/ Descriptions

TO-252

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

/ Features

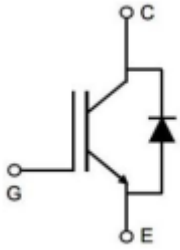
V_{CES} =650V I_C =6A @T_C=+100

$V_{CE(SAT)}$=1.63V(typ.)@ V_{GE}=15V

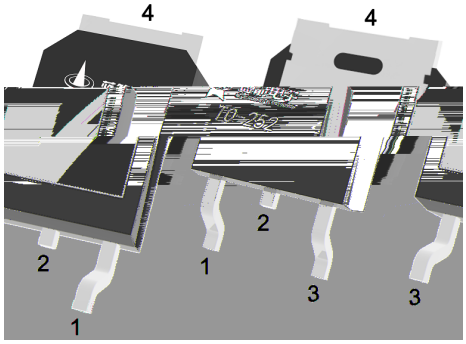
/ Applications

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)

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	us
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_{JA}	62.5	/W
Maximum IGBT Junction-to-Case		R_{JC}	1.80	/W
Maximum Diode Junction-to-Case		R_{JC}	2.20	/W

/ Electrical Characteristics(Ta=25)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CES}	I_C=250uA V_{GE}=0V		650			V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=6A	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=1mA		4.3	5.3	6.3	V
Gate-emitter Leakage Current	I_{GES}	V_{CE}=0V V_{GE}= ±20V				200	nA
Collector-emitter Leakage Current	I_{CES}	V_{CE}=650V V_{GE}=0V				10	uA
Input Capacitance	C_{ies}	V_{GE}=0V V_{CE}=25V f=1MHz			246		pF
Output Capacitance	C_{oes}				33		pF
Reverse Transfer Capacitance	C_{res}				3.8		pF
Total Gate Charge	Q_g	V_{GE}=15V V_{CC}=520V I_C=6A			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		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		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

