

/ Descriptions

TO-3P Insulated-Gate Bipolar Transistor in a TO-3P Plastic Package.

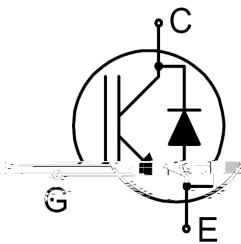
/ Features

,
,
, RoHS
Built in fast recovery diode, Saturation voltage positive temperature coefficient, High reliability and thermal stability parameters, good agreement, RoHS product.

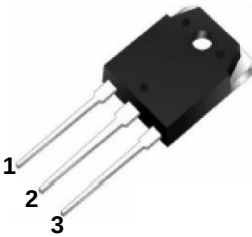
/ Applications

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

/ Equivalent Circuit



/ Pinning



PIN1 Gate PIN 2 Collector PIN 3 Emitter

/ h_{FE} Classifications & Marking

See Marking Instructions.

/ Absolute Maximum Ratings(Ta=25)

Parameter	Symbol	Rating	Unit
Collector-emitter voltage	V_{CES}	650	V
Gate-emitter voltage	V_{GES}	± 20	V
Collector current@ $T_C=25^{\circ}\text{C}$	I_C	120	A
Collector current@ $T_C=100^{\circ}\text{C}$		60	A
Collector peak current, T_P limited by T_{JMAX}	I_{CM}	180	A
Diode forward current@ $T_C=100^{\circ}\text{C}$	I_F	30	A
Diode maximum forward current	I_{FM}	60	A
Power dissipation($T_C=25^{\circ}\text{C}$)	P_D	310	W
Power dissipation($T_C=100^{\circ}\text{C}$)		125	W
Operating junction and storage temperature range	T_J, T_{stg}	-55 155	$^{\circ}\text{C}$
Maximum temperature for soldering	T_L	260	$^{\circ}\text{C}$
IGBT thermal resistance,junction-case	$R_{th(j-c)}$	0.4	$^{\circ}\text{C/W}$
Diode thermal resistance,junction-case	$R_{th(j-c)}$	1.2	$^{\circ}\text{C/W}$
Thermal resistance,junction-ambient	$R_{th(j-a)}$	40	$^{\circ}\text{C/W}$

