

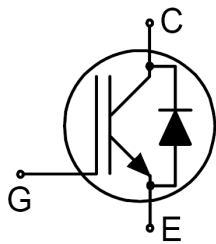
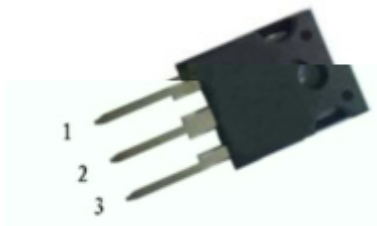
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Low gate charge,, Low saturation voltage ,Positive temperature coefficient, RoHS product.

Đ ÷ / Applications

" J òòù J » òòù MCăòù ç ðòù

General purpose inverter, Frequency converters, Induction Heating(IH), Uninterrupted Power Supply(UPS).

Ã W] Ô · / Equivalent Circuit**• Û - æ / Pinning**

PIN1 yGate PIN 2 yCollector PIN 3 yEmitter

Z Ü B , M V / h_{FE} Classifications & Marking

- ~ ™ ¢òù See Marking Instructions.

Table 1 / Absolute Maximum Ratings(Ta=25℃ ;)

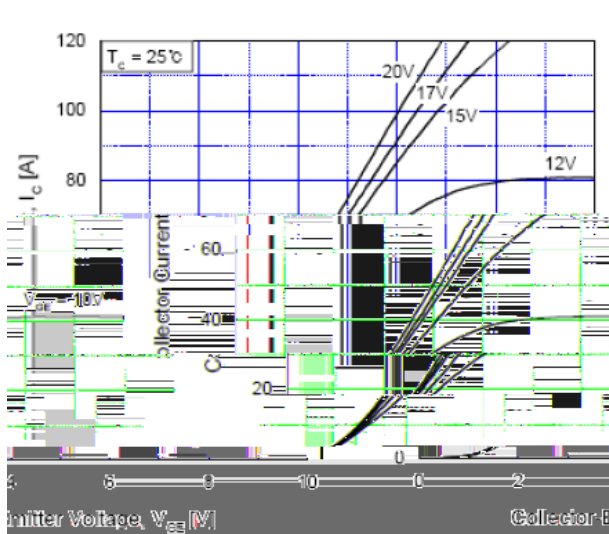
Parameter	Symbol	Rating	Unit
Collector-emitter voltage	V_{CES}	1200	V
Gate-emitter voltage	V_{GES}	±20	V
Short circuit withstand time	T_{SC}	10	s
Collector current	I_C	30	A
Collector current@ $T_C=100$		15	A
Collector peak current, T_P limited by T_{JMAX}	I_{CM}	45	A
Diode forward current@ $T_C=100$	I_F	15	A
Diode maximum forward current	I_{FM}	45	A
Power dissipation($T_C=25℃$)	P_D	150	W
Operating junction and storage temperature range	T_J, T_{stg}	-55 ~ 150	
Maximum temperature for soldering	T_L	300	
IGBT thermal resistance,junction-case	$R_{th(j-c)}$	0.63	/W
Diode thermal resistance,junction-case	$R_{th(j-c)}$	2.88	/W
Thermal resistance,junction-ambient	$R_{th(j-a)}$	40	/W

Electrical Characteristics(Ta=25 ;)

