5 é / Descriptions

: 5 .> / / x ˝ Û ı Insulated-Gate Bipolar Transistor in a TO-247 Plastic Package.

¤ ª / Features

z ı â >o 3 ' o z Õ y 9 o 8 U . 9 D }o

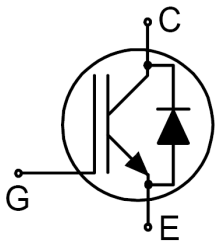
Low gate charge,, Low saturation voltage ,Positive temperature coefficient, RoHS product.

Ð ÷ / Applications

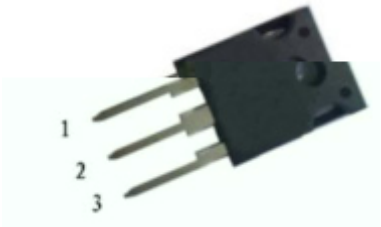
" J o J ¨ o MC o o

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

Ã W] Ô · / Equivalent Circuit



• Û - æ / Pinning



PIN1 y Gate PIN 2 y Collector PIN 3 y Emitter

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

- ~ “ ¢ See Marking Instructions.

Ã a ? d / Absolute Maximum Ratings(Ta=25 ;)

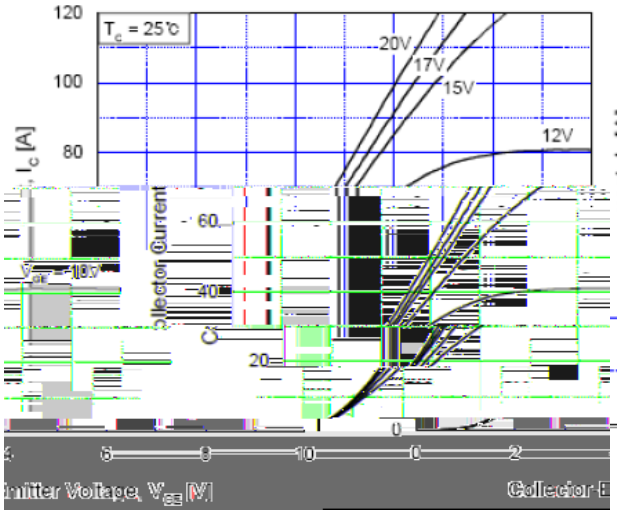
@ Parameter	Z Symbol	Rating	% y Unit
Collector-emitter voltage	V_{CES}	1200	V
Gate-emitter voltage	V_{GES}	±20	V
Short circuit withstand time	T_{SC}	10	- s
Collector current	I_C	30	A
Collector current@T_C=100		15	A
Collector peak current, T_P limited by T_{JMAX}	I_{CM}	45	A
Diode forward current@T_C=100	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

Ô4ì × ? d / Electrical Characteristics(Ta=25 ;)

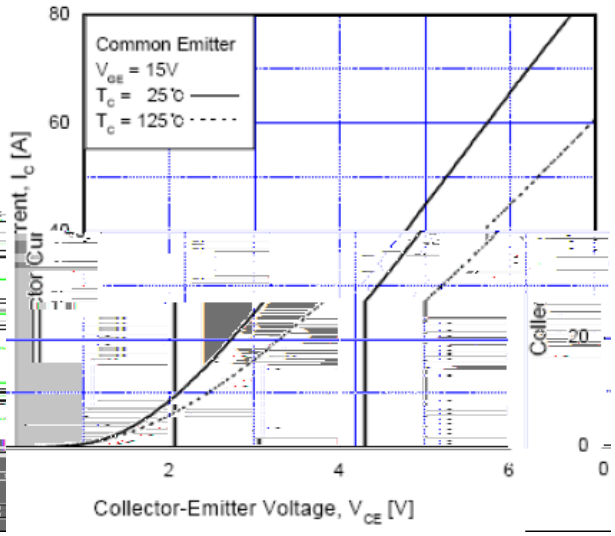
@ Parameter	Z Symbol	y ¡ Ú ^ Test Conditions	´ 4 Min	` ” Typ	´ Ý Max	% y Unit
Collector-emitter breakdown voltage	V_{CES}	V_{GE}=0V; I_{CE}=500uA	1200	-	-	V
Breakdown Voltage Temperature Coefficient	¸ BV_{CES}/ ¸ T_J	I_{CE}=1mA;reference to 25		0.6		V/
Zero gate voltage Collector current	I_{CES}	V_{GE}=0V;V_{CE}=1200V Tc=25	-	-	0.2	mA
		Tc=100			2	mA
		Tc=150			2.5	mA
Gate-body leakage current	I_{GES}	V_{GE}=±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 Tc=25	-	2	2.5	V
		Tc=100		2.2		V
		Tc=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; tsc Ø10 - s Tc=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	