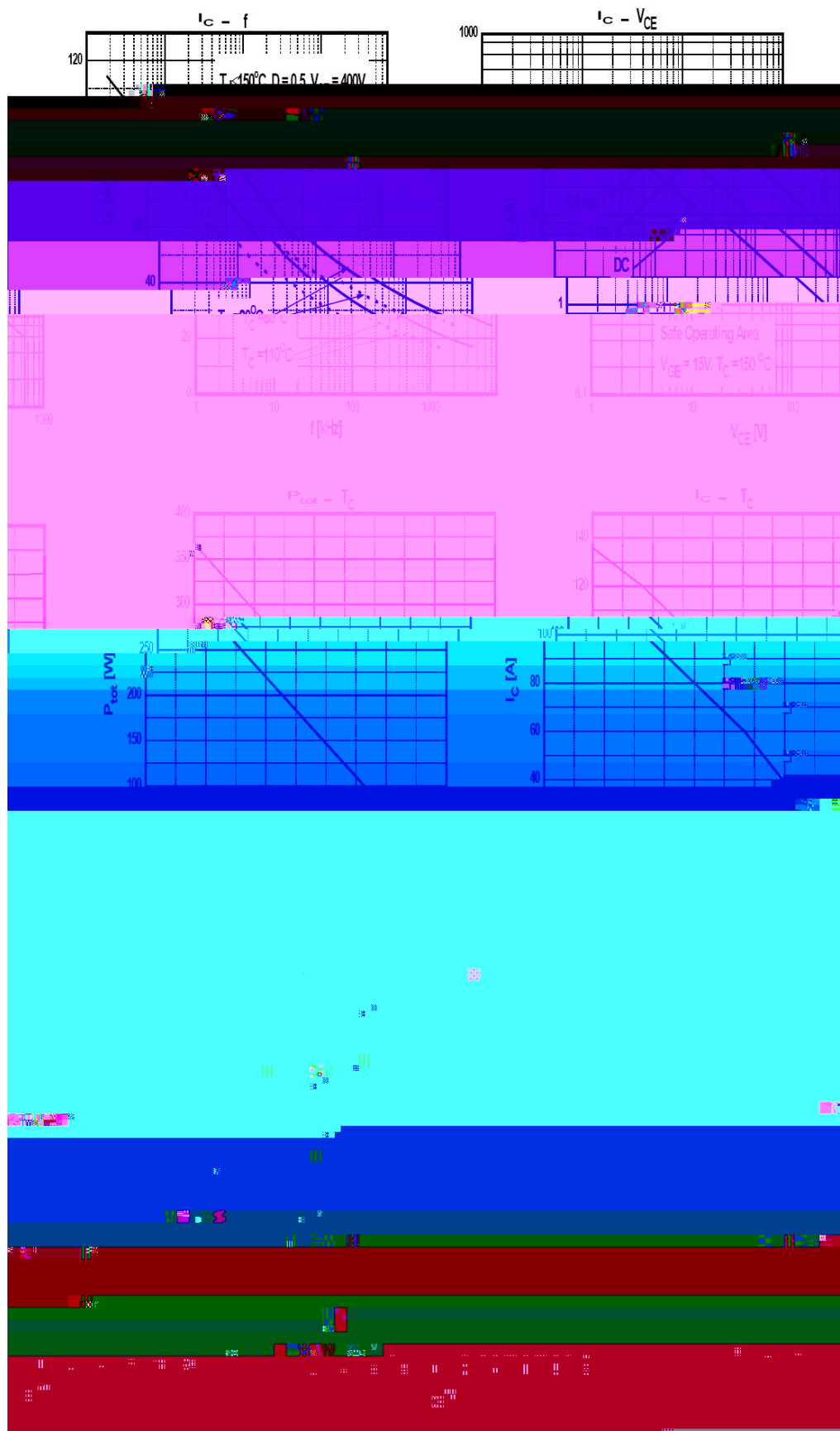
/ Electrical Characteristics(Ta=25)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-emitter breakdown voltage	V_{CES}	$V_{GE}=0V$ $I_{CE}=1.0mA$	650	-	-	V
Zero gate voltage Collector current	I_{CES}	$V_{GE}=0V$ $V_{CE}=650V$	-	-	4	μA
Gate-body leakage current	I_{GES}	$V_{GE}=\pm 20V$ $V_{CE}=0V$	-	-	± 100	nA
Gate threshold voltage	$V_{GE(th)}$	$I_C=0.8mA$ $V_{CE}=V_{GE}$	5.3	5.7	6.3	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=60A$ $V_{GE}=15V$	-	2.2	-	V
Input capacitance	C_{ies}	$V_{CE}=25V$ $f=1MHz$ $V_{GE}=0V$	-	5150	-	pF
Output capacitance	C_{oes}		-	300	-	
Reverse transfer capacitance	C_{res}		-	65	-	