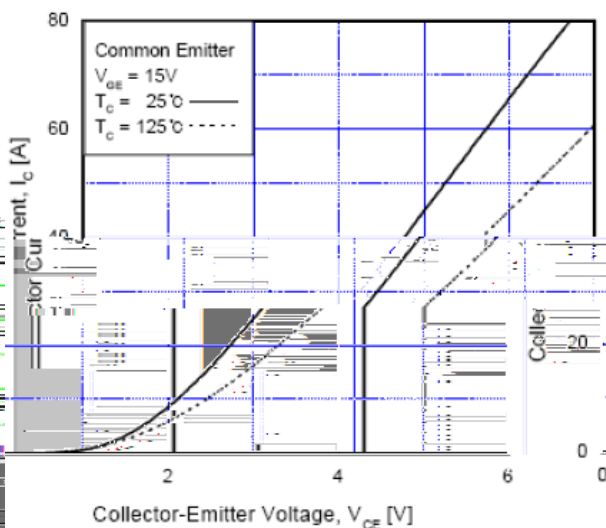
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-emitter breakdown voltage	V_{CES}	$V_{GE}=0V; I_{CE}=500\mu A$	1200	-	-	V
Breakdown Voltage Temperature Coefficient	$\frac{BV_{CES}}{T_J}$	$I_{CE}=1mA$;reference to 25		0.6		V/
Zero gate voltage Collector current	I_{CES}	$V_{GE}=0V; V_{CE}=1200V$ $T_C=25$	-	-	0.2	mA
		$T_C=100$			2	mA
		$T_C=150$			2.5	mA
Gate-body leakage current	I_{GES}	$V_{GE}=\pm 20V; V_{CE}=0V$	-	-	± 100	nA
Gate threshold voltage	$V_{GE(th)}$	$I_C=600 - A; V_{CE}=V_{GE}$	4.5		6.5	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=15A; V_{GE}=15V$ $T_C=25$	-	2	2.5	V
		$T_C=100$		2.2		V
		$T_C=150$		2.3		V
Forward Transconductance	g_{fs}	$V_{CE}=20V; I_C=15A$		10		S
Short Collector current	$I_{C(SC)}$	$V_{GE}=15V; V_{CE}=600V;$ $t_{sc} \leq 10s; T_C=25$		90		A
Input capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V, f=1MHz$	-	1330	2000	pF
Output capacitance	C_{oes}		-	128	200	
Reverse transfer capacitance	C_{res}		-	88	140	

@ É Parameter	Ö Z Symbol	y ° / ^ Test Conditions	¬ 4 ð Min	i f ð Typ	¬ > ð Max	% y Unit
Turn-on delay time	$t_{d(ON)}$	$V_{CE}=600V \quad I_C=15A$ $R_G=56 \quad T_C=25$	-	70	-	ns
Rise time	t_r		-	150	-	
Turn-off delay time	$t_{d(OFF)}$		-	300	-	
Fall time	t_f		-	80	-	
Turn-On Switching Loss	E_{on}	$V_{CE}=600V \quad I_C=15A$ $V_{GE}=15V$	-	2.3	-	mJ
Turn-Off Switching Loss	E_{off}		-	1.3	-	
Total Switching Loss	E_{ts}		-	3.6	-	
Total gate charge	Q_G	$V_{CE}=600V \quad I_C=15A$ $V_{GE}=15V$	-	130	180	nC
Gate-emitter charge	Q_{G-E}		-	15	22	
Gate-collector charge	Q_{G-C}		-	50	65	
Diode forward voltage	V					