@ Parameter	Z Symbol	y ¡ Ú ^ Test Conditions	´ 4 Min	` ” Typ	´ Ý Max	% y Unit
Turn-on delay time	$t_{d(ON)}$	V_{CE}=600V I_C=15A R_G=56 Tc=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}		-	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 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					

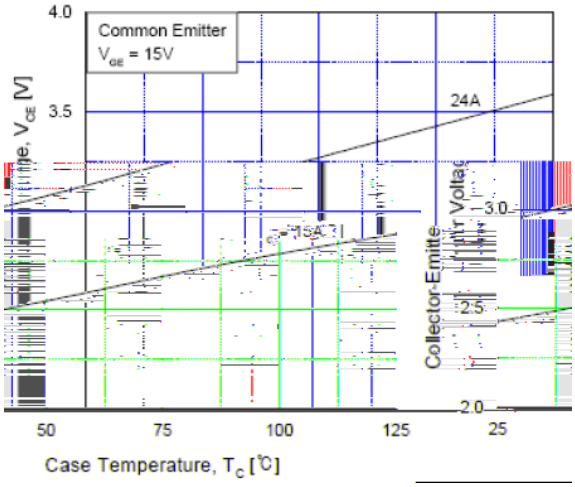
Ô ? d • Ž ¢ / Electrical Characteristic Curve



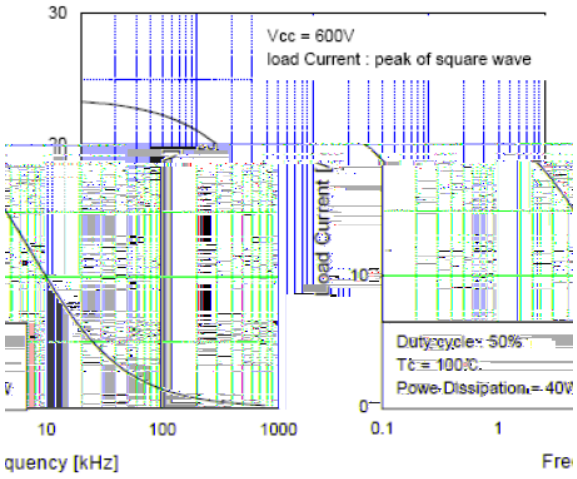
1.Typical Output Characteristics



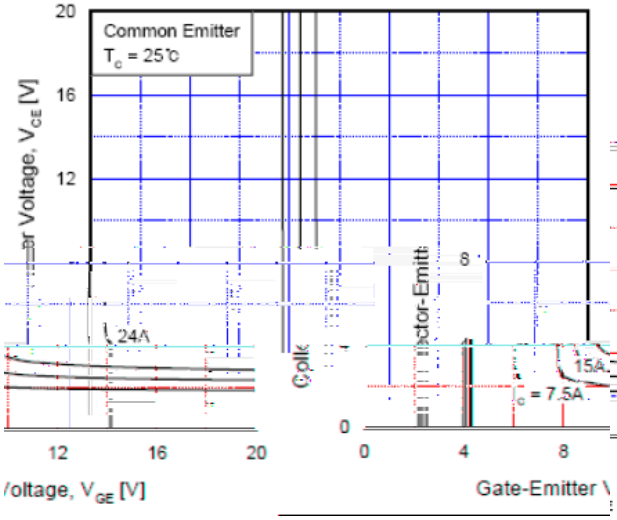
2.Typical Saturation Voltage Characteristics