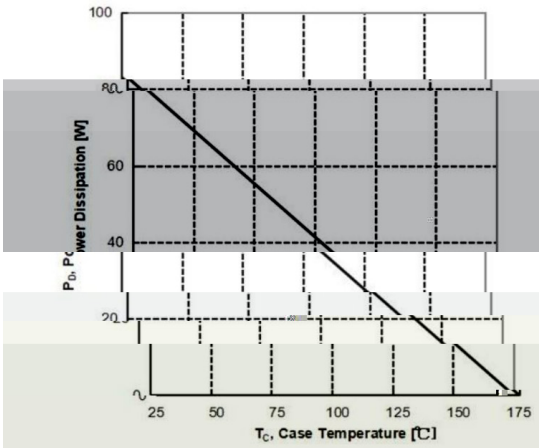


Fig1. TYP. Power Dissipation

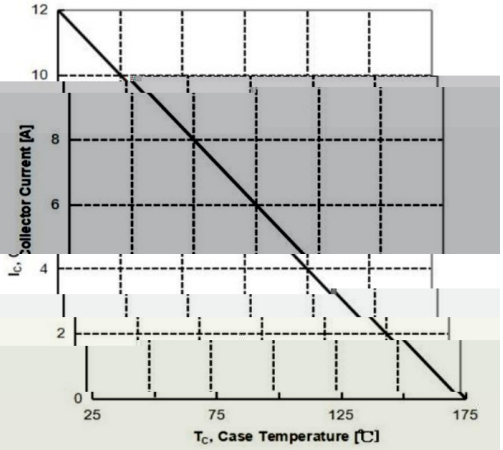


Fig2. TYP. Collector Current vs. Case Temperature

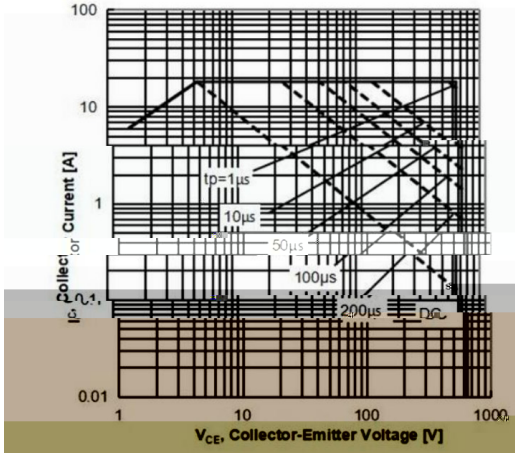


Fig3. TYP. Safe Operation Area

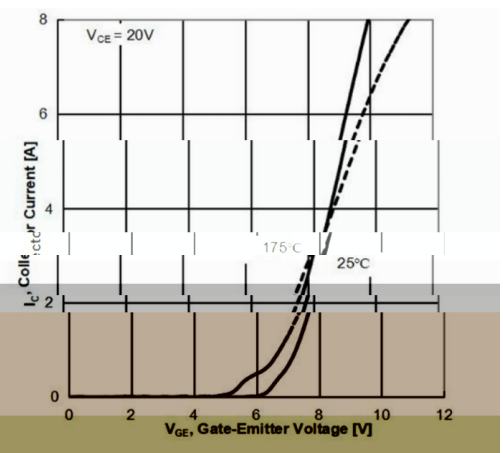


Fig4. TYP. Transfer Characteristics

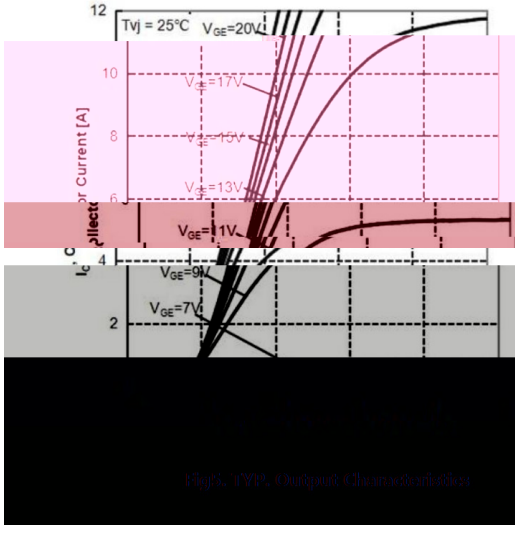


Fig5. TYP. Output Characteristics

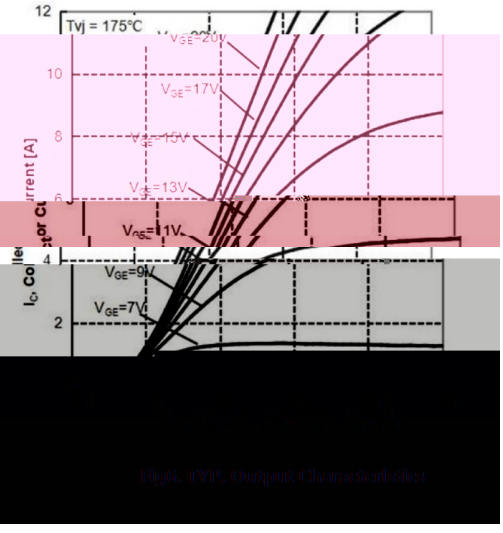


Fig6. TYP. Output Characteristics

/ Electrical Characteristic Curve

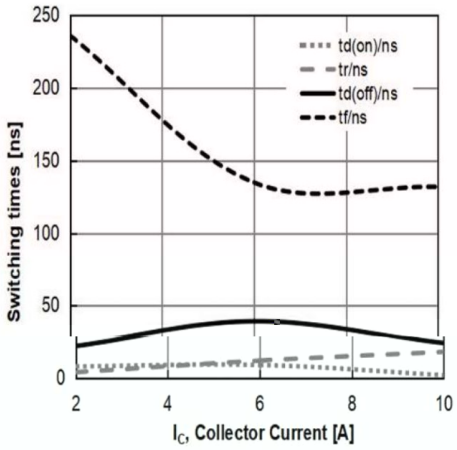


Fig13. TYP. Switching Times vs. Collector Current.
(TJ=25℃,VCE=400V,VGE=15V, Rg=5Ω)

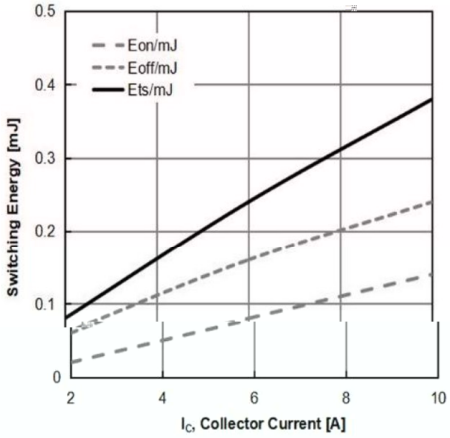


Fig14. TYP. Switching Energy vs. Collector Current.
(TJ=25℃,VCE=400V,VGE=15V, Rg=5Ω)