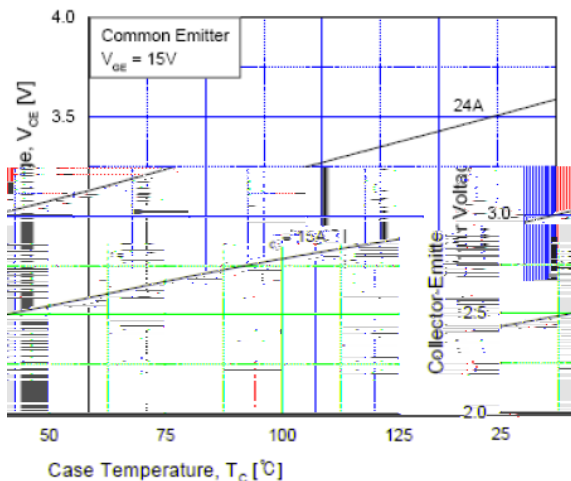
Electrical Characteristic Curve



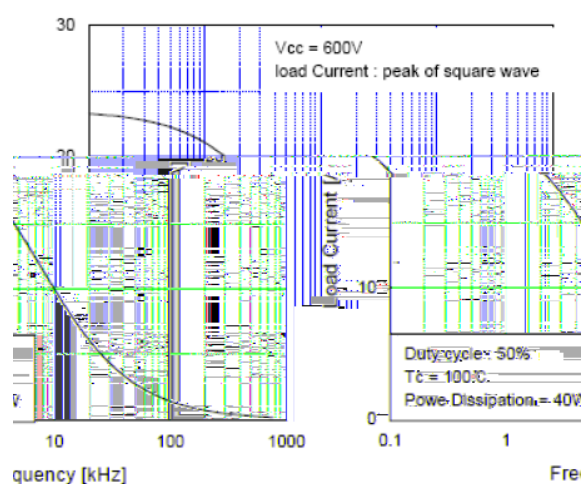
1. Typical Output Characteristics



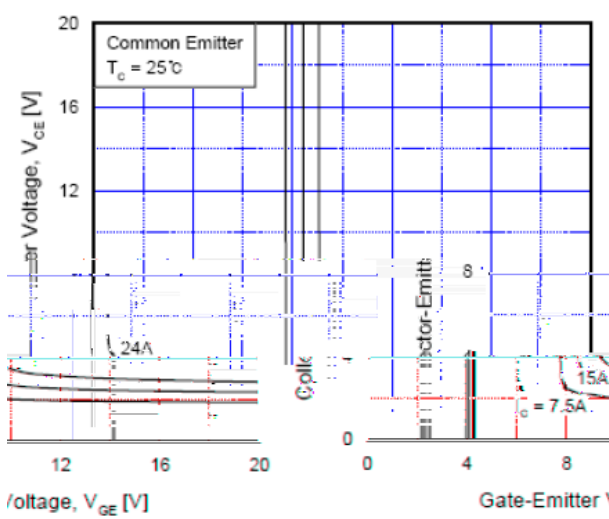
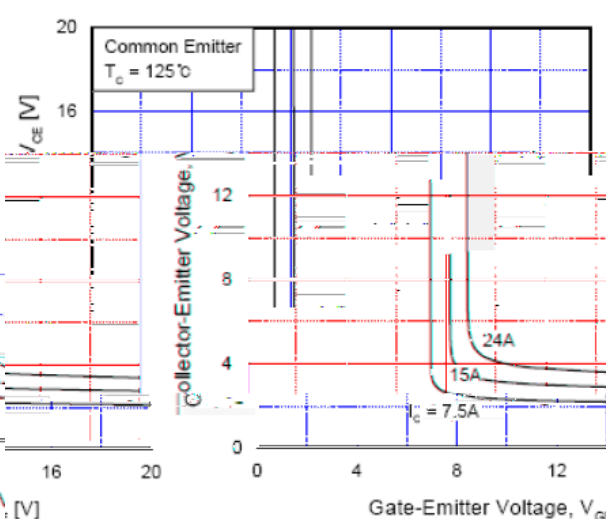
2. Typical Saturation Voltage Characteristics



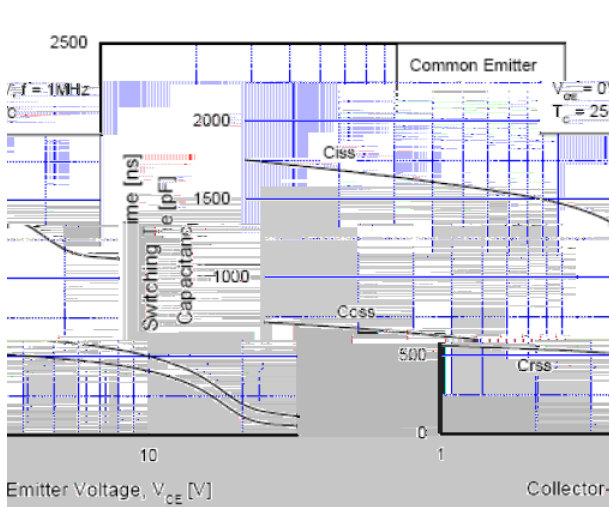
3. Saturation Voltage vs. Case Temperature at Variant Current Level



