N-Channel Insulated Gate Bipolar Power Transistor

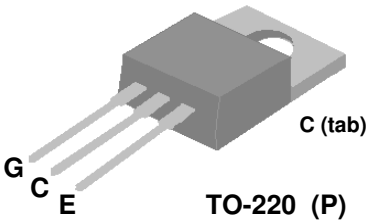
High Speed Switching

Low Saturation Voltage

Typical $V_{CE(sat)}$ = 1.7V at I_C=19A

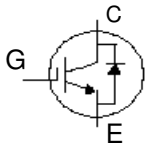
Industry-standard TO-220 package

RoHS-compliant, halogen-free



TO-220 (P)

V_{CES}	600V
I_C	19A



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{CES}	Collector-Emitter Voltage	600	V
V_{GE}	Gate-Emitter Voltage	±20	V
I_C at T_C=25°C	Collector Current	33	A
I_C at T_C=100°C	Collector Current	19	A
I_{CM}	Pulsed Collector Current[1]	72	A
I_F at T_C=100°C	Diode Forward Current	8	A
I_{FM}	Diode Pulse Forward Current	40	A
P_D at T_C=25°C	Maximum Power Dissipation	78	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	150	°C

Notes:

1. Pulse width limited by maximum junction temperature.

Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Thermal Resistance Junction-Case	1.6	°C/W
Rthj-c(Diode)	Thermal Resistance Junction-Case	2.4	°C/W
Rthj-a	Thermal Resistance Junction-Ambient	62	°C/W

Electrical Specifications at T_j=25°C (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_{GES}	Gate-to-Emitter Leakage Current	V_{GE}=±20V, V_{CE}=0V	-	-	±100	nA
I_{CES}	Collector-Emitter Leakage Current	V_{CE}=600V, V_{GE}=0V	-	-	1	mA
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C=19A	-	1.7	2.2	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C=25A	-	1.9	-	V
$V_{GE(th)}$	Gate Threshold Voltage	V_{CE}=V_{GE}, I_C=250uA	2	-	6	V
Q_g	Total Gate Charge	I_C=20A	-	95	150	nC
Q_{ge}	Gate-Emitter Charge	V_{CC}=480V	-	16	-	nC
Q_{gc}	Gate-Collector Charge	V_{GE}=15V	-	35	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{CE}=480V,	-	40	-	ns
t_r	Rise Time	I_c=20A,	-	20	-	ns
$t_{d(off)}$	Turn-off Delay Time	V_{GE}=15V,	-	140	-	ns
t_f	Fall Time	R_G=5Ω,	-	200	400	ns
E_{on}	Turn-On Switching Loss	Induc ive Load	-	0.1	-	mJ
E_{off}	Turn-Off Switching Loss		-	1	-	mJ
C_{ies}	Input Capacitance	V_{GE}=0V	-	2760	4400	pF
C_{oes}	Output Capacitance	V_{CE}=30V	-	65	-	pF
C_{res}	Reverse Transfer Capacitance	f=1.0MHz	-	40	-	pF

V_F	FRD Forward Voltage	I_F=8A	-	1.8	2.4	V
t_{rr}	FRD Reverse Recovery Time	I_F=8A	-	30	-	ns
Q_{rr}	FRD Reverse Recovery Charge	di/dt = 100 A/μs	-	30	-	nC

Ordering Information

AP20GT60ASP-HF-3TB : in RoHS-compliant halogen-free TO-220, shipped in tubes (50pcs/tube)

