

/ Descriptions

TO-252

Insulated-Gate Bipolar Transistor in a TO-252 Plastic Package.

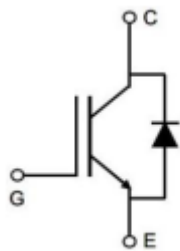
/ Features

 $V_{CES} = 650V$ $I_C = 6A$ @ $T_C = +100$ $V_{CE(SAT)} = 1.63V(\text{typ.}) @ V_{GE} = 15V$

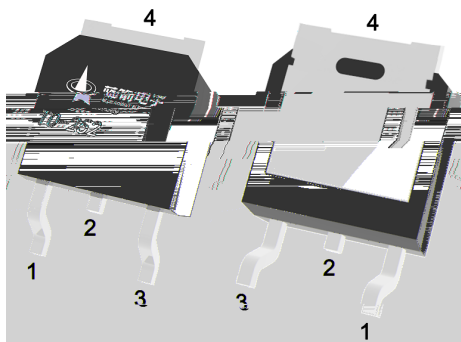
/ Applications

PFC, Motordriver, Boost, UPS.

/ Equivalent Circuit



/ Pinning



PIN1 G

PIN 2 C

PIN 3 E

PIN 4 C

/ Marking

See Marking Instructions.

/ Absolute Maximum Ratings($T_a=25^\circ\text{C}$)

Parameter		Symbol	Rating	Unit
Collector-Emitter Voltage		V_{CES}	650	V
Gate-Emitter Voltage		V_{GES}	30	V
Continuous Collector Current	$T_C=+100$	I_C	6	A
	$T_C=+25$		12	A
Pulsed Collector Current , Limited by T_{Jmax}		I_{CRM}	18	A
Diode Continuous DC Forward Current	$T_C=+100$	I_F	6	A
	$T_C=+25$		12	A
Diode Repetitive Peak Forward Current		I_{FRM}	18	A
Short Circuit with standing time		t_{SC}	15	μs
Power Dissipation		P_D	83	W
Storage Temperature Range		T_{STG}	-55 to +175	
Maximum lead temperature for soldering		T_L	260	
Maximum Junction-to-Ambient		$R_{\theta JA}$	62.5	/W
Maximum IGBT Junction-to-Case		$R_{\theta JC}$	1.80	/W
Maximum Diode Junction-to-Case		$R_{\theta JC}$	2.20	/W

/ Electrical Characteristics($T_a=25^\circ\text{C}$)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CES}	$I_C=250\mu\text{A}$ $V_{GE}=0\text{V}$	650			V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15\text{V}$, $I_C=6\text{A}$ $T_J=25$		1.63	1.98	V
		$T_J=125$		1.97		
		$T_J=175$		2.14		
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}$ $I_C=1\text{mA}$	4.3	5.3	6.3	V
Gate-emitter Leakage Current	I_{GES}	$V_{CE}=0\text{V}$ $V_{GE}=\pm 20\text{V}$			200	nA
Collector-emitter Leakage Current	I_{CES}	$V_{CE}=650\text{V}$ $V_{GE}=0\text{V}$			10	μA
Input Capacitance	C_{ies}	$V_{GE}=0\text{V}$ $V_{CE}=25\text{V}$ $f=1\text{MHz}$		246		pF
Output Capacitance	C_{oes}			33		pF
Reverse Transfer Capacitance	C_{res}			3.8		pF
Total Gate Charge	Q_g	$V_{GE}=15\text{V}$ $V_{CC}=520\text{V}$ $I_C=6\text{A}$		9		nC
Gate to Emitter Charge	Q_{ge}			3		nC
Gate to Collector Charge	Q_{gc}			3.2		nC