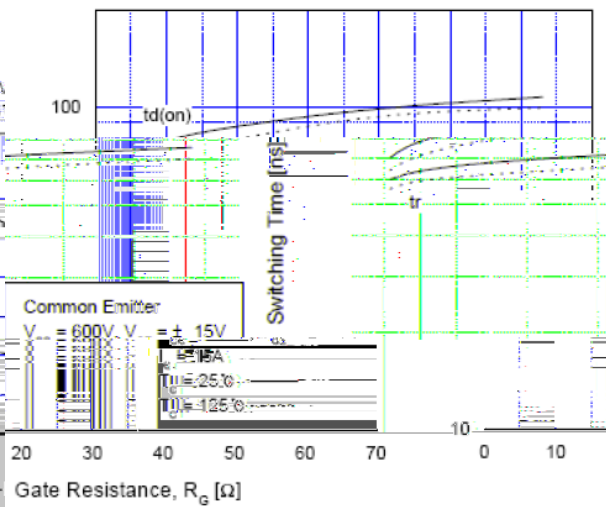
4. Load Current vs. Frequency

5. Saturation Voltage vs. V_{GE} 6. Saturation Voltage vs. V_{GE}

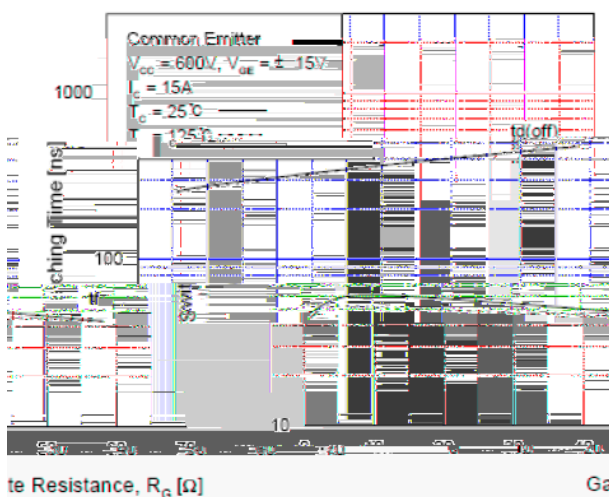
Electrical Characteristic Curve



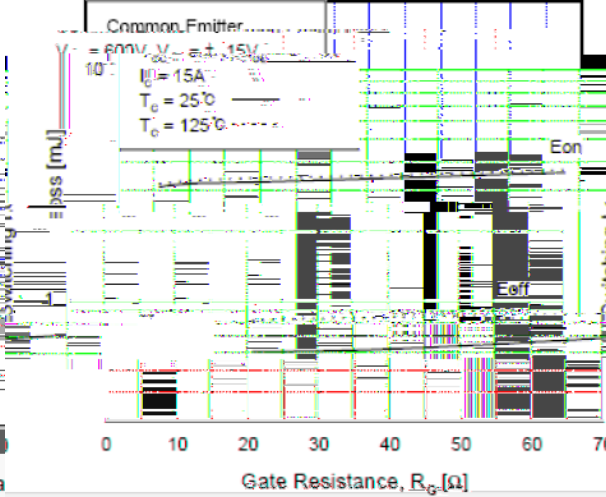
7. Capacitance Characteristics



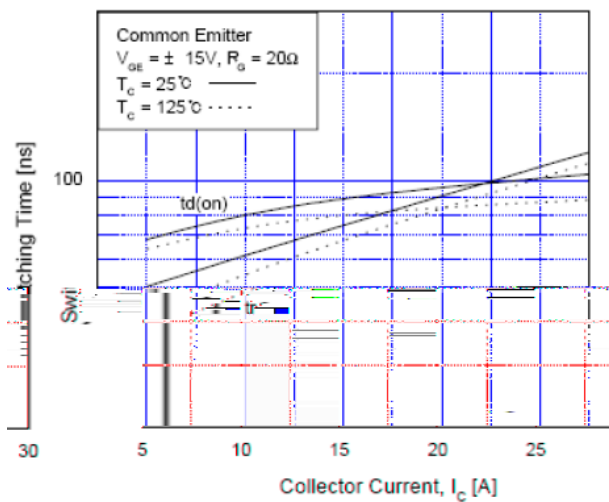
8. Turn-On Characteristics vs. Gate Resistance



