N-Channel Insulated Gate Bipolar Power Transistor

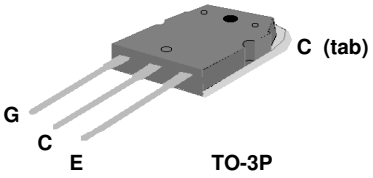
High Speed Switching

Low Saturation Voltage

Typical $V_{CE(sat)}$= 3.0V at I_C=30A

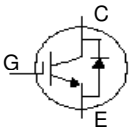
Internal "Co-Pak" Fast Recovery Diode

RoHS-compliant, halogen-free TO-3P package



TO-3P

V_{CES}	1200V
I_C	30A



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GE}	Gate-Emitter Voltage	±30	V
I_C at T_C=25℃	Continuous Collector Current	60	A
I_C at T_C=100℃	Continuous Collector Current	30	A
I_{CM}	Pulsed Collector Current[1]	160	A
I_F at T_C=100℃	Diode Continuous Forward Current	12	A
I_{FM}	Diode Pulse Forward Current	75	A
P_D at T_C=25℃	Maximum Power Dissipation	208	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
T_L	Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds .	300	℃

Notes:

1.Repetitive rating : Pulse width limited by maximum junction temperature.

Thermal Data

Symbol	Parameter	Value	Units
Rthj-c (IGBT)	Thermal Resistance Junction-Case	0.6	℃/W
Rthj-c (Diode)	Thermal Resistance Junction-Case	1.6	℃/W
Rthj-a	Thermal Resistance Junction-Ambient	40	℃/W

Electrical Specifications at T_j=25℃ (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{CES}	Collect-to-Emitter Breakdown Voltage	V_{GE}=0V, I_C=250uA	1200	-	-	V
I_{GES}	Gate-to-Emitter Leakage Current	V_{GE}=±30V, V_{CE}=0V	-	-	±500	nA
I_{CES}	Collector-Emitter Leakage Current	V_{CE}=1200V, V_{GE}=0V	-	-	1	mA
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C=30A	-	3	3.6	V
		V_{GE}=15V, I_C=60A	-	3.8	-	V
$V_{GE(th)}$	Gate Threshold Voltage	V_{CE}=V_{GE}, I_C=1mA	3	4.4	7	V
Q_g	Total Gate Charge	I_C=30A	-	55	88	nC
Q_{ge}	Gate-Emitter Charge	V_{CC}=500V	-	12	-	nC
Q_{gc}	Gate-Collector Charge	V_{GE}=15V	-	27	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V,	-	20	-	ns
t_r	Rise Time	I_c=30A,	-	20	-	ns
$t_{d(off)}$	Turn-off Delay Time	V_{GE}=15V,	-	65	-	ns
t_f	Fall Time	R_G=5Ω,	-	200	300	ns
E_{on}	Turn-On Switching Loss	Inductive Load	-	1.8	-	mJ
E_{off}	Turn-Off Switching Loss		-	1.1	-	mJ
C_{ies}	Input Capacitance	V_{GE}=0V	-	1320	2110	pF
C_{oes}	Output Capacitance	V_{CE}=30V	-	105	-	pF
C_{res}	Reverse Transfer Capacitance	f=1.0MHz	-	9	-	pF

Electrical Characteristics of Diode at T_j=25℃ (unless otherwise specified)

V_{F-1}	Forward Voltage	I_F=10A	-	1.7	2	V
V_{F-2}	Forward Voltage	I_F=20A	-	1.8	2.4	V
t_{rr}	Reverse Recovery Time	I_F=10A	-	80	-	ns
Q_{rr}	Reverse Recovery Charge	di/dt = 100 A/μs	-	22	-	nC

Ordering Information

AP30G120SW-3TB **RoHS-compliant halogen-free TO-3P, shipped in tubes (30pcs/tube)**