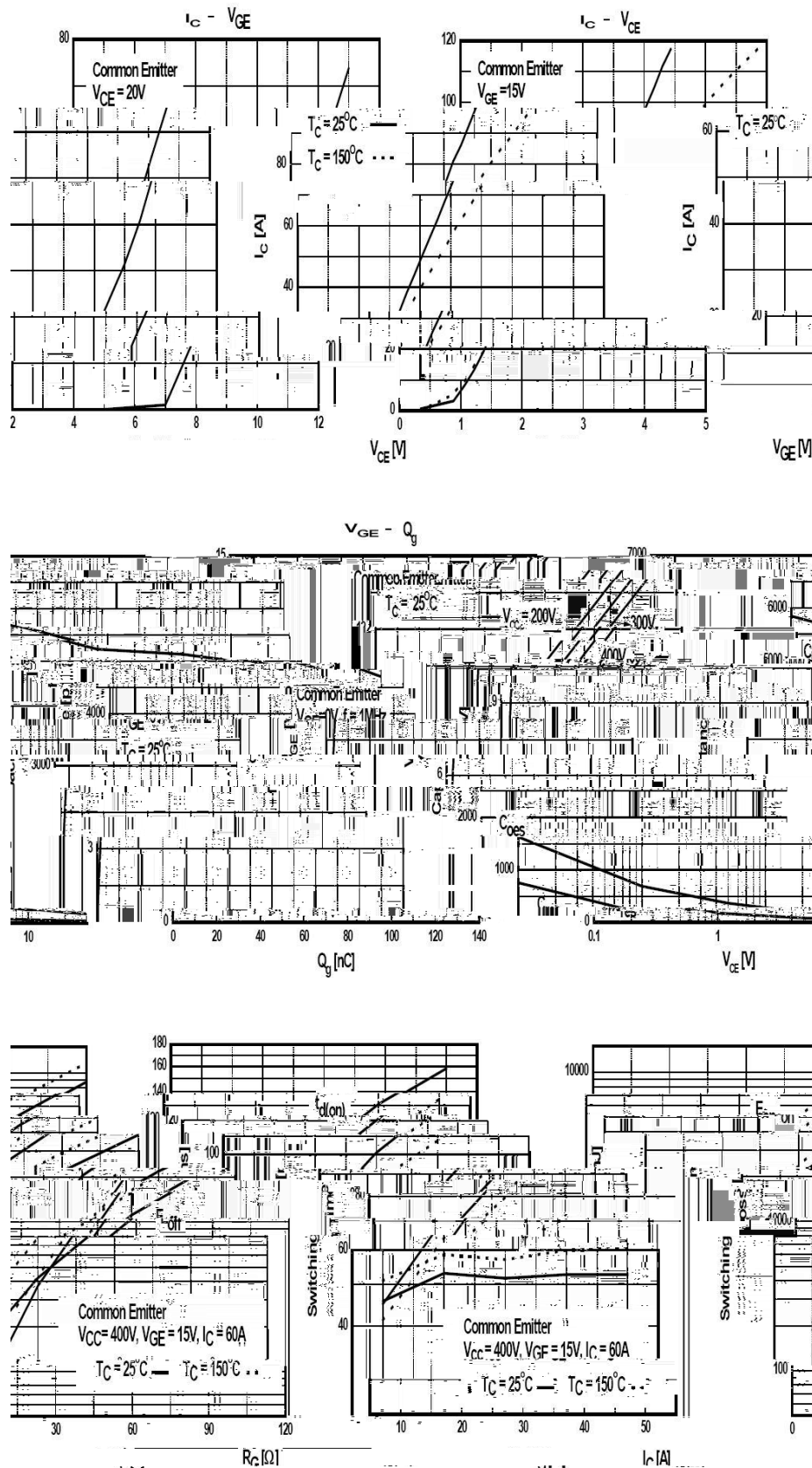
/ Electrical Characteristics(Ta=25)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input capacitance	C_{ies}	$V_{CE}=25V$ $V_{GE}=0V$ $f=1MHz$	-	5150	-	pF
Output capacitance	C_{oes}		-	300	-	
Reverse transfer capacitance	C_{res}		-	65	-	
Turn-on delay time	$t_{d(ON)}$	$V_{CE}=400V$ $I_C=60A$, $R_G=3\Omega$ $V_{GE}=0/15V$ Inductive Load	-	35	-	ns
Rise time	t_r		-	35	-	
Turn-off delay time	$t_{d(OFF)}$		-	107	-	
Fall time	t_f		-	36	-	
Turn-On Switching Loss	E_{on}		-	2.05		mJ
Turn-Off Switching Loss	E_{off}		-	1.11		
Total Switching Loss	E_{ts}		-	3.16		
Total gate charge	Q_G	$V_{CE}=480V$ $I_C=60A$ $V_{GE}=15V$	-	135	-	nC
Diode forward voltage	V_F	$I_F=60A$	-	2.54		V
Reverse recovery time	T_{rr}	$V_R=400V$ $I_F=30A$ $di/dt=500A/\mu S$	-	60		ns
Diode Peak Reverse Recovery Current	I_{rr}		-	12		A
Reverse recovery charge	Q_{rr}		-	0.4		μC

