Absolute Maximum Ratings

Parameter		**Symbol**	**Value**	**Unit**
Collector-Emitter Voltage		V_{CES}	600	V
Gate-Emitter Voltage		V_{GES}	20	V
Continuous Collector Current	T_C = 25 ℃	I_C	36	A
	T_C = 100 ℃		18	A
Pulsed Collector Current (Note 1)		I_{CM}	50	A
Diode Continuous Forward Current	T_C = 100 ℃	I_F	18	A
Diode Pulsed Forward Current (Note 1)		I_{FM}	100	A
Power Dissipation	T_C = 25 ℃	P_D	44	W
	T_C = 100 ℃		22	W
Operating Junction Temperature		T_{vj}	-55 ~ 175	℃
Storage Temperature Range		T_{STG}	-55 ~ 150	℃
Maximum lead tem100				

C

Electrical Characteristics of the IGBT T_{vj}=25 , unless otherwise noted

Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
SWITCHING (Note 2)						
Turn-On Delay Time	$t_{d(on)}$	V_{CC} = 400V, I_C = 9A R_G = 5 , V_{GE} = 15V Inductive Load, T_{vj} = 175 ℃	--	9	--	ns
Rise Time	t_r		--	11	--	ns
Turn-Off Delay Time	$t_{d(off)}$		--	158	--	ns
Fall Time	t_f		--	77	--	ns
Turn-On Switching Loss	E_{ON}		--	0.36	--	mJ
Turn-Off Switching Loss	E_{OFF}		--	0.19	--	mJ
Total Switching Loss	E_{TS}		--	0.55	--	mJ
Turn-On Delay Time	$t_{d(on)}$	V_{CC} = 400V, I_C = 18A R_G = 5 , V_{GE} = 15V Inductive Load, T_{vj} = 175 ℃	--	13	--	ns
Rise Time	t_r		--	17	--	ns
Turn-Off Delay Time	$t_{d(off)}$		--	138	--	ns
Fall Time	t_f		--	81	--	ns
Turn-On Switching Loss	E_{ON}		--	0.72	1.08	mJ
Turn-Off Switching Loss	E_{OFF}		--	0.43	0.65	mJ
Total Switching Loss	E_{TS}		--	1.15	1.73	mJ
Short Circuit Withstanding Time	t_{SC}	V_{CC} = 300V, V_{GE} = 15V, T_{vj} = 125	5	--	--	s

Not subject to production test verified by design/characterization

Electrical Characteristics of the DIODE T_{vj}=25 , unless otherwise noted

Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_{FM}	I_F = 9A, T_{vj} = 25 ℃	--	1.66	--	V
		I_F = 9A, T_{vj} = 125 ℃	--	1.43	--	V
		I_F = 9A, T_{vj} = 175 ℃	--	1.31	--	V
		I_F = 18A, T_{vj} = 25 ℃	--	2.01	--	V
		I_F = 18A, T_{vj} = 125 ℃	--	1.81	--	V
		I_F = 18A, T_{vj} = 175 ℃	--	1.73	--	V
Reverse Recovery Time	t_{rr}	I_F = 9A, di/dt = 200A/µs, T_{vj} = 25 ℃	--	45	--	ns
Reverse Recovery Current	I_{rr}		--	4.3	--	A
Reverse Recovery Charge	Q_{rr}		--	112	--	nC
Reverse Recovery Time	t_{rr}	I_F = 9A, di/dt = 200A/µs, T_{vj} = 175 ℃	--	116	--	ns
Reverse Recovery Current	I_{rr}		--	9.0	--	A
Reverse Recovery Charge	Q_{rr}		--	605	--	nC
Reverse Recovery Time	t_{rr}	I_F = 18A, di/dt = 200A/µs, T_{vj} = 25 ℃	--	52	--	ns
Reverse Recovery Current	I_{rr}		--	5.1	--	A
Reverse Recovery Charge	Q_{rr}		--	148	--	nC
Reverse Recovery Time	t_{rr}	I_F = 18A, di/dt = 200A/µs, T_{vj} = 175 ℃	--	118	--	ns
Reverse Recovery Current	I_{rr}		--	10.1	--	A
Reverse Recovery Charge	Q_{rr}		--	730	--	nC

IGBT Characteristics

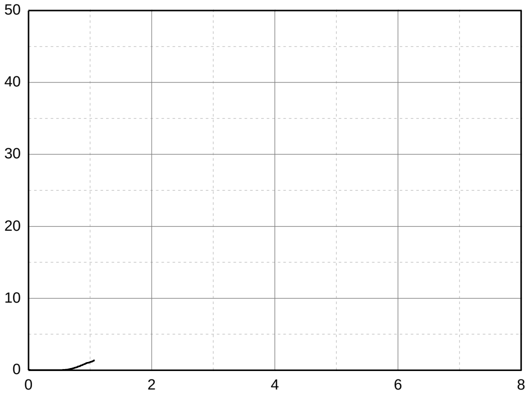


Fig. 1 IGBT Output Characteristics

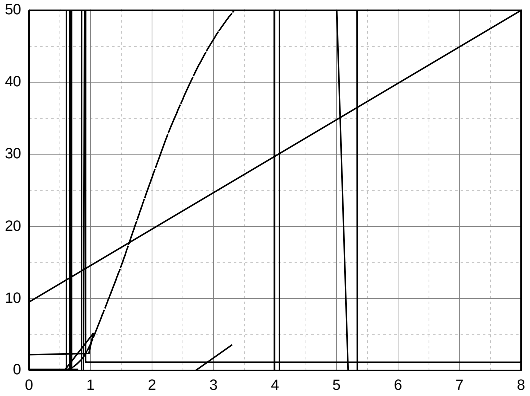


Fig. 2 IGBT Output Characteristics

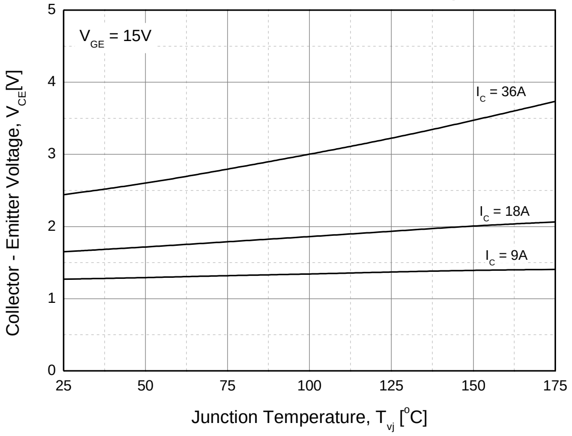


Fig. 3 IGBT Saturation Voltage vs. Junction Temperature

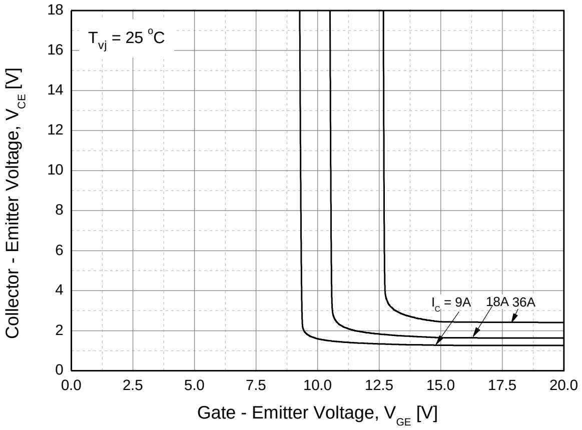


Fig. 4 IGBT Saturation Voltage vs. Gate Bias

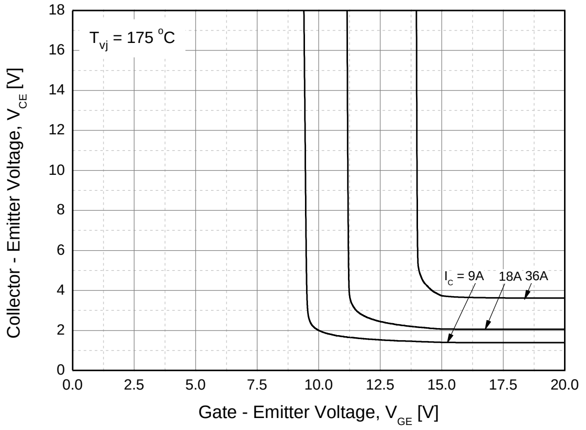
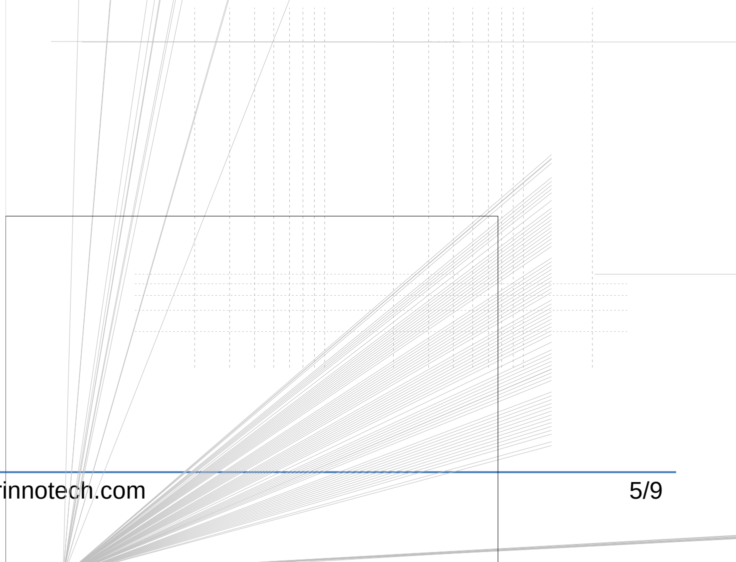


Fig. 5 IGBT Saturation Voltage vs. Gate Bias

Fig. 6 IGBT Capacitance Characteristics



IGBT Characteristics

Fig. 7 Turn-on Time vs. Gate Resistor

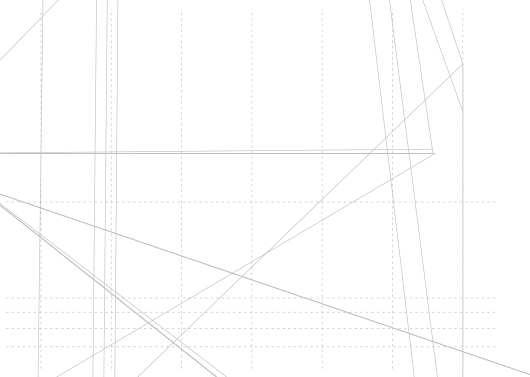


Fig. 8 Turn-off Time vs. Gate Resistor

Fig. 9 Switching Loss vs. Gate Resistor

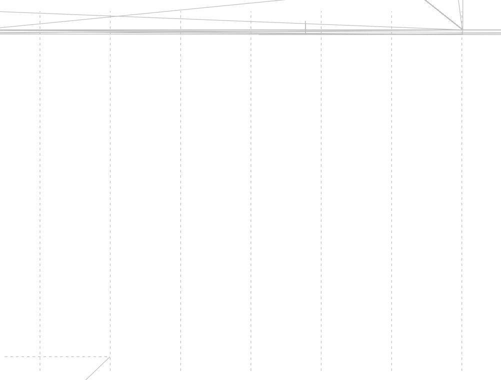


Fig. 10 Turn-on Time vs. Collector Current

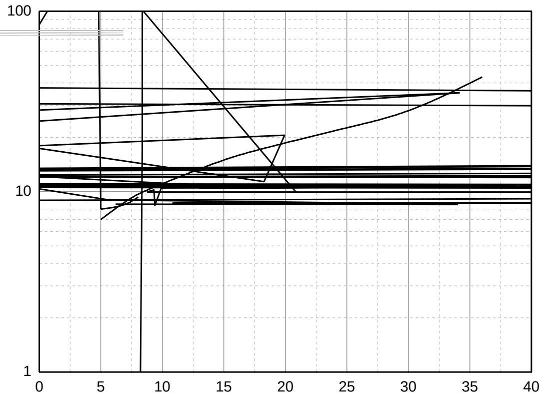


Fig. 11 Turn-off Time vs. Collector Current

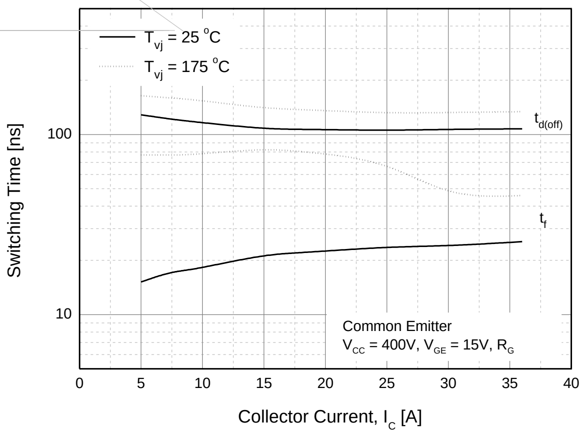
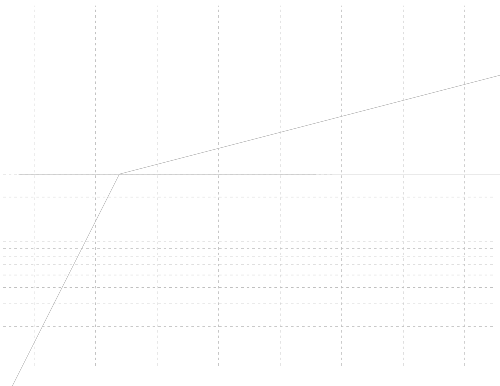


Fig. 12 Switching Loss vs. Collector Current



IGBT Characteristics

Fig. 13 Gate Charge Characteristics

Fig. 14 SOA

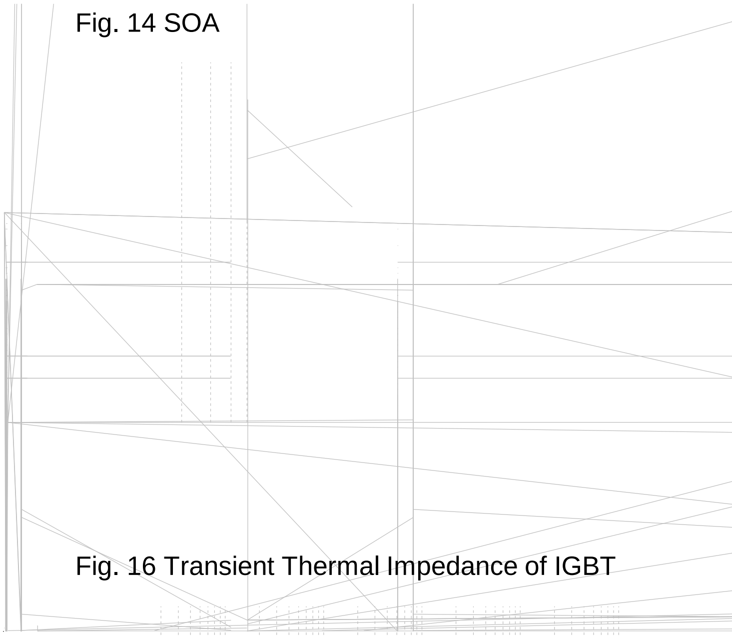


Fig. 15 RBSOA

Fig. 16 Transient Thermal Impedance of IGBT

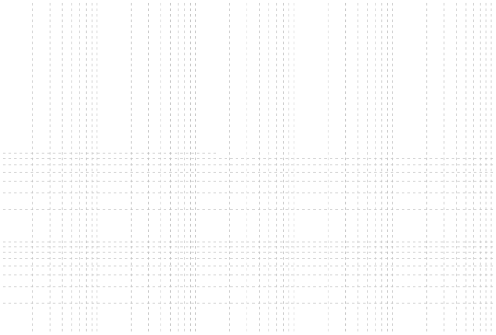
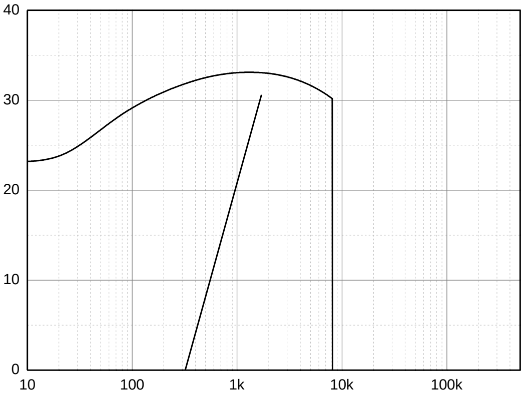


Fig. 17 Load Current vs. Frequency



DIODE Characteristics

Fig. 18 Diode Conduction Characteristics