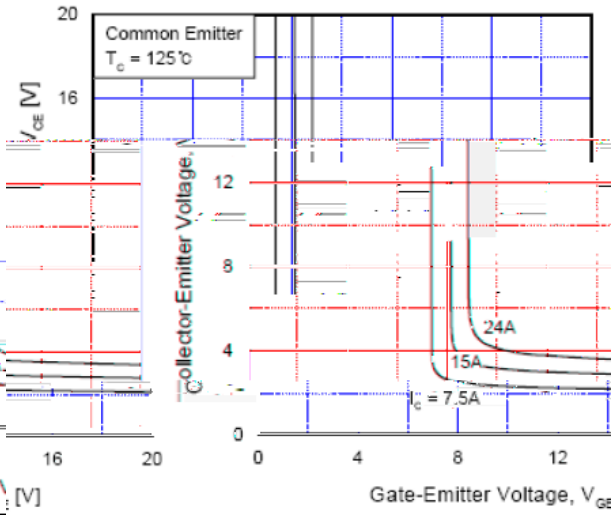
3.Saturation Voltage vs. Case Temperature at Variant Current Level



4.Load Current vs. Frequency

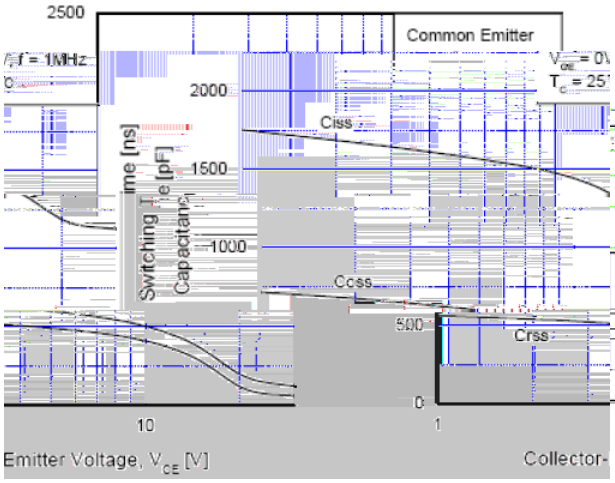


5.Saturation Voltage vs. VGE

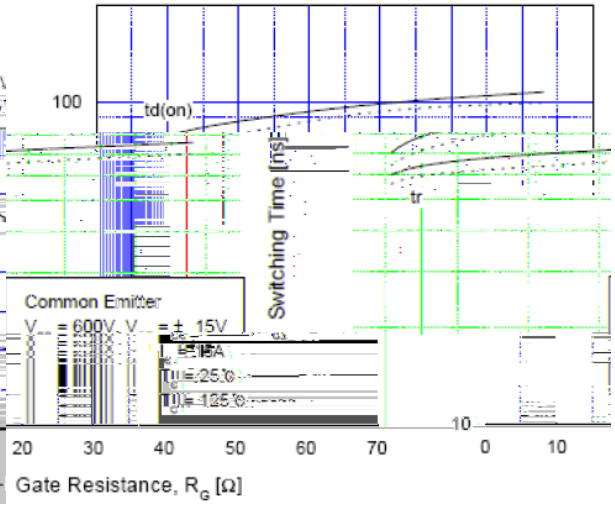


6.Saturation Voltage vs. VGE

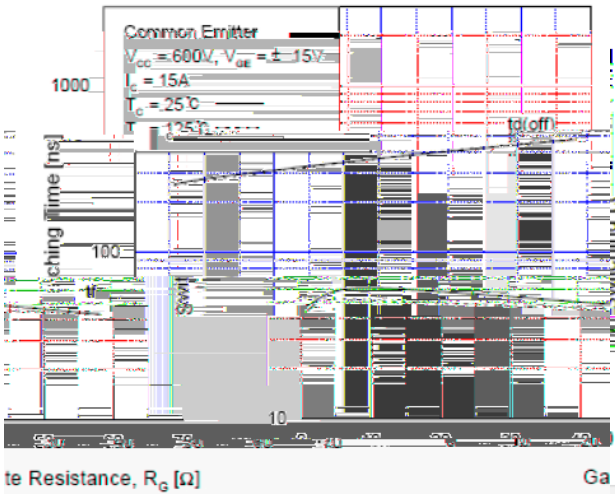
Ô ? d • Ž ¢ / Electrical Characteristic Curve