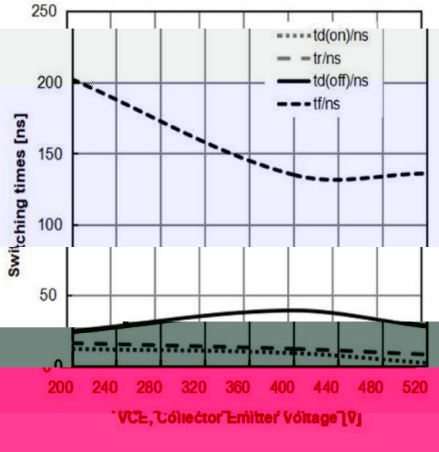


Fig15. TYP. Switching Times vs. VCE
(TJ=25℃,IC=6A,VGE=15V, Rg=5Ω)

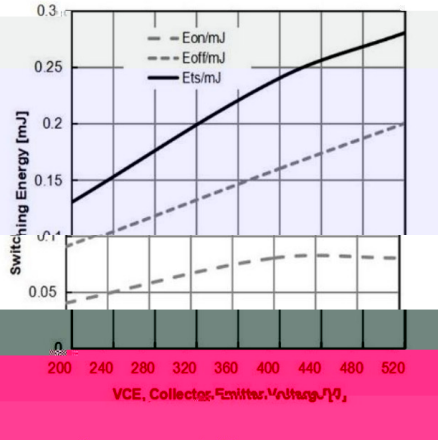


Fig16. TYP. Switching Energy vs. VCE
(TJ=25℃,IC=6A,VGE=15V, Rg=5Ω)

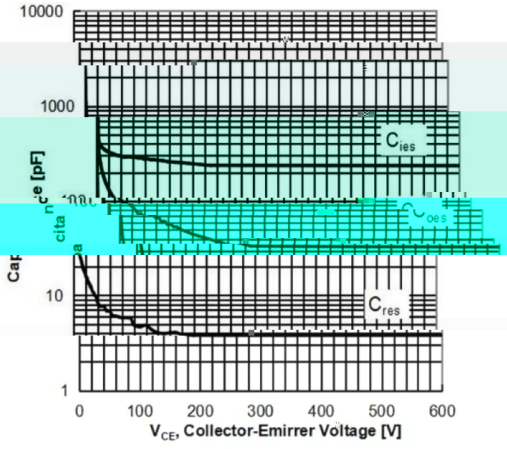


Fig.17 TYP. Capacitance vs. Collector-Emitter Voltage

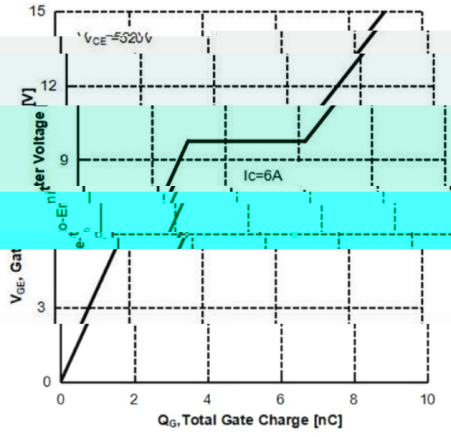
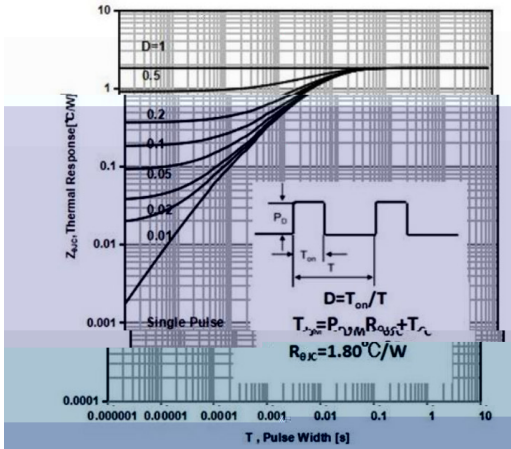