Typical Electrical Characteristics

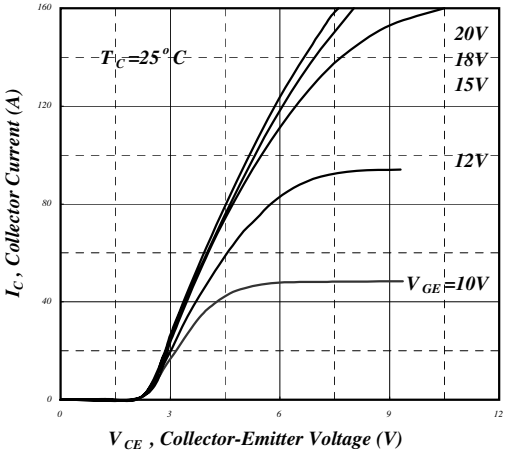


Fig 1. Typical Output Characteristics

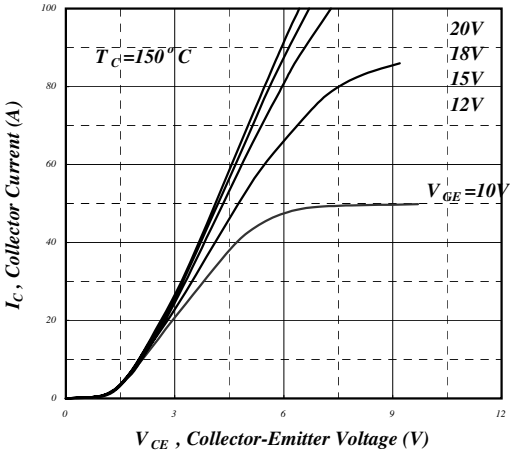


Fig 2. Typical Output Characteristics

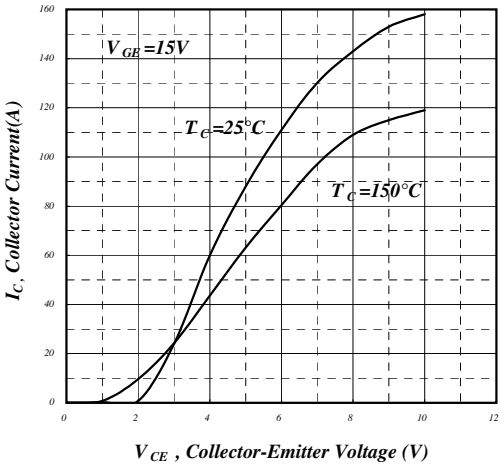


Fig 3. Typical Saturation Voltage Characteristics

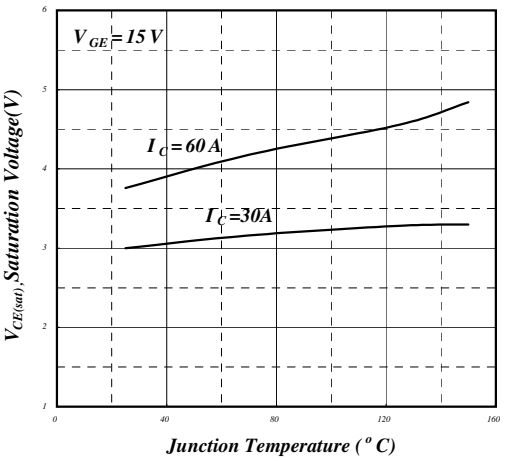


Fig 4. Typical Collector- Emitter Voltage vs. Junction Temperature

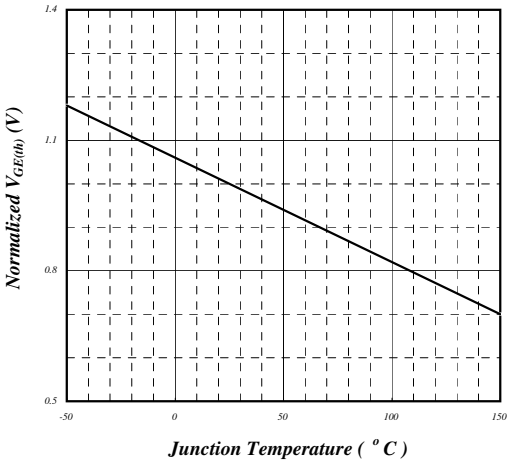


Fig 5. Gate Threshold Voltage vs. Junction Temperature

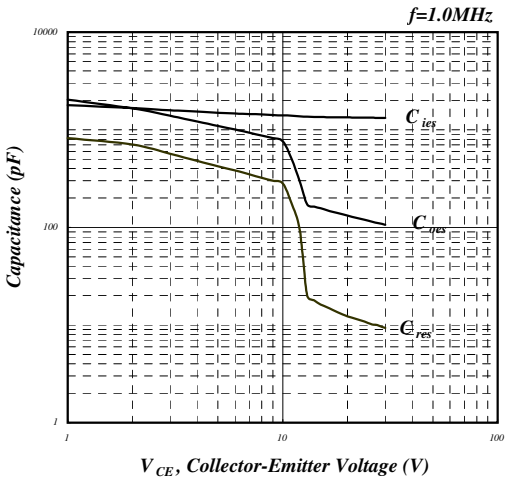


Fig 6. Typical Capacitance Characterisitics

Typical Electrical Characteristics (cont.)