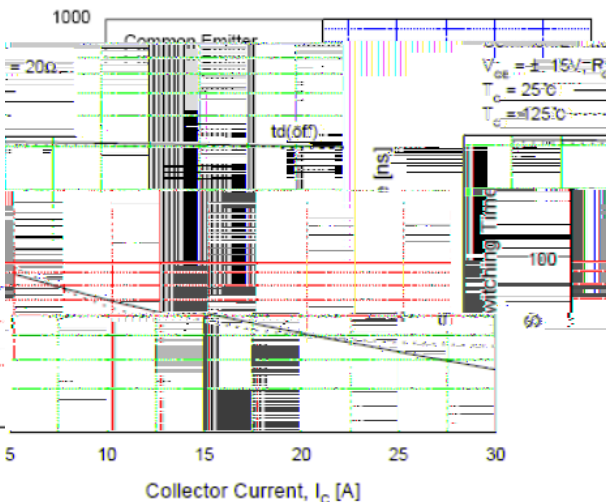
9. Turn-Off Characteristics vs. Gate Resistance



10. Switching Loss vs. Gate Resistance

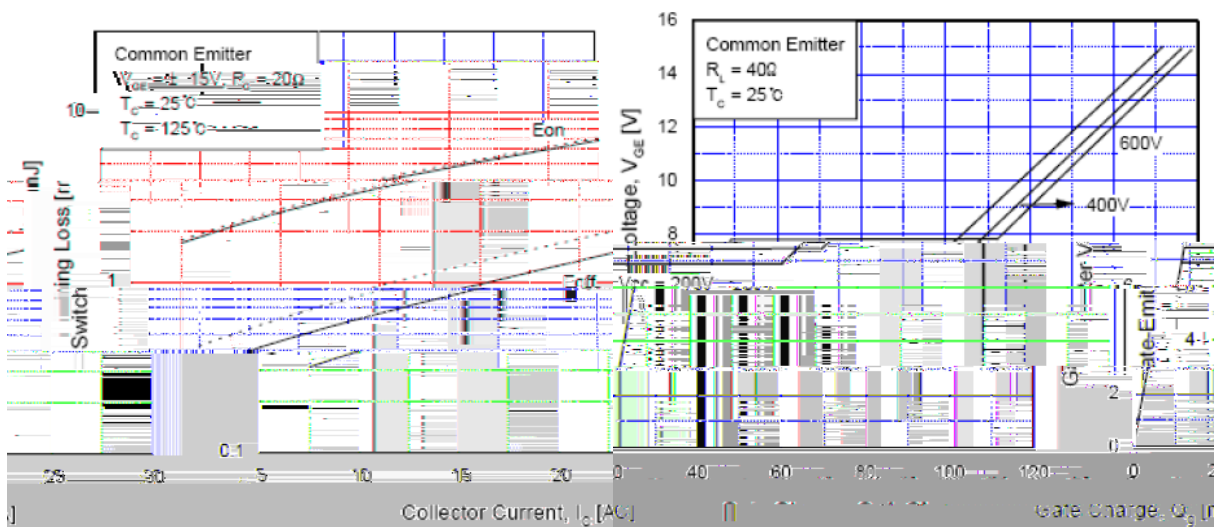


11. Turn-On Characteristics vs. Collector Current



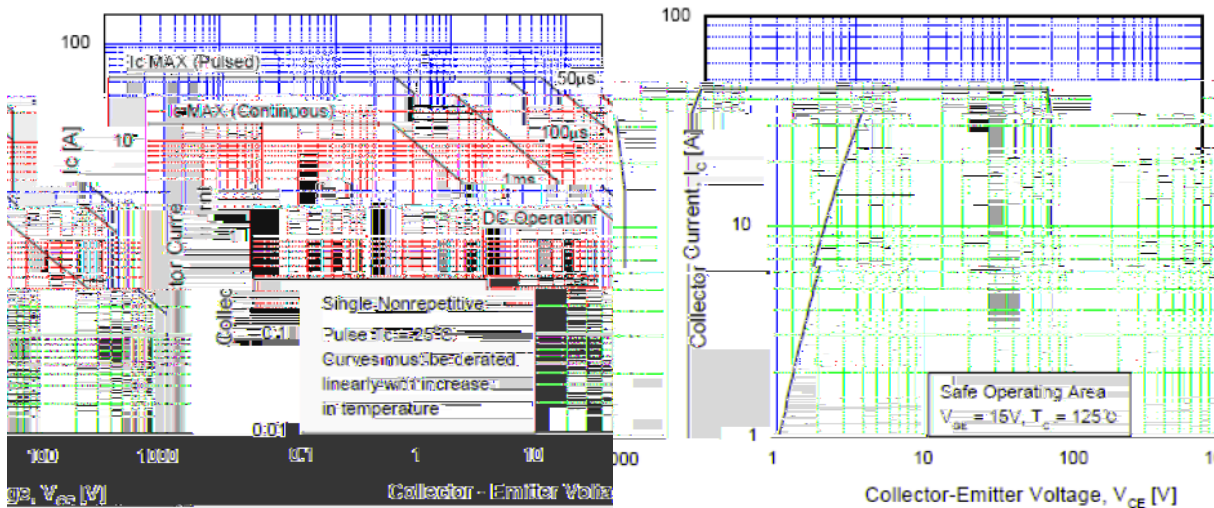
12. Turn-Off Characteristics vs. Collector Current