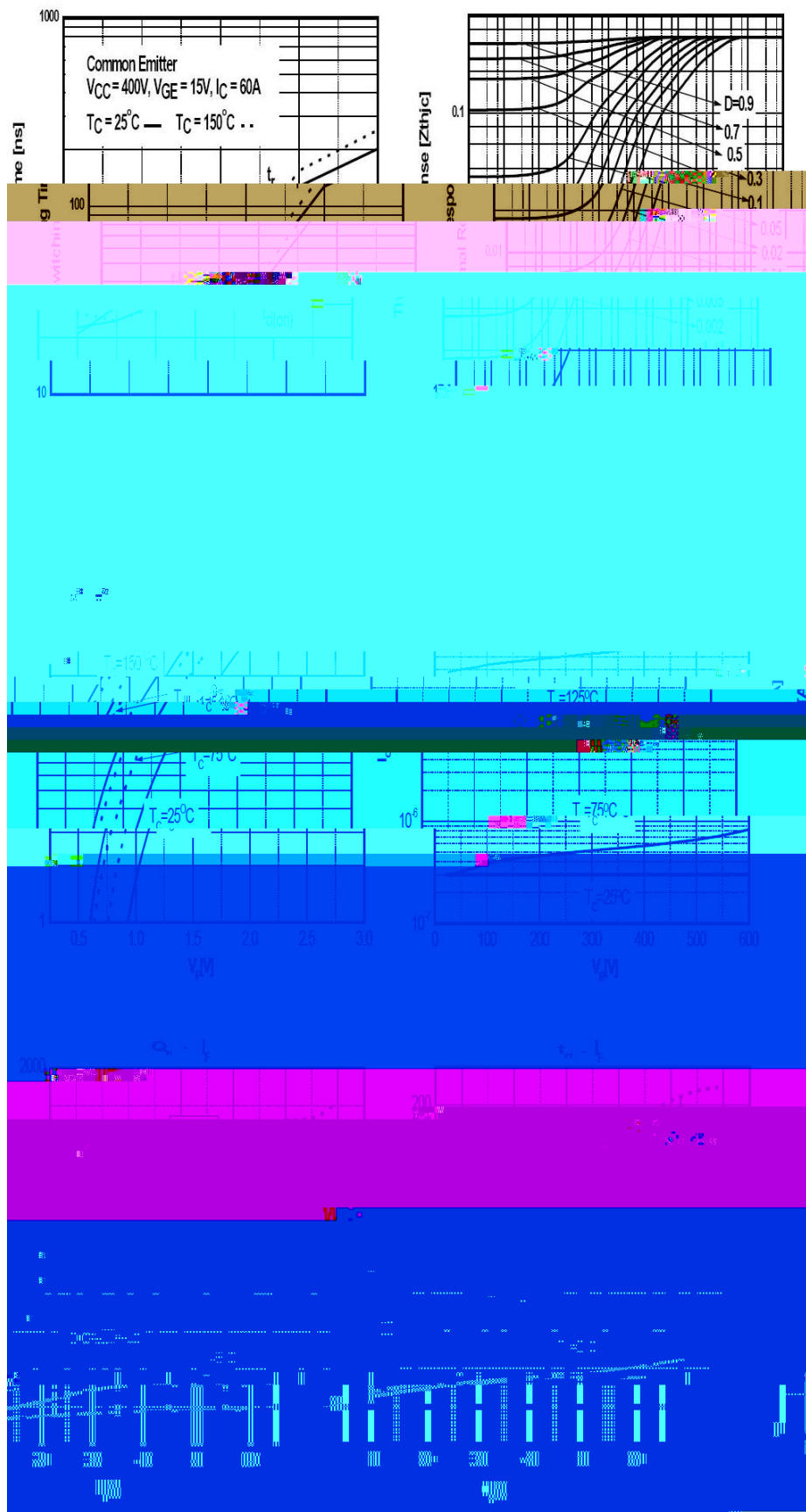
/ **Electrical Characteristic Curve**



/ Electrical Characteristic Curve



/ Electrical Characteristic Curve



Wave curve