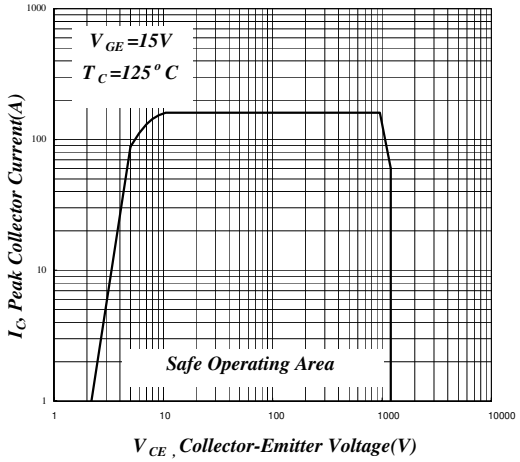


Fig 7. Turn-off SOA

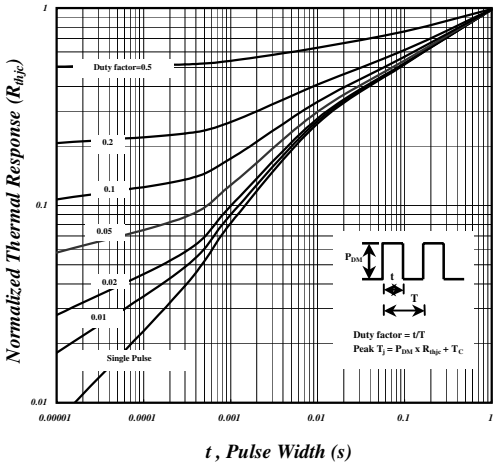


Fig 8. Effective Transient Thermal Impedance

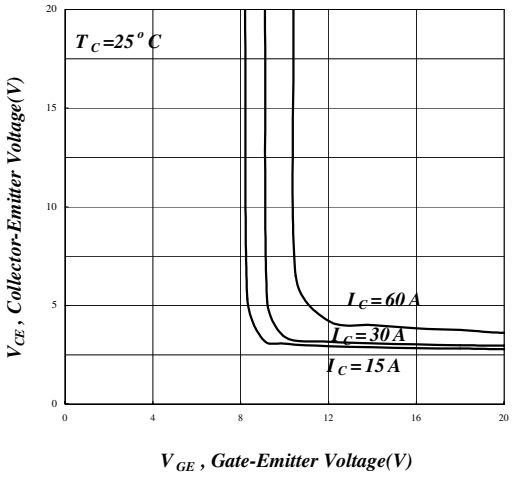


Fig 9. Saturation Voltage vs. V_{GE}

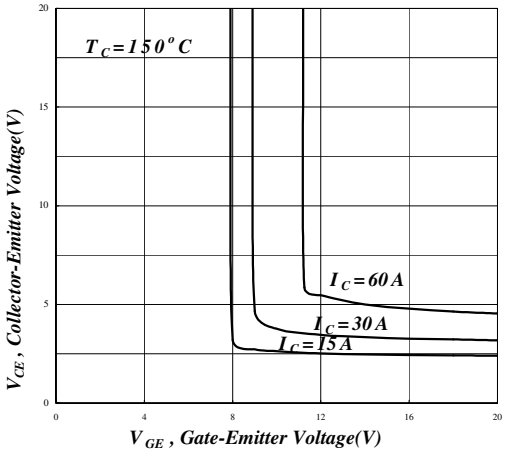


Fig 10. Saturation Voltage vs. V_{GE}

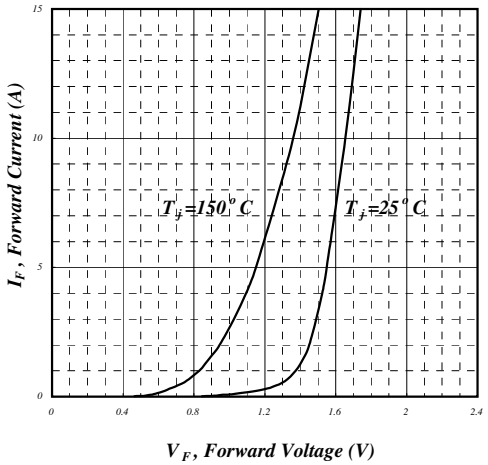


Fig11. Forward Characteristics of the Co-packaged Diode

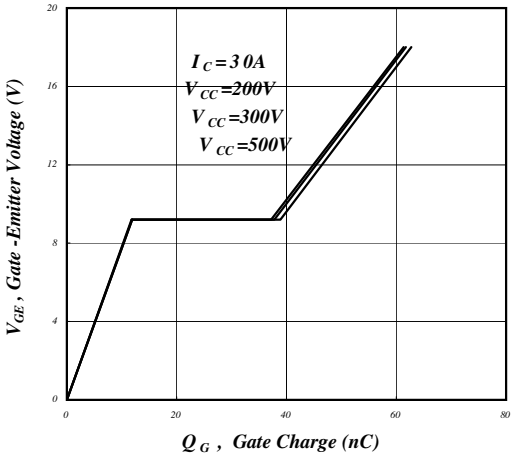
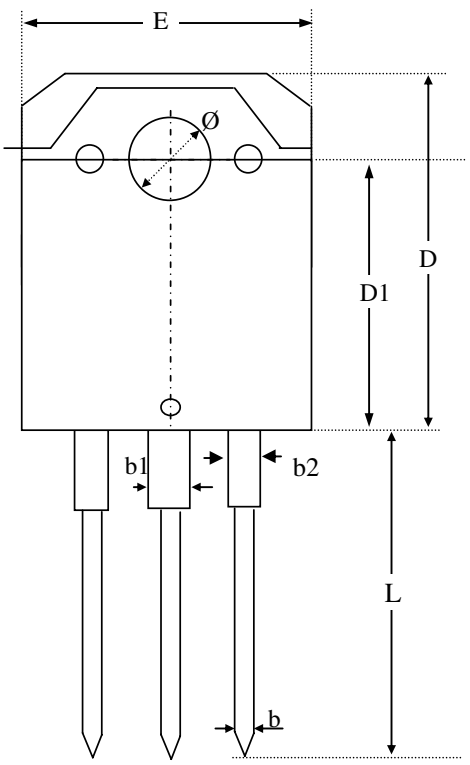