Electrical Characteristic Curve



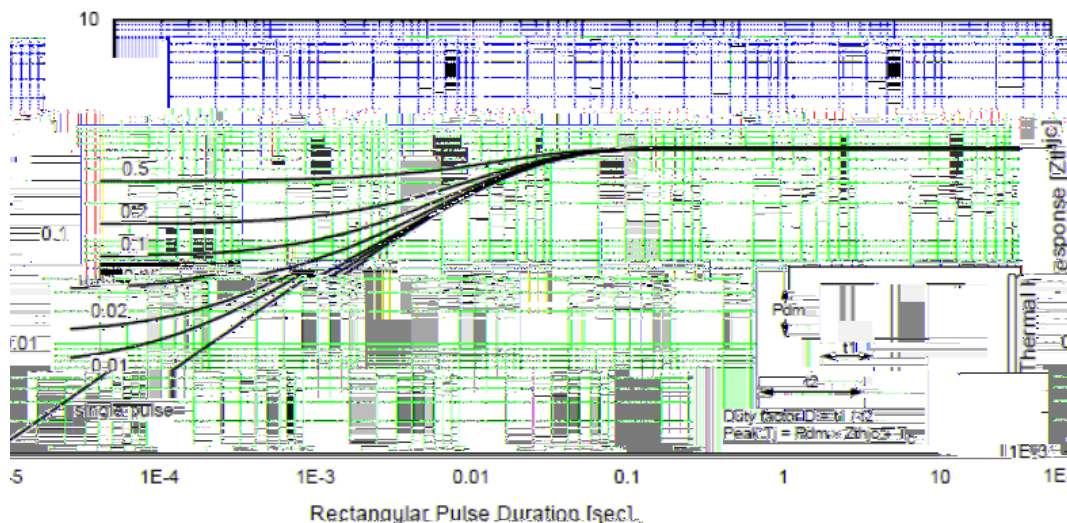
13.Switching Loss vs. Collector Current

14.Gate Charge Characteristics



15.SOA Characteristics

16.Turn-Off SOA



17.Transient Thermal Impedance

BRGH15N120D

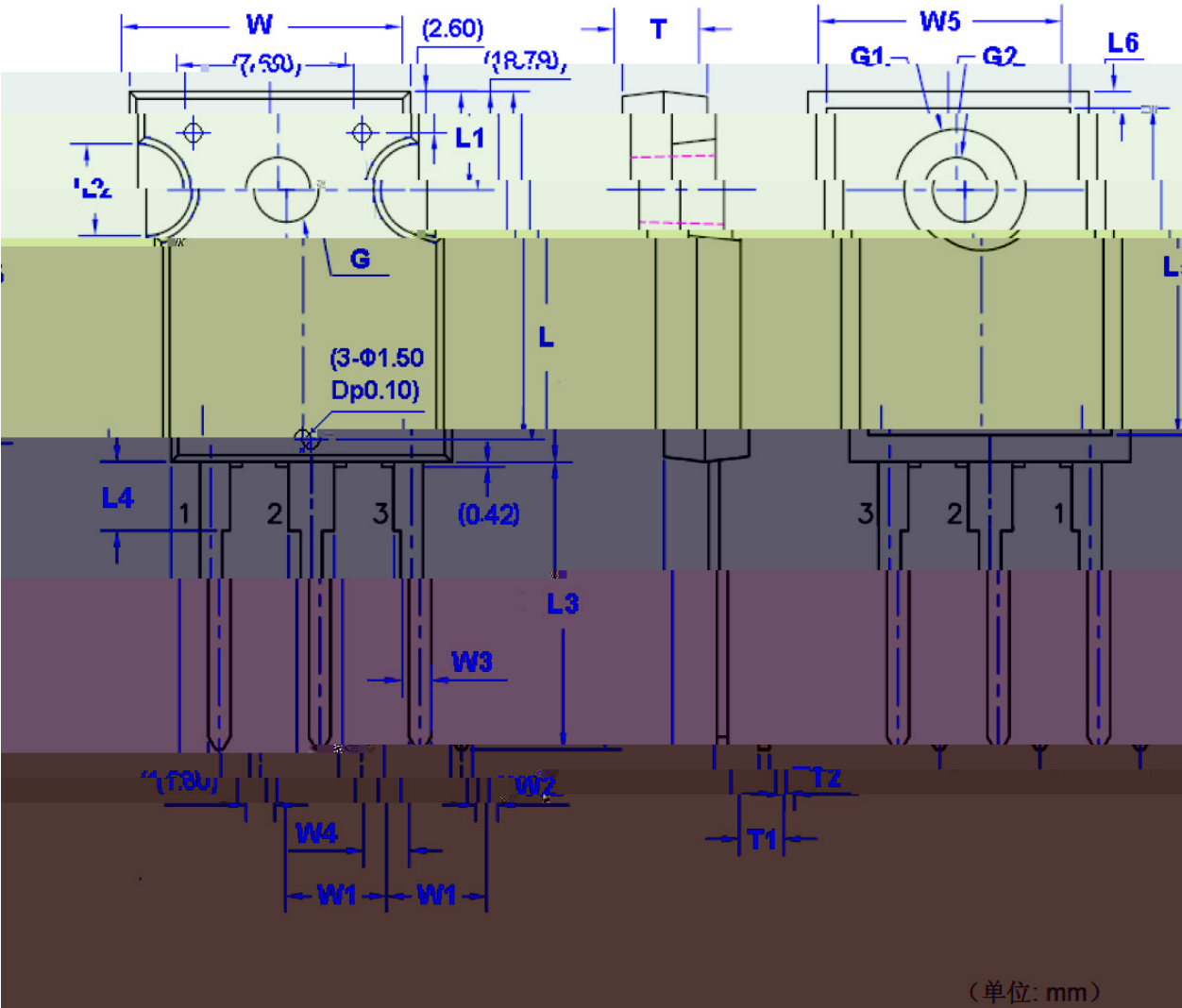
Rev.A May.-2019



DATA SHEET

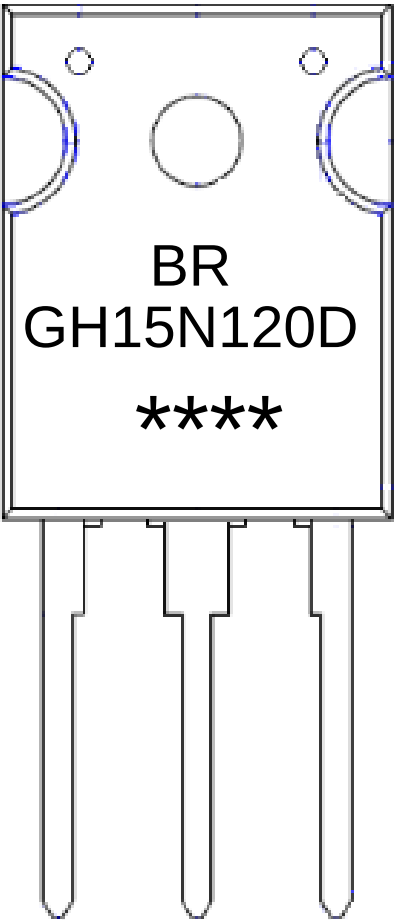
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$\varnothing \square =) \phi$
/ Package Dimensions