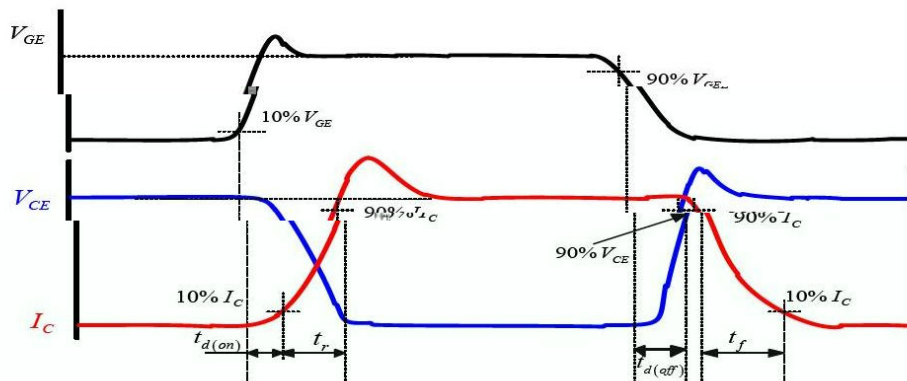


Figure A. Definition of switching times

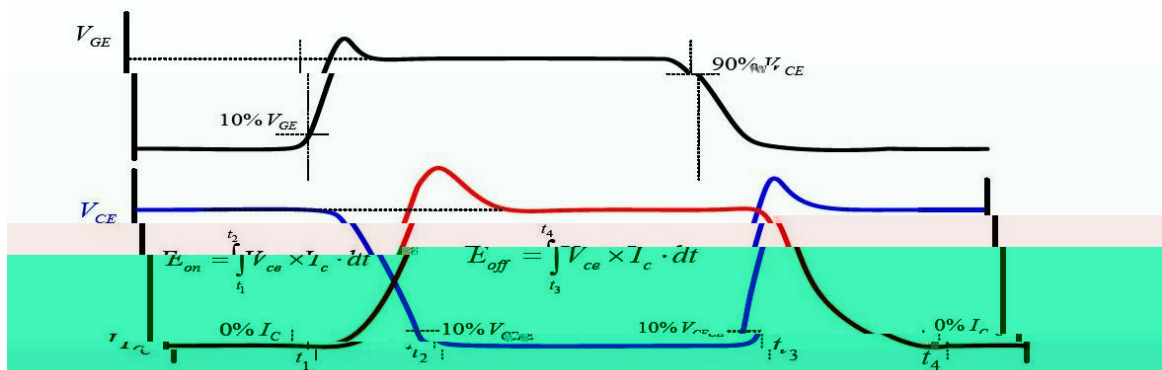


Figure B. Definition of switching losses