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Turn-On Delay Time	$t_{d(on)}$	$T_J=25$ $V_{GE}=15V$ $V_{CE}=400V$ $I_C=6A$ $R_G=5\Omega$		9		ns
Turn-On Rise Time	t_r			12		ns
Turn-Off Delay Time	$t_{d(off)}$			39		ns
Turn-Off Fall Time	t_f			135		ns
Turn-On Energy	E_{on}			0.08		mJ
Turn-Off Energy	E_{off}			0.16		mJ
Total Switching Energy	E_{total}			0.24		mJ
Diode Reverse Recovery Time	t_{rr}	$T_J=25$ $I_F=6A$, $di/dt=200A/us$, $V_{CC}=400V$		42		ns
Diode Reverse Recovery Charge	Q_{rr}			88		nC
Diode Peak Reverse Recovery Current	I_{rm}			4.4		A
Turn-On Delay Time	$t_{D(on)}$	$T_J=175$ $V_{GE}=15V$ $V_{CC}=400V$ $I_C=6A$ $R_G=5\Omega$		10		ns
Turn-On Rise Time	t_r			33		ns
Turn-Off Delay Time	$t_{D(off)}$			57		ns
Turn-Off Fall Time	T_f			180		ns
Turn-On Energy	E_{on}			0.11		mJ
Turn-Off Energy	E_{off}			0.23		mJ
Total Switching Energy	E_{total}			0.34		mJ