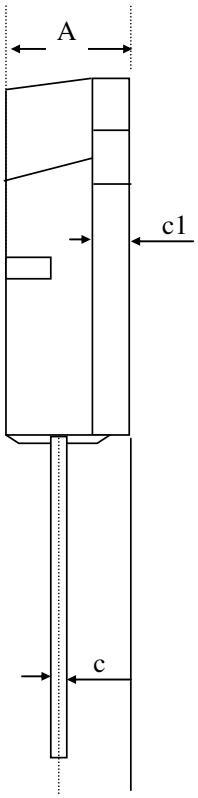


Fig 12. Gate Charge Characterisitics

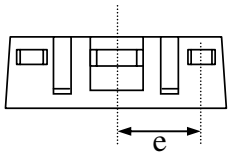
Package Dimensions: TO-3P





YMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.50	4.80	5.10
b	0.90	1.00	1.30
b1	1.80	2.50	3.20
b2	1.30	--	2.30
c	0.40	0.60	0.90
c1	1.40	--	2.20
D	19.70	20.00	20.30
D1	14.70	15.00	15.30
E	15.30	--	16.10
e	4.45	5.45	6.45
L	17.50	--	20.50
Ø	3.00	3.20	3.40

1. All dimensions are in millimeters.
2. Dimensions do not include mold protrusions.



Marking Information:

Laser Marking