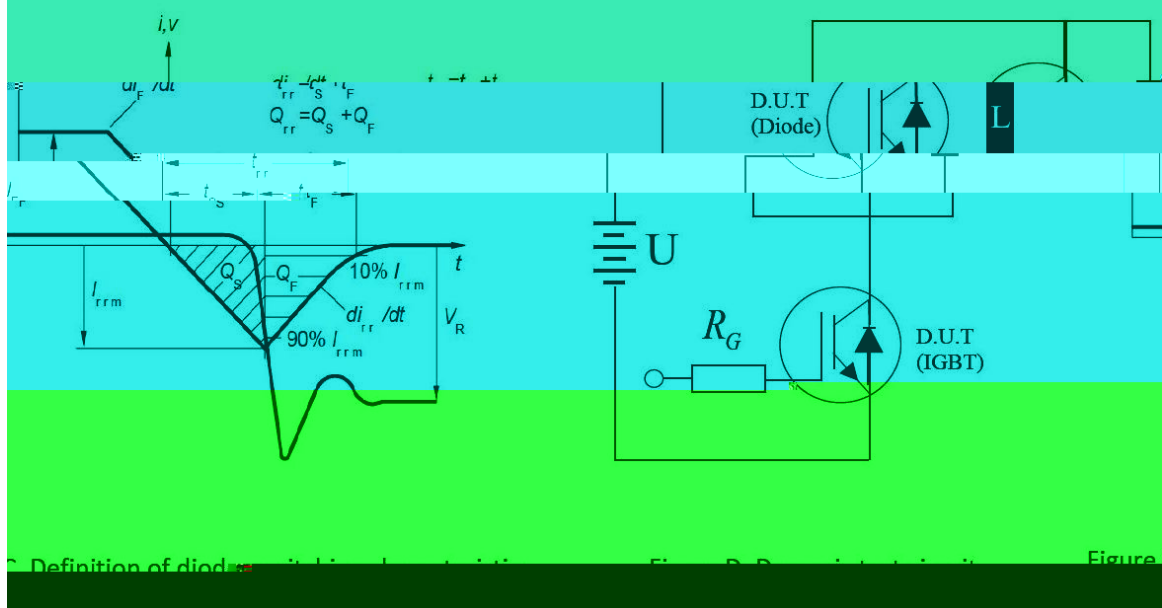
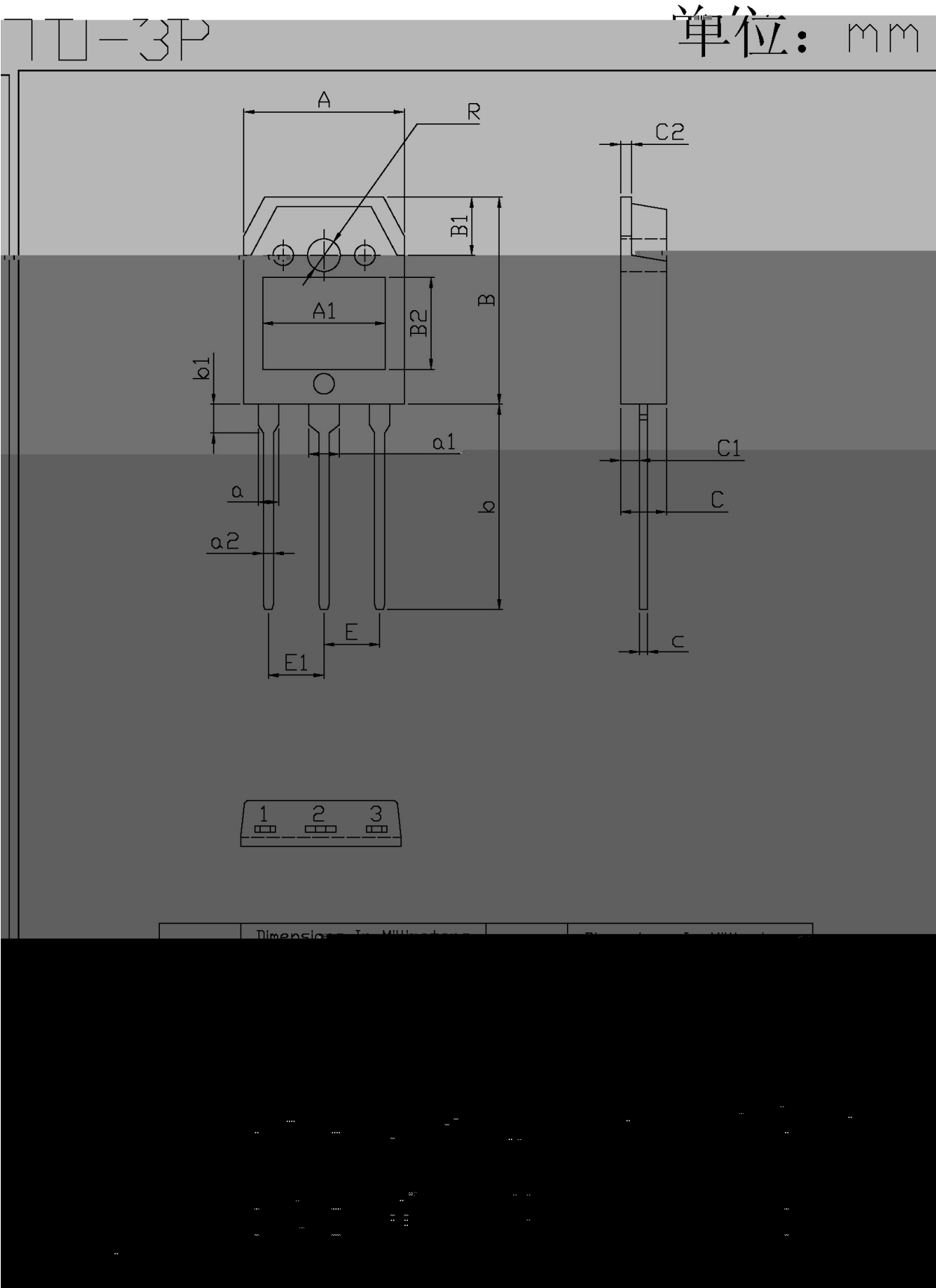
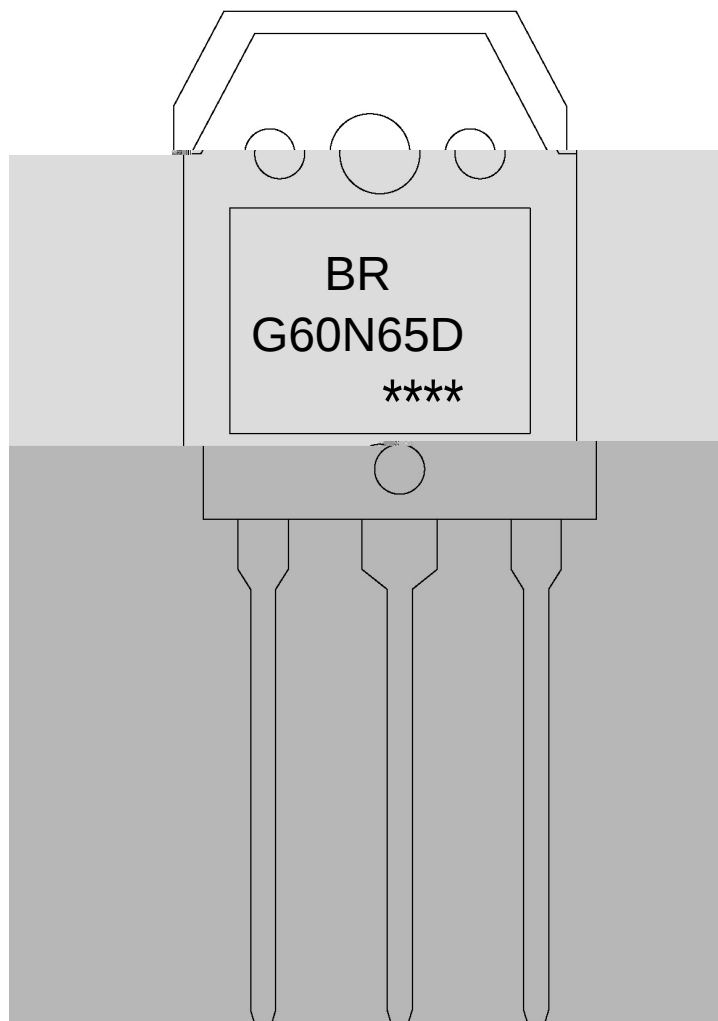


Figure C. Definition of diode reverse recovery time

/ Package Dimensions



/ Marking Instructions



BR:

G60N65D

Note:

BR: Company Code.

G60N65D: Product Type.

****: 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. |