/ Electrical Characteristic Curve

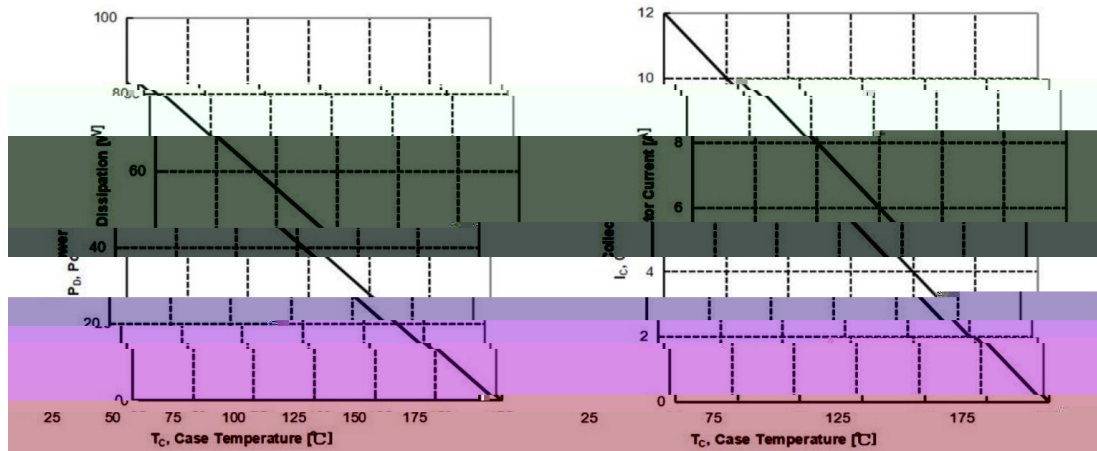


Fig1. TYP. Power Dissipation

Fig2. TYP. Collector Current vs. Case Temperature

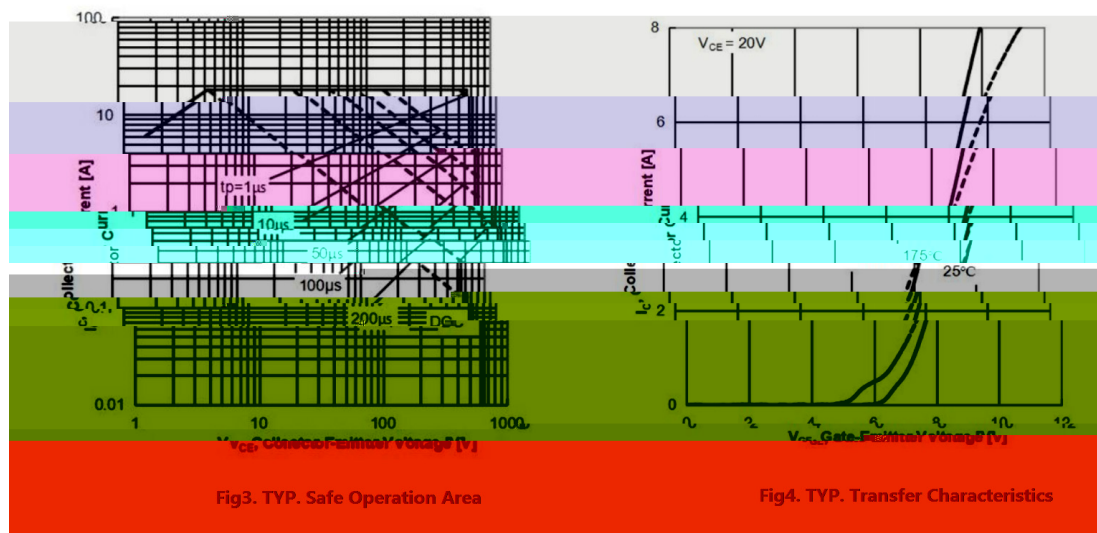
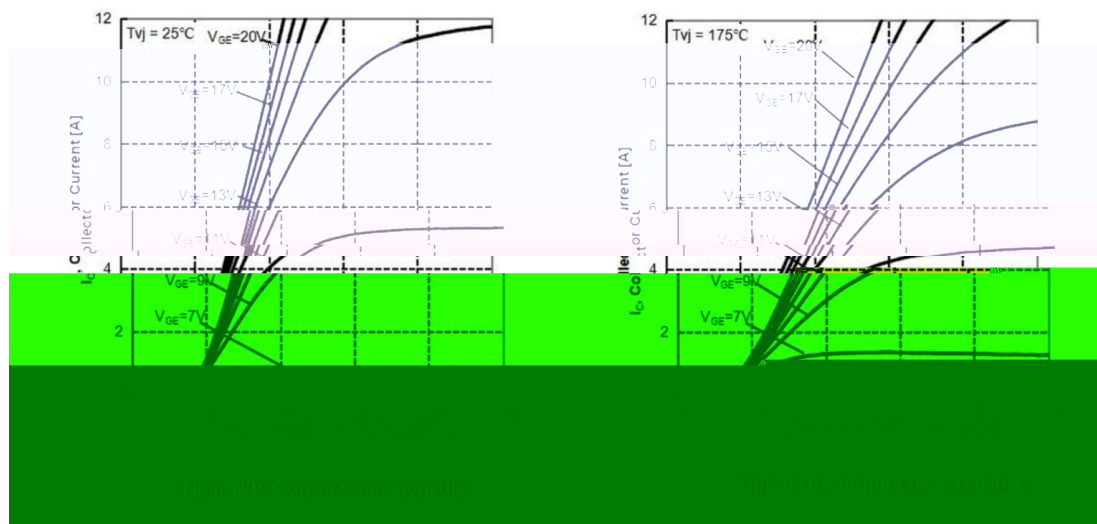


Fig3. TYP. Safe Operation Area

Fig4. TYP. Transfer Characteristics



/ Electrical Characteristic Curve

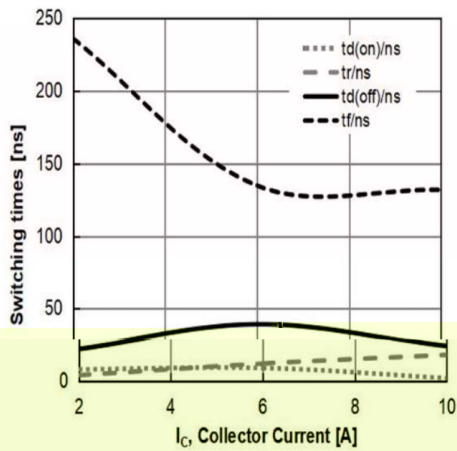


Fig13. TYP. Switching Times vs. Collector Current
($T_J=25^{\circ}\text{C}$, $V_{CE}=400\text{V}$, $V_{GE}=15\text{V}$, $R_g=5\Omega$)

