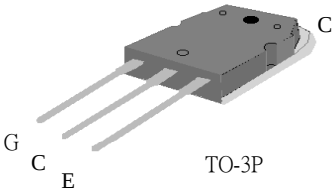
Advanced Power Electronics Corp.

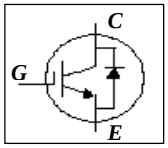
N-CHANNEL INSULATED GATE BIPOLAR TRANSISTOR

Features

- ▼ **High Speed Switching**
- ▼ **Low Saturation Voltage**
  $V_{CE(sat),Typ.}$=1.85V@I_C=45A
- ▼ **Built-in Fast Recovery Diode**
- ▼ **RoHS Compliant & Halogen-Free**



V_{CES}	600V
I_C	45A



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{CES}	Collector-Emitter Voltage	600	V
V_{GE}	Gate-Emitter Voltage	±30	V
I_C@T_C=25°C	Collector Current	90	A
I_C@T_C=100°C	Collector Current	45	A
I_{CM}	Pulsed Collector Current	180	A
I_F@T_C=100°C	Diode Forward Current	20	A
P_D@T_C=25°C	Maximum Power Dissipation	250	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	150	°C
T_L	Maximum Lead Temp. for Soldering Purposes , 1/8" from case for 5 seconds .	300	°C

Notes:

1.Pulse width limited by max. junction temperature .

Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Thermal Resistance Junction-Case	0.5	°C/W
Rthj-c(Diode)	Thermal Resistance Junction-Case	1.2	°C/W
Rthj-a	Thermal Resistance Junction-Ambient	40	°C/W

Electrical Characteristics@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_{GES}	Gate-to-Emitter Leakage Current	V_{GE}=±30V, 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=45A	-	1.85	2.4	V
$V_{GE(th)}$	Gate Threshold Voltage	V_{CE}=V_{GE}, I_C=250uA	2.5	-	7.5	V
Q_g	Total Gate Charge	I_C=45A	-	118	188	nC
Q_{ge}	Gate-Emitter Charge	V_{CE}=400V	-	30	-	nC
Q_{gc}	Gate-Collector Charge	V_{GE}=15V	-	64	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{CE}=300V,	-	60	-	ns
t_r	Rise Time	I_c=45A,	-	50	-	ns
$t_{d(off)}$	Turn-off Delay Time	V_{GE}=15V,	-	140	-	ns
t_f	Fall Time	R_G=5Ω,	-	180	360	ns
E_{on}	Turn-On Switching Loss	Inductive Load	-	0.8	-	mJ
E_{off}	Turn-Off Switching Loss		-	1.4	-	mJ
C_{ies}	Input Capacitance	V_{GE}=0V	-	3200	5120	pF
C_{oes}	Output Capacitance	V_{CE}=30V	-	240	-	pF
C_{res}	Reverse Transfer Capacitance	f=1.0MHz	-	75	-	pF

V_F	FRD Forward Voltage	I_F=20A	-	1.45	1.8	V
t_{rr}	FRD Reverse Recovery Time	I_F=20A	-	60	-	ns
Q_{rr}	FRD Reverse Recovery Charge	di/dt = 100 A/us	-	120	-	nC