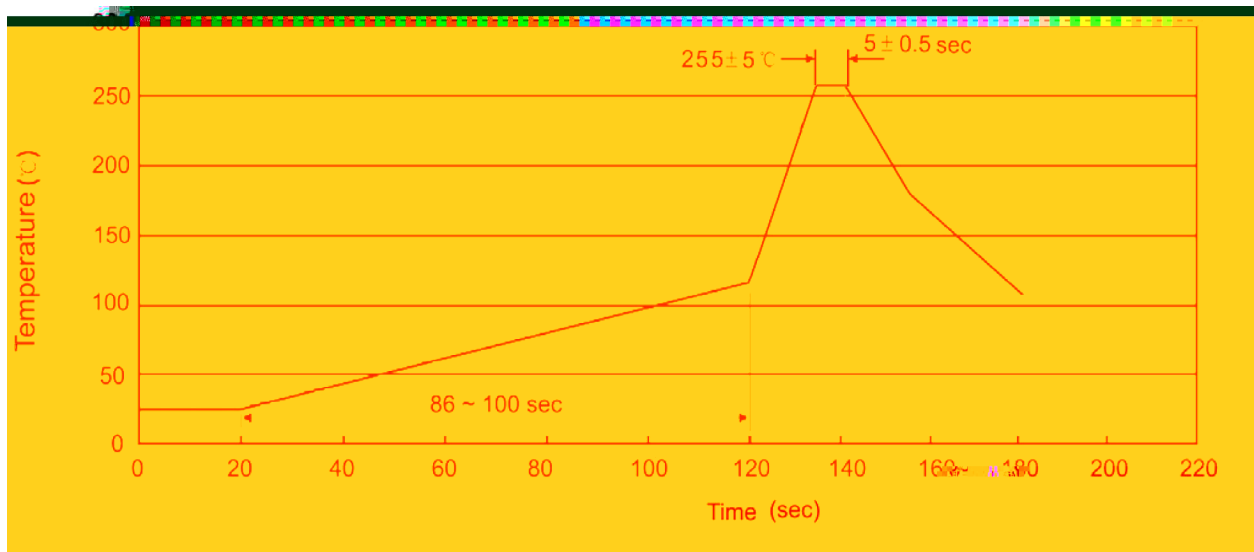


尺寸	符号	尺寸	符号	尺寸	符号	尺寸	符号	尺寸	符号
Max		Min	Max	Min	Max	Min	Max	Min	Max
0.74	W	15.37	15.37	12.91	W5	12.91	L4	3.60	3.60
0.5	L6	12.91	12.91	12.91	W2	12.91	12.91	0.5	T2
0.5	T1	12.91	12.91	12.91	W1	12.91	12.91	0.5	T1

, M y f / Marking Instructions



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- 4 * y	D } } Z
y	~ D Z W A k ö ~ D Z J o û
Note:	
BR:	Company Code.
G15N120D:	Product Type.
****:	Lot No. Code, code change with Lot No.


G PD t... • Ž Ć (x /) / Temperature Profile for Dip Soldering(Pb-Free)

 $\text{TM } \phi y$
 $1\text{ou } f\Omega\text{Ü } 25 \Omega 150 - k \hat{u} \quad 60 \Omega 90\text{sec};$
 $2\text{ou } Q \text{öi } \text{Ü } 255r \ 5 - k \hat{u} \quad 4 " \quad 5r \ 0.5\text{sec};$
 $3\text{ou } D \ N \acute{U} \text{ i " } 0 , \text{Ü } \quad 2 \Omega 10 - / \text{sec}.$

Note:

1.Preheating:25~150 - , Time:60~90sec.

2.Peak Temp.:255r 5 - , Duration:5r 0.5sec.

3. Cooling Speed: 2~10 - /sec.

ÂD /Cã p ¯ »] / Resistance to Soldering Heat Test Conditions
 $\text{i Ü y } 270r \ 5 -$
 $\hat{u} \ y \ 10r \ 1 \ \text{sec}.$

Temp.:270±5

Time:10±1 sec

G P á / Packaging SPEC.
 $\text{Ï í x } / \text{ TUBE}$

Package Type ß m ù ´	Units g m ô h					Dimension g m d Ê (unit ! mm³)		
	Units/Tube /Š •	Tubes/Inner Box Š • / Ć	Units/Inner Box / Ć	Inner Boxes/Outer Box Ć / ±	Units/Outer Box / ±	Tube Š •	Inner Box Ć	Outer Box ±
TO-247	30	15	450	5	2250	497.5×46×8	555×164×50	575×290×180

„ Ð y f / Notices