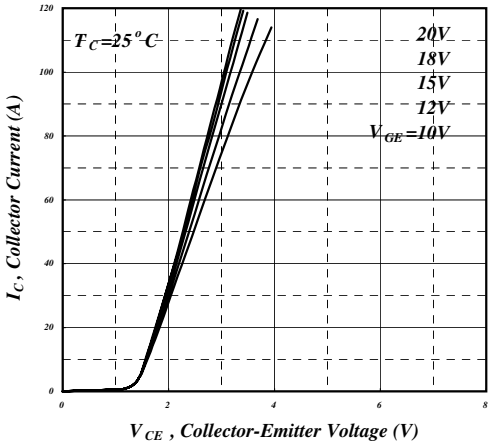


Fig 1. Typical Output Characteristics

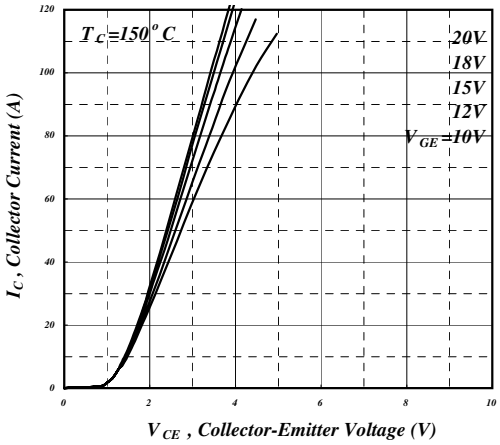


Fig 2. Typical Output Characteristics

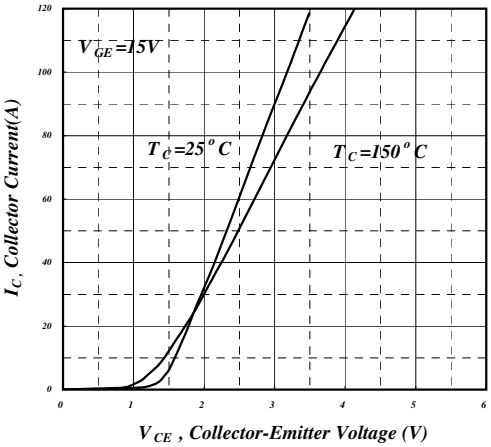


Fig 3. Typical Saturation Voltage Characteristics

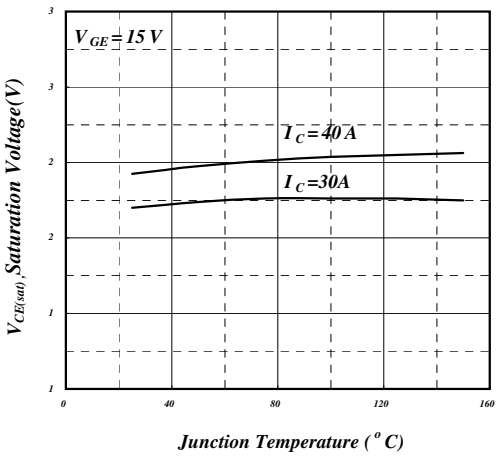


Fig 4. Typical Collector- Emitter Voltage vs. Junction Temperature

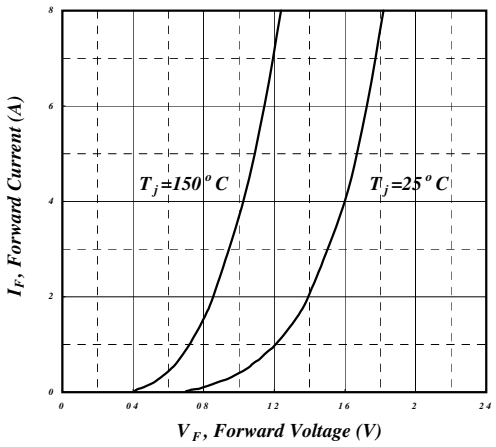


Fig 5. Forward Characteristics of the Diode

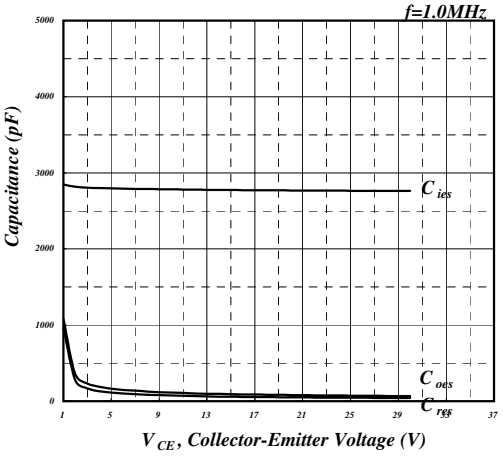