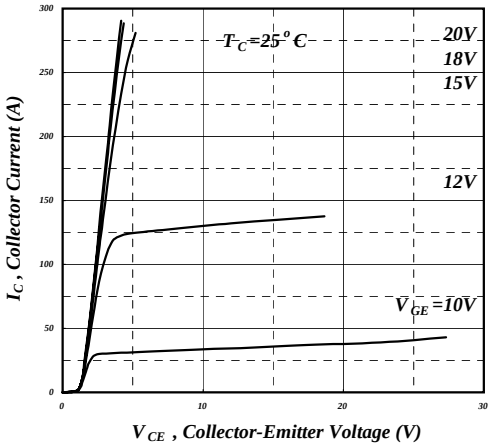


Fig 1. Typical Output Characteristics

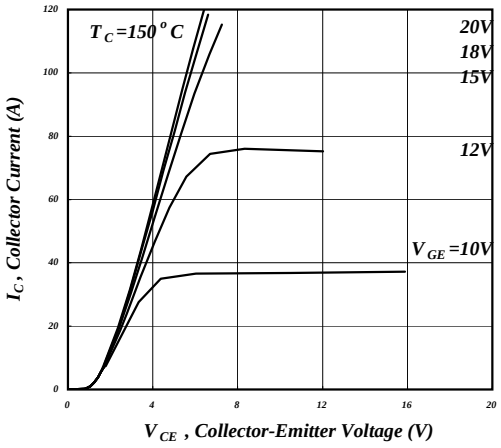


Fig 2. Typical Output Characteristics

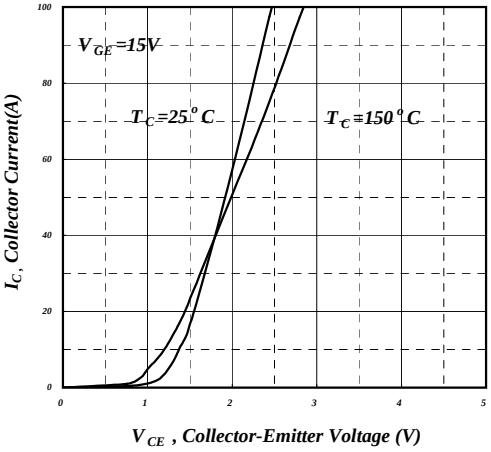


Fig 3. Typical Saturation Voltage Characteristics

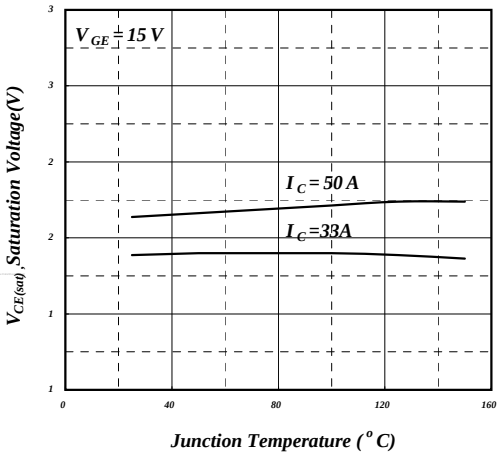


Fig 4. Typical Collector- Emitter Voltage v.s. Junction Temperature

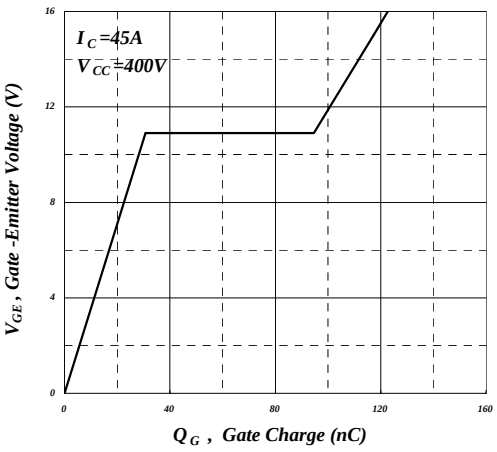


Fig 5. Gate Charge Characterisitics

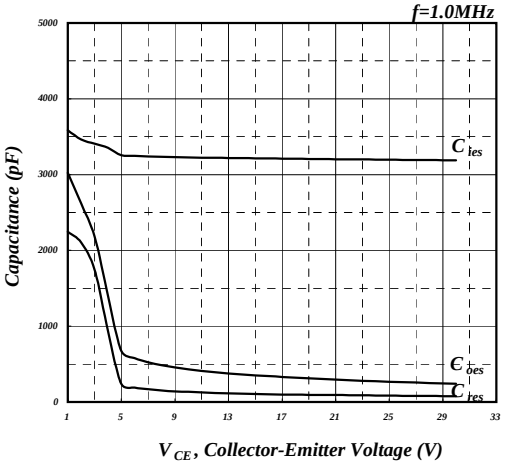


Fig 6. Typical Capacitance Characterisitics

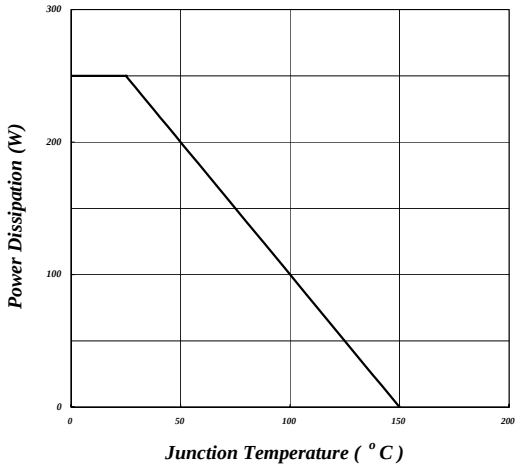


Fig 7. Power Dissipation vs. Junction Temperature

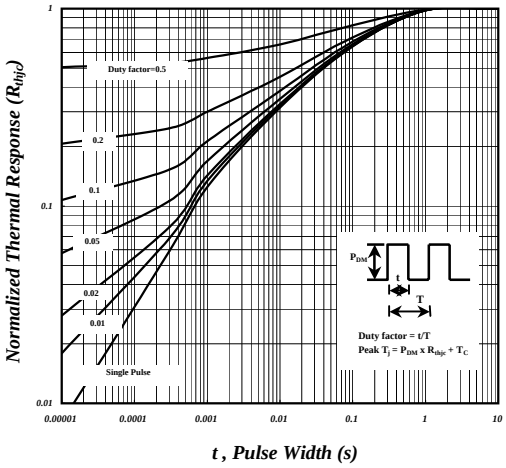


Fig 8. Effective Transient Thermal Impedance, Junction-to-Case (IGBT)

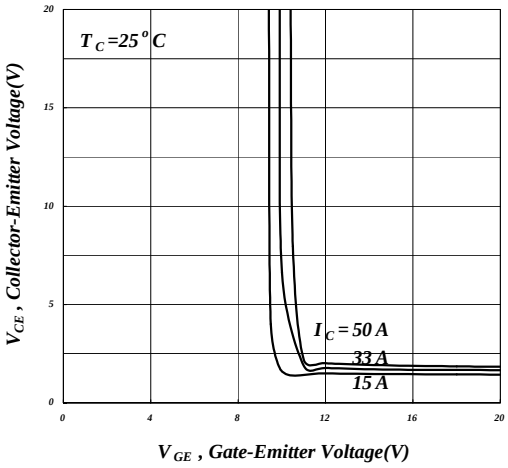


Fig 9. Saturation Voltage vs. V_{GE}

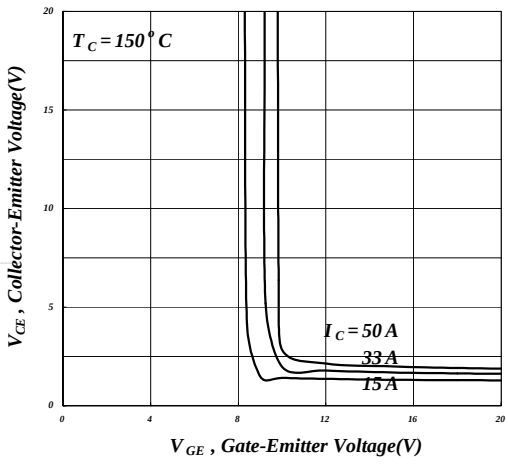


Fig 10. Saturation Voltage vs. V_{GE}

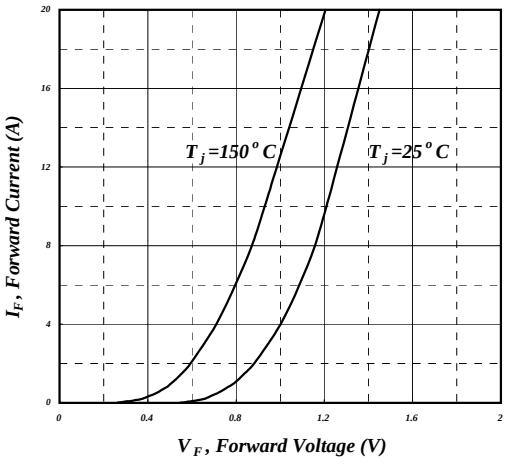


Fig 11. Forward Characteristic of Diode

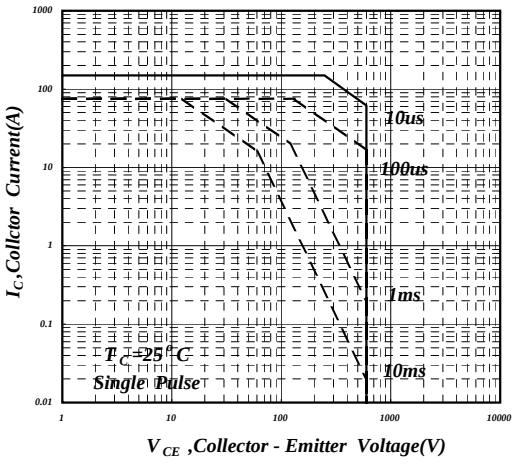


Fig 12. SOA Characteristics