Fig18. TYP. Gate Charge

/ Electrical Characteristic Curve



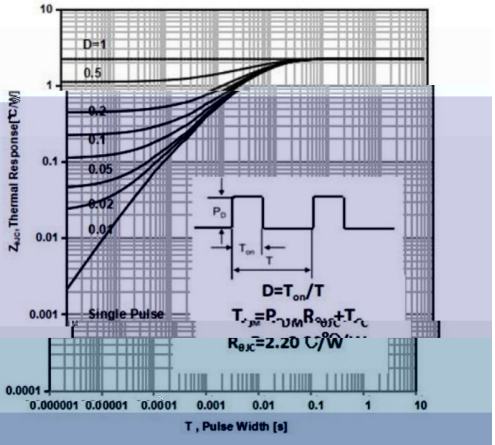


Fig20. TYP. Diode Transient Thermal Impedance vs. Pulse Width

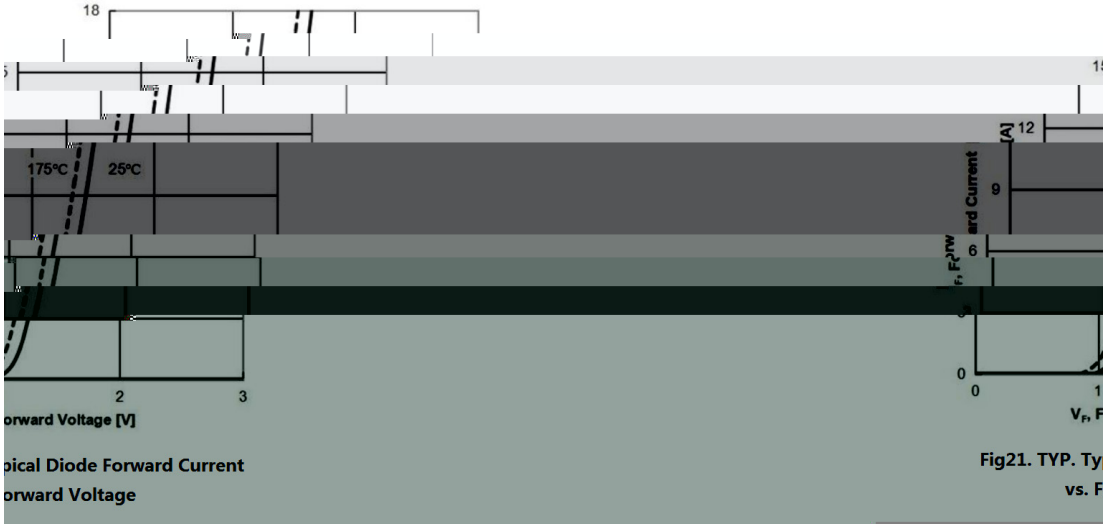
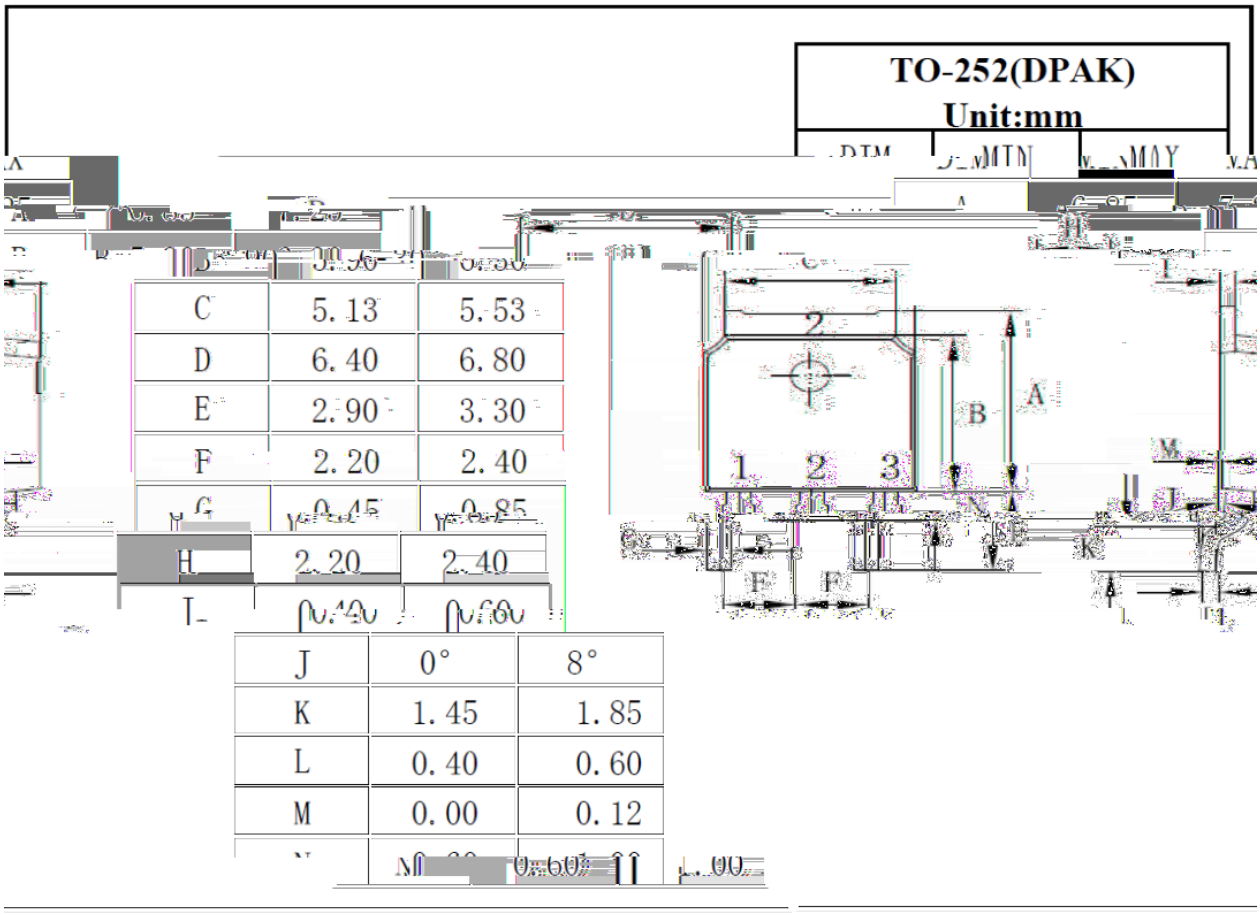