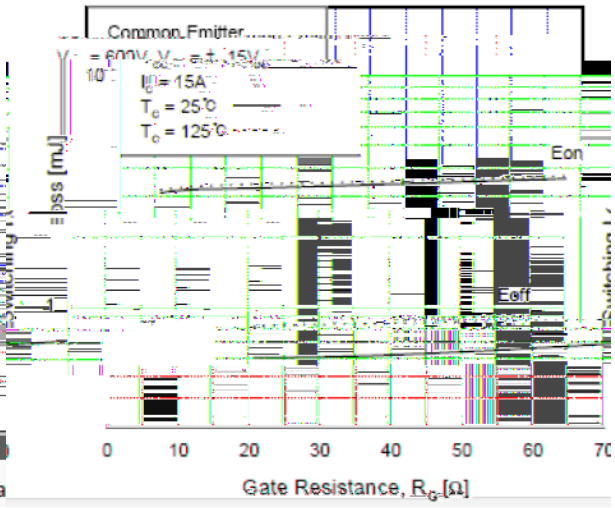
7.Capacitance Characteristics



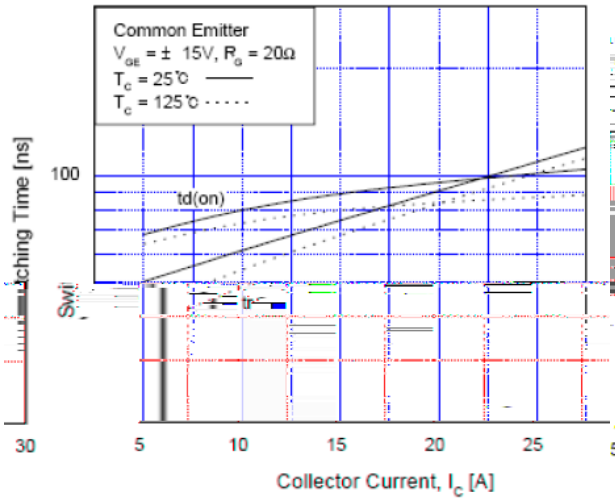
8.Turn-On Characteristics vs. Gate Resistance



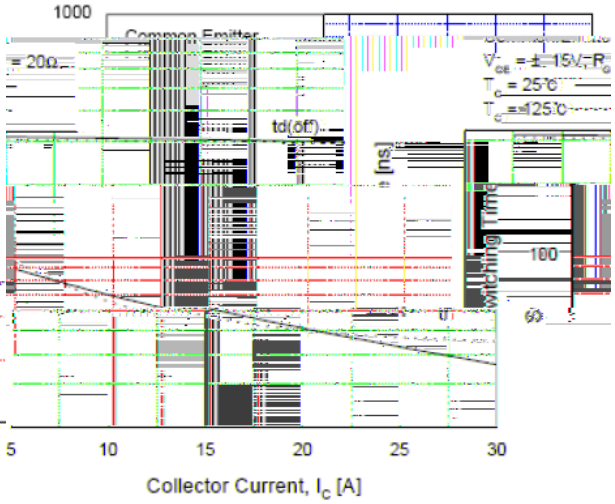
9.Turn-Off Characteristics vs.Gate Resistance