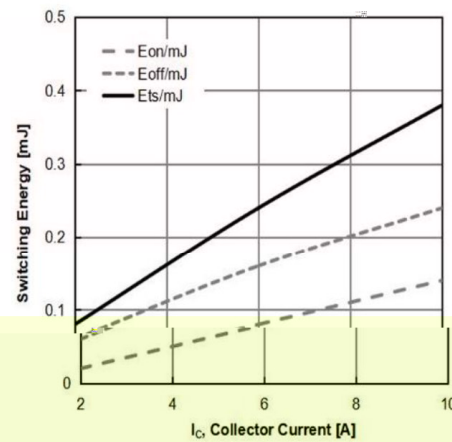


Fig14. TYP. Switching Energy vs. Collector Current
($T_J=25^{\circ}\text{C}$, $V_{CE}=400\text{V}$, $V_{GE}=15\text{V}$, $R_g=5\Omega$)

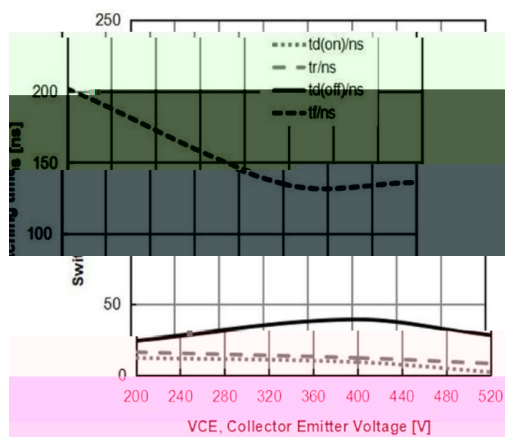


Fig15. TYP. Switching Times vs. V_{CE}
($T_J=25^{\circ}\text{C}$, $I_C=6\text{A}$, $V_{GE}=15\text{V}$, $R_g=5\Omega$)

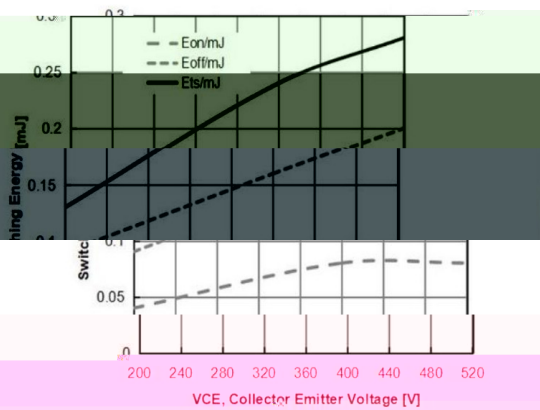


Fig16. TYP. Switching Energy vs. V_{CE}
($T_J=25^{\circ}\text{C}$, $I_C=6\text{A}$, $V_{GE}=15\text{V}$, $R_g=5\Omega$)

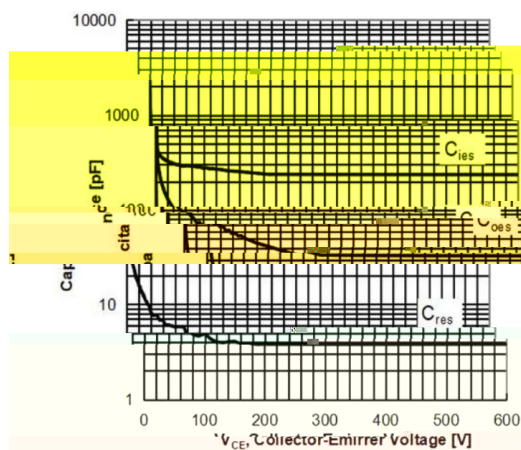


Fig17. TYP. Capacitance vs. Collector-Emmitter Voltage

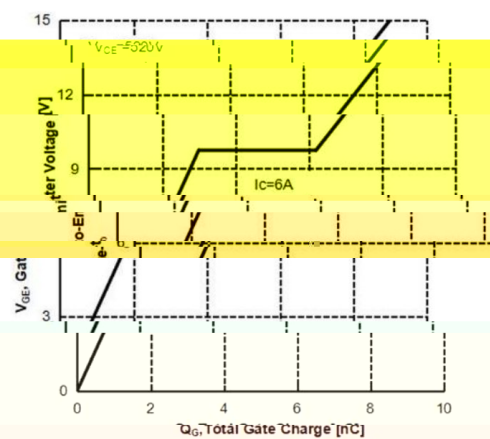
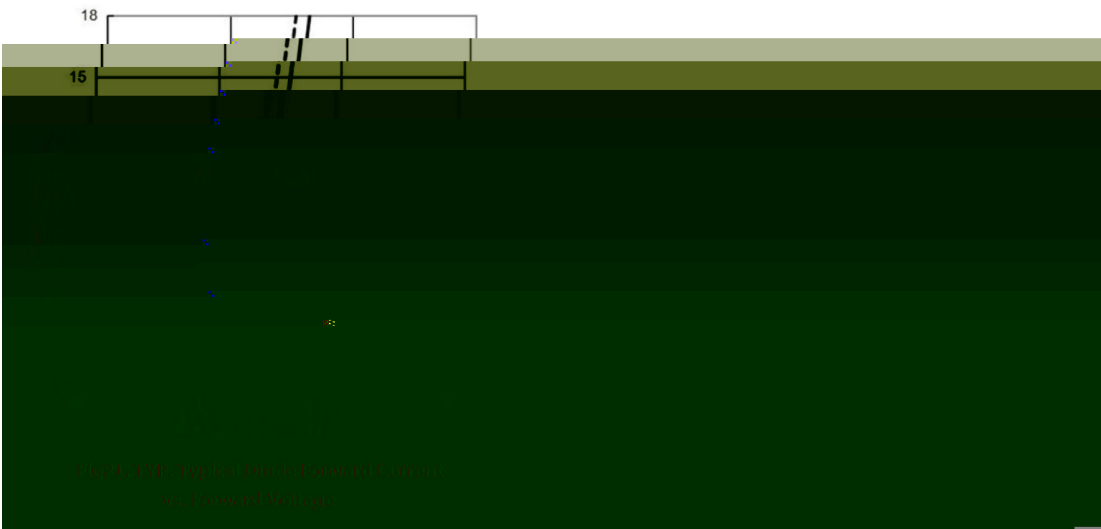
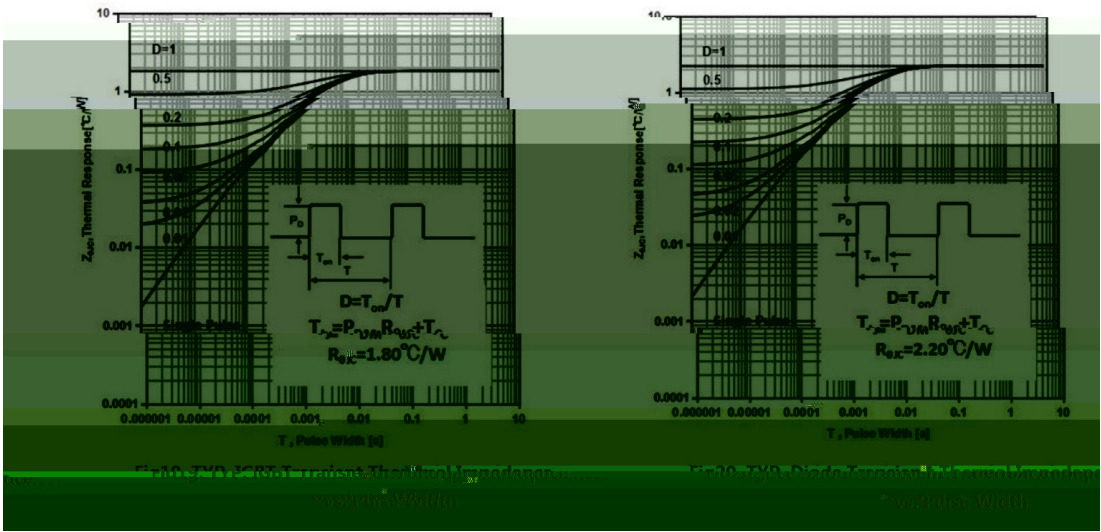
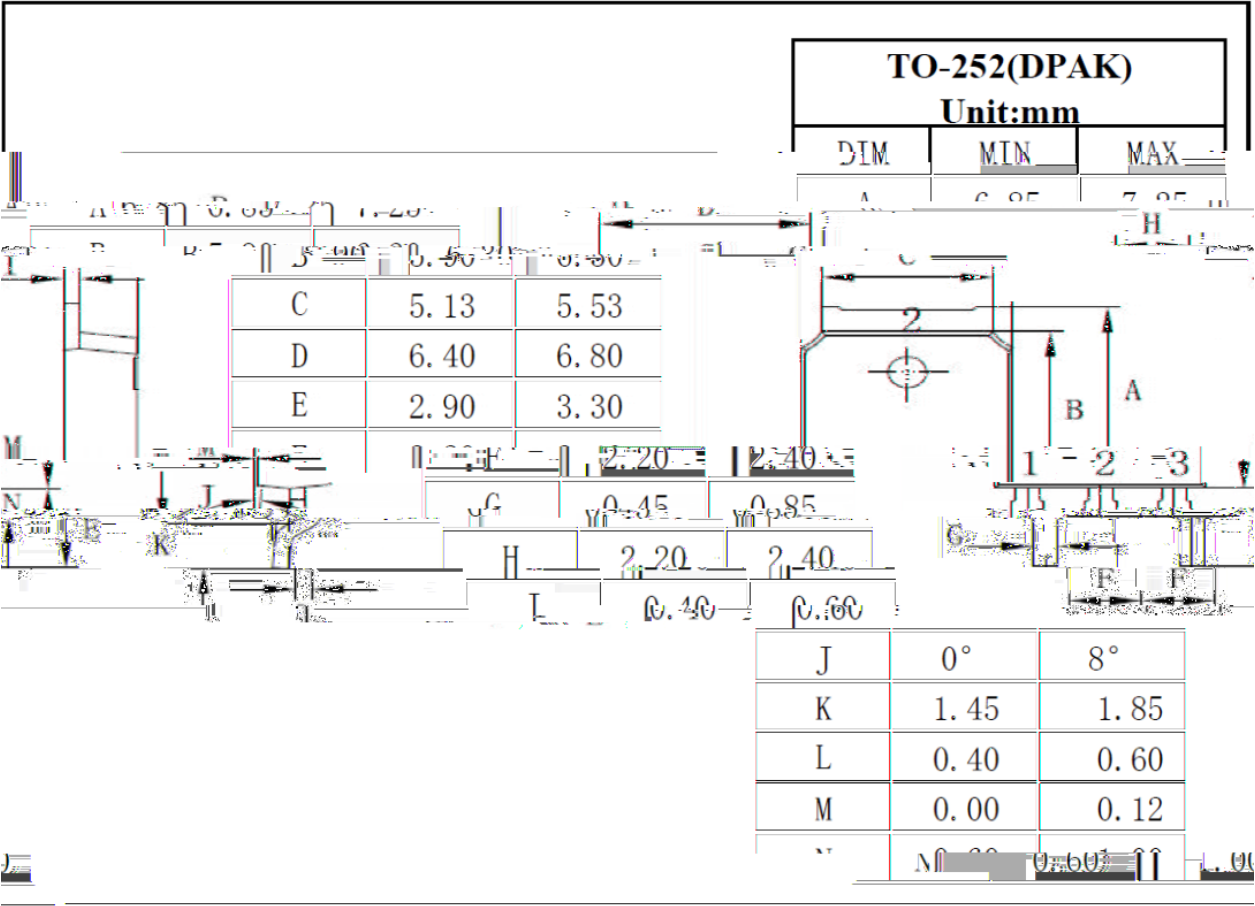


Fig18. TYP. Gate Charge

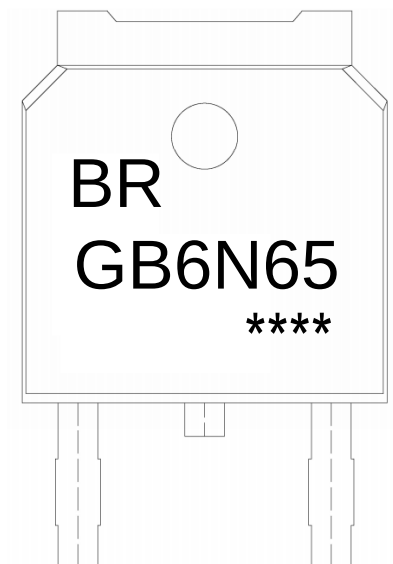
/ Electrical Characteristic Curve



/ Package Dimensions



/ Marking Instructions



BR

GB6N65

Note:

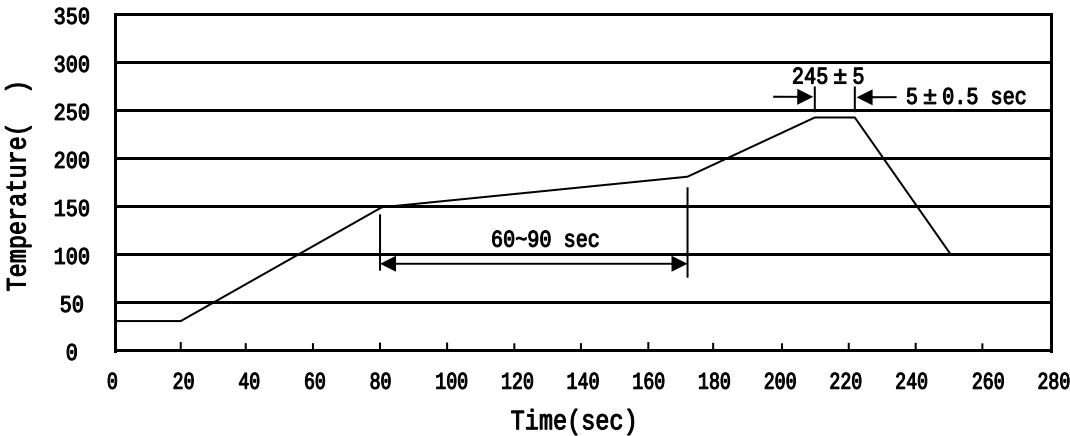
BR: Company Code

GB6N65: Product Type Code

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



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Note:

- | | | | | | |
|---|-------|-----|----|-----------|---|
| 1 | 150 | 180 | 60 | 90sec; | 1.Preheating:150~180 , Time:60~90sec. |
| 2 | 245±5 | | | 5±0.5sec; | 2.Peak Temp.:245±5 , Duration:5±0.5sec. |
| 3 | | 2 | 10 | /sec. | 3. Cooling Speed: 2~10 /sec. |

/ Resistance to Soldering Heat Test Conditions

260±5 10±1 sec. Temp.:260±5 Time:10±1 sec

/ Packaging SPEC.

/ REEL

Package Type	Units					Dimension (unit mm ³)		
	Units/Reel	Reels/Inner Box	Units/Inner Box	Inner Boxes/Outer Box	Units/Outer Box	Reel	Inner Box	Outer Box
TO-252	2,500	2	5,000	6	30,000	13 ×16	360×360×50	380×335×366

/ TUBE

Package Type	Units					Dimension (unit mm ³)		
	Units/Tube	Tubes/Inner Box	Units/Inner Box	Inner Boxes/Outer Box	Units/Outer Box	Tube	Inner Box	Outer Box
TO-251/252	75	48	3,600	5	18,000	526×20.5×5.25	555×164×50	575×290×180

/ Notices

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