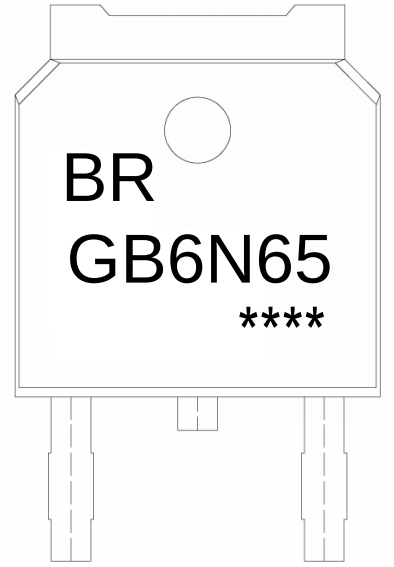
Fig21. TYP. Ty
vs. F

/ Package Dimensions



C	5.13	5.53
D	6.40	6.80
E	2.90	3.30
F	2.20	2.40
G	0.45	0.85
H	2.20	2.40
J	0°	8°
K	1.45	1.85
L	0.40	0.60
M	0.00	0.12

/ Marking Instructions



BR

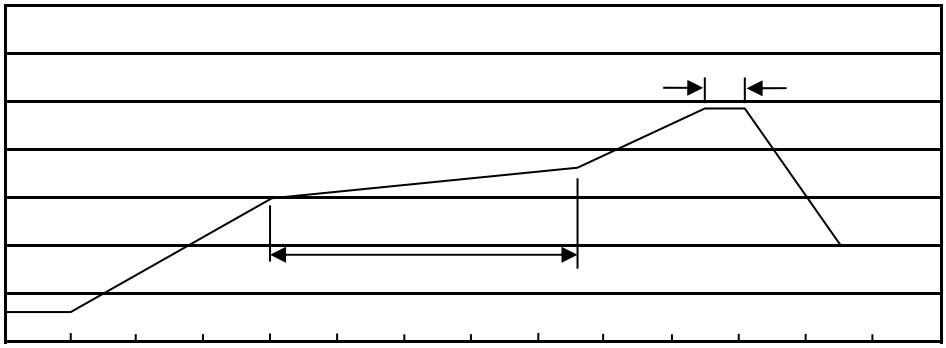
GB6N65

****

Note:

BR:	Company Code
GB6N65:	Product Type Code
****:	Lot No. Code, code change with Lot No.

( ) / Temperature Profile for IR Reflow Soldering(Pb-Free)



				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 mm³)
	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 mm³)
	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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