10.Switching Loss vs. Gate Resistance

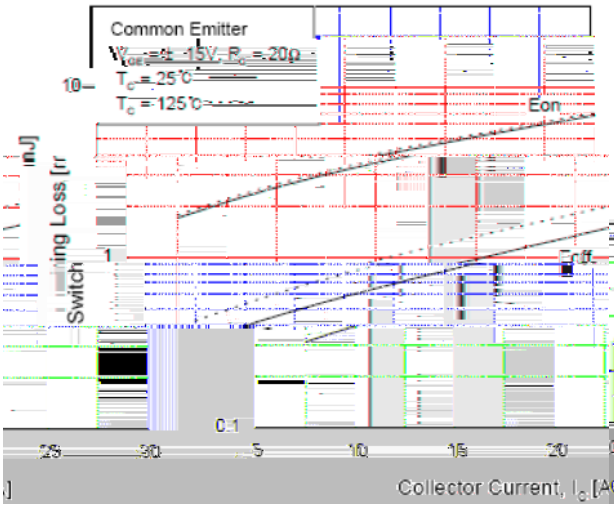


11.Turn-On Characteristics vs. Collector Current

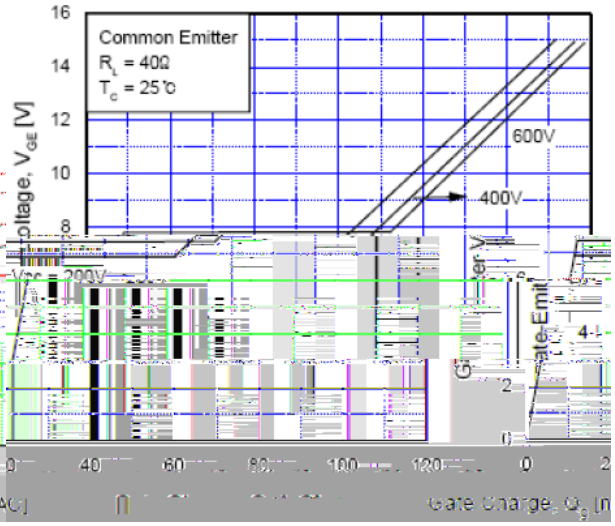


12.Turn-Off Characteristics vs. Collector Current

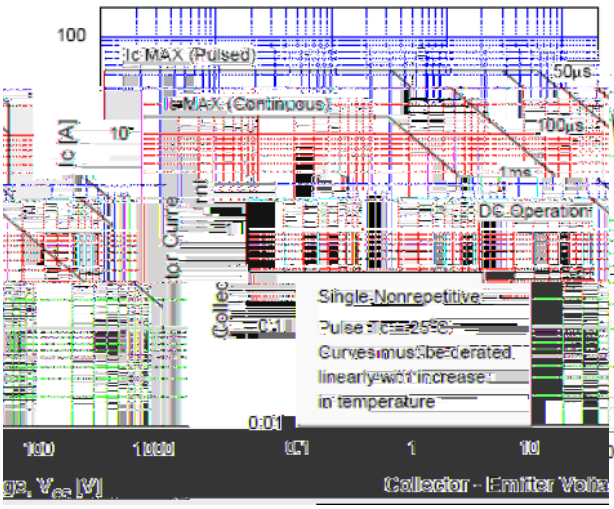
Ô ? d • Ž ¢ / Electrical Characteristic Curve



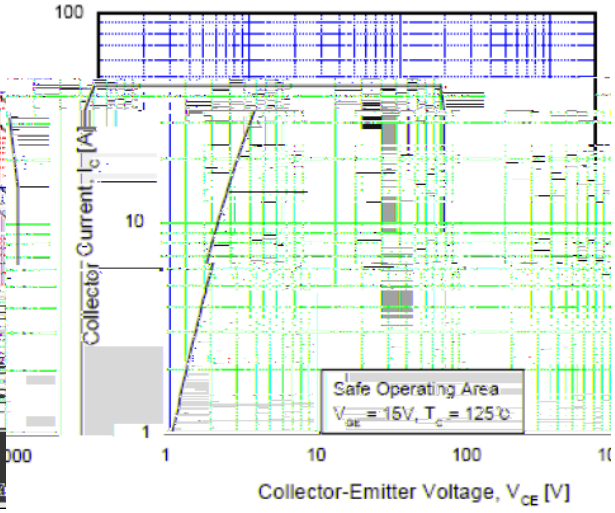
13.Switching Loss vs. Collector Current



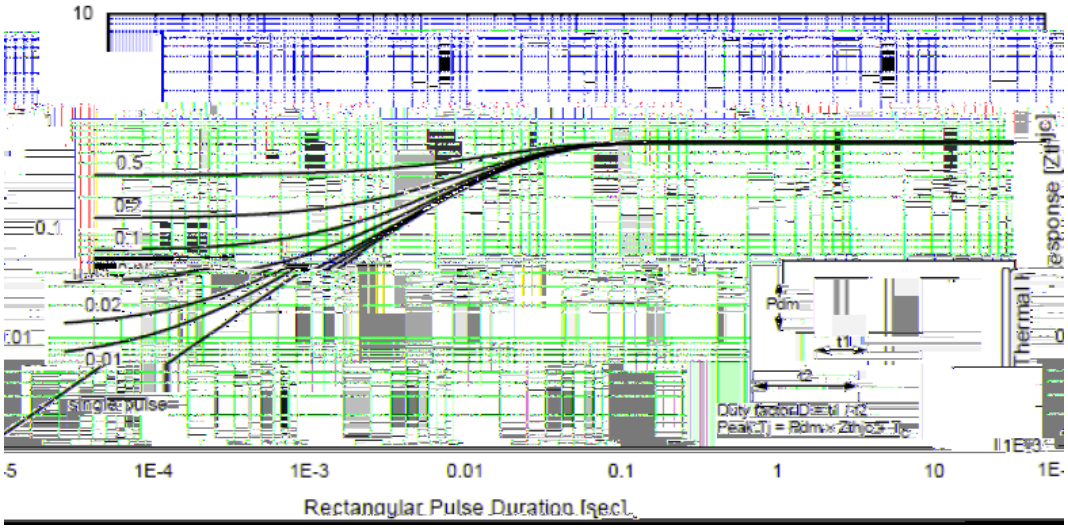
14.Gate Charge Characteristics



15.SOA Characteristics



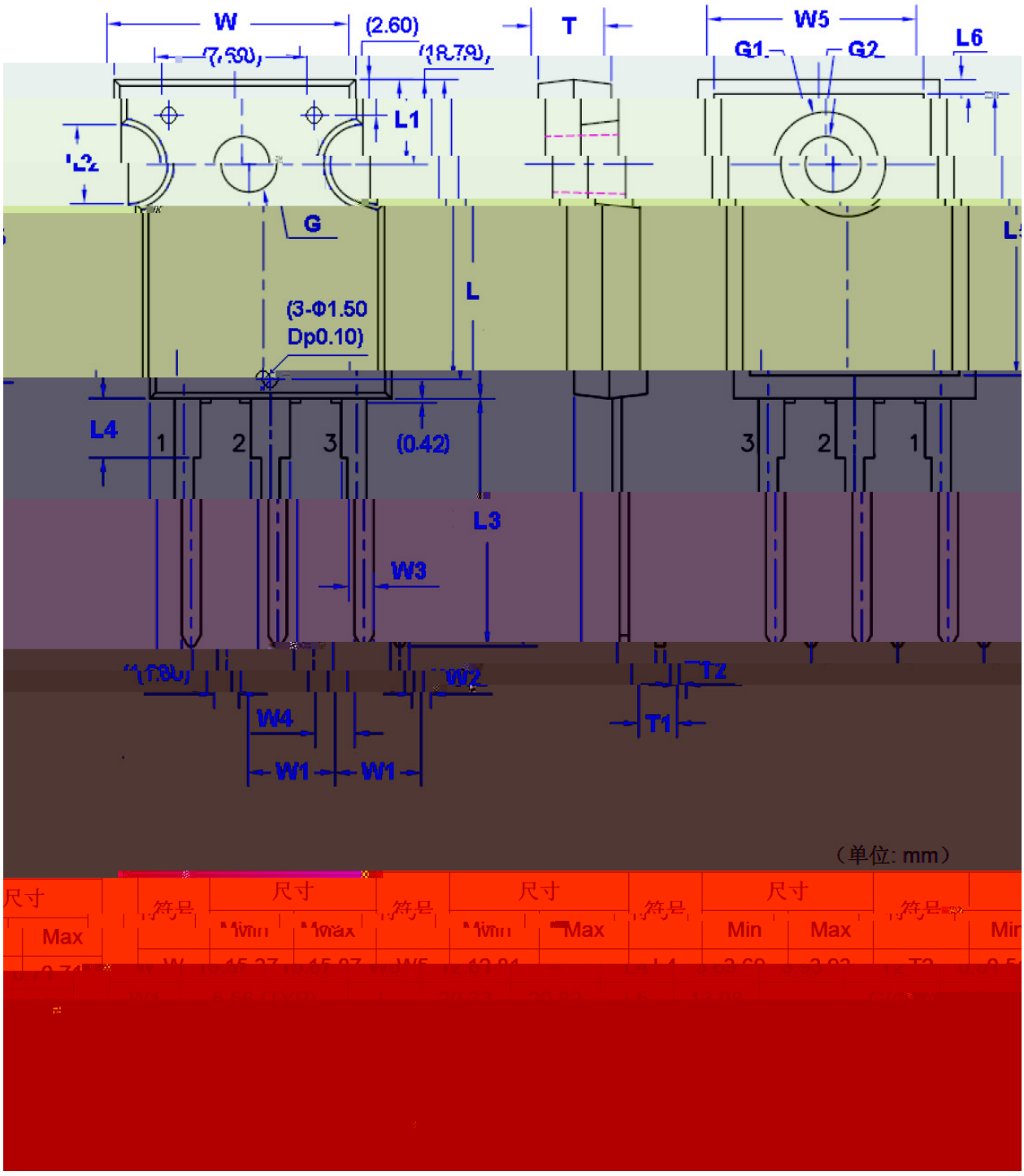
16.Turn-Off SOA



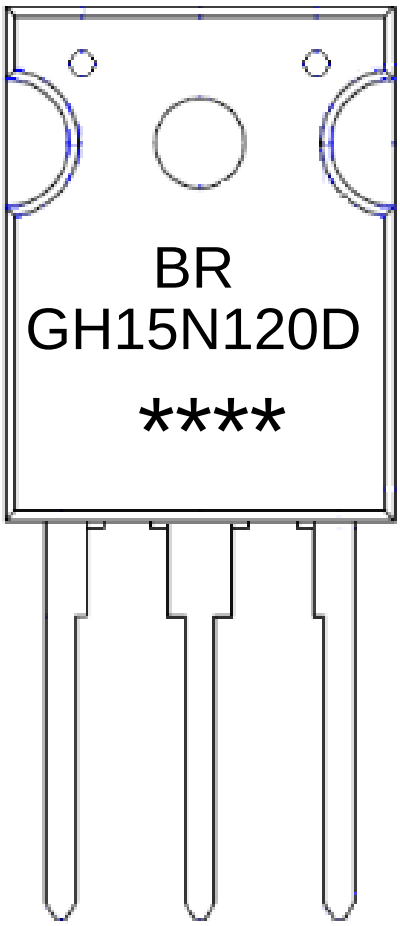
17.Transient Thermal Impedance

h / ElectricalCharacteristicCurve8

Ø ¤ =) ¢ / Package Dimensions



, M y ƒ / Marking Instructions



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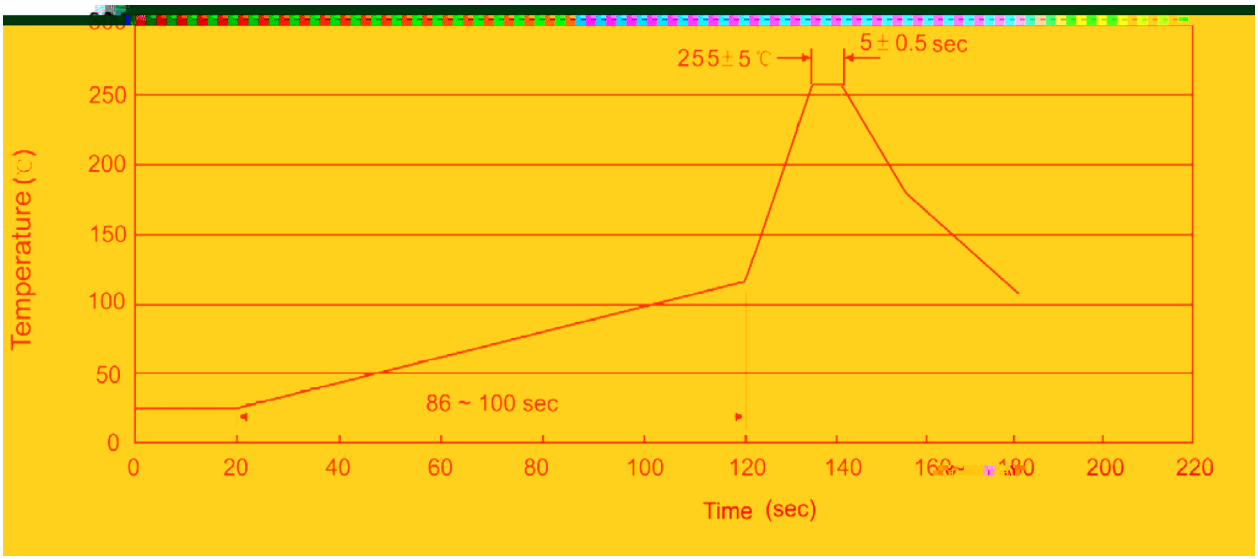
Note:

BR:	Company Code.
G15N120D:	Product Type.
****:	Lot No. Code, code change with Lot No.

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



“ ¢ y

1o ˜ ‰ 25 ‰150 - k 60 ‰90sec;

2o Q 255 5 - k 4 5Ò 0.5sec;

3o D N ò i Ò 0 2 ‰10 -/sec.

Note:

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

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

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

ÂD /Cã p ¯ »] / Resistance to Soldering Heat Test Conditions

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

G P á / Packaging SPEC.

ì /x 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 • / ç	Units/Inner Box / ç	Inner Boxes/Outer Box ç / ±	Units/Outer Box / ±	Tube Š •	Inner Box ç	Outer Box ±
TO-247	30	15	450	5	2250	497.5×46×8	555×164×50	575×290×180

„ Ð y ƒ / Notices