Fig 6. Typical Capacitance Characterisitics

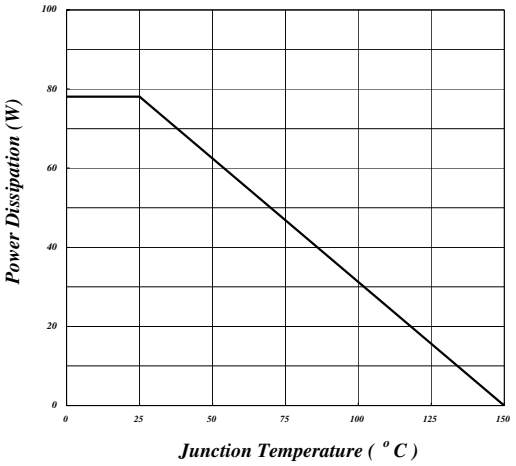


Fig7. Power Dissipation vs. Junction Temperature

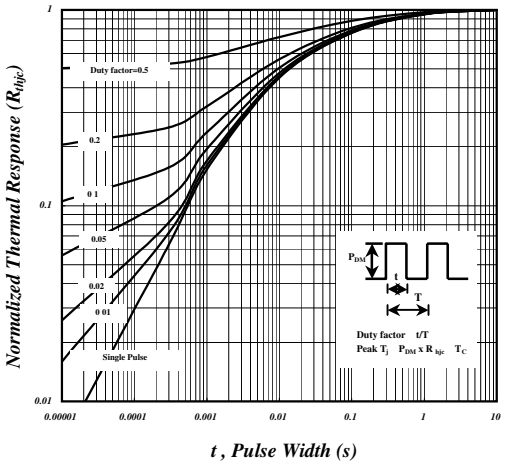


Fig 8. Effective Transient Thermal Impedance

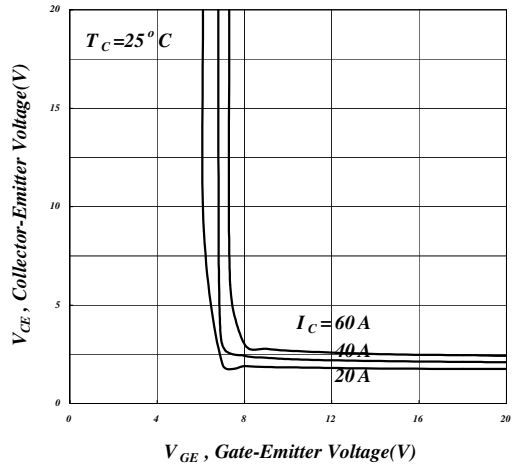


Fig 9. Saturation Voltage vs. V_{GE}

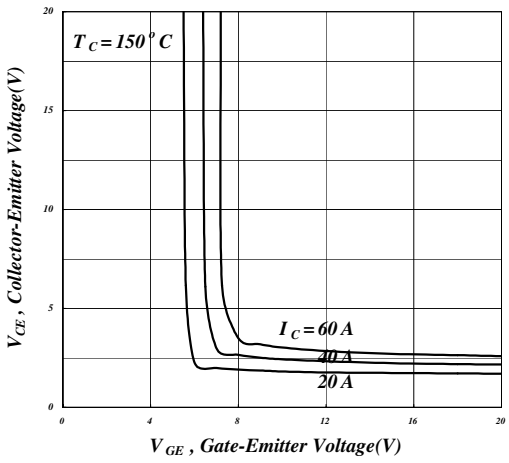


Fig 10. Saturation Voltage vs. V_{GE}

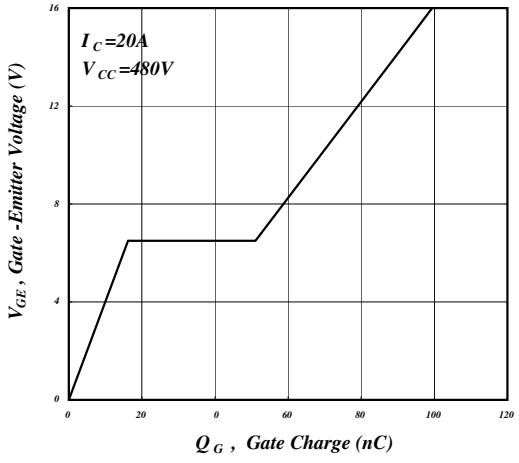


Fig 11. Gate Charge Characterisitics

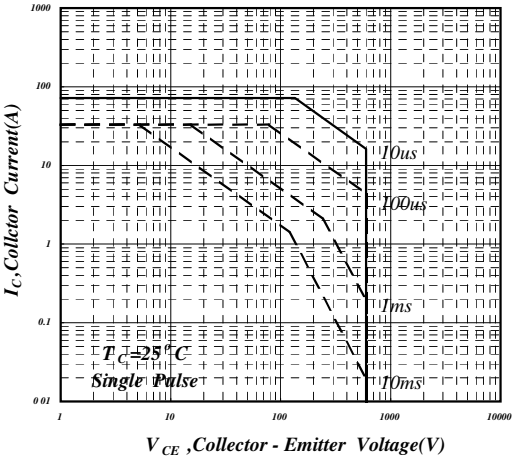
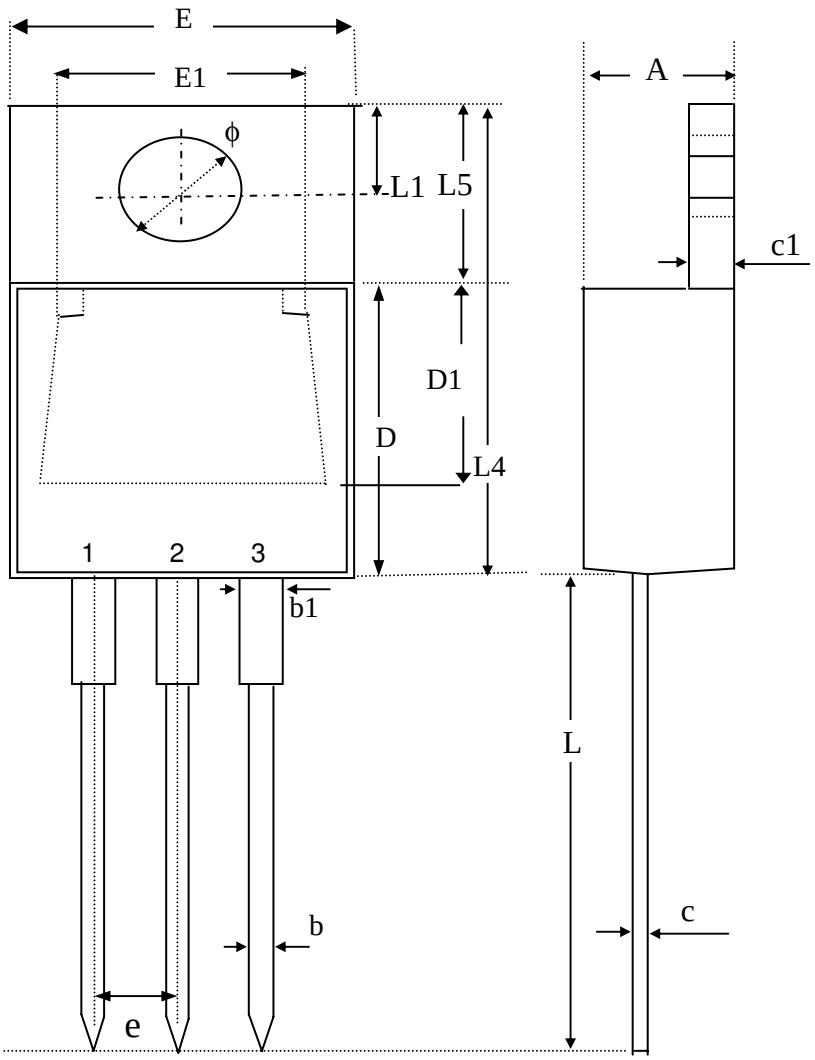


Fig 12. SOA Characteristics

Package Dimensions: TO-220



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.40	4.60	4.80
b	0.76	0.88	1.00
D	8.60	8.80	9.00
c	0.36	0.43	0.50
E	9.80	10.10	10.40
L4	14.70	15.00	15.30
L5	6.20	6.40	6.60
D1	5.10 REF.		
c1	1.25	1.35	1.45
b1	1.17	1.32	1.47
L	13.25	13.75	14.25
e	2.54 REF.		
L1	2.60	2.75	2.89
ϕ	3.71	3.84	3.96
E1	7.4 REF,		

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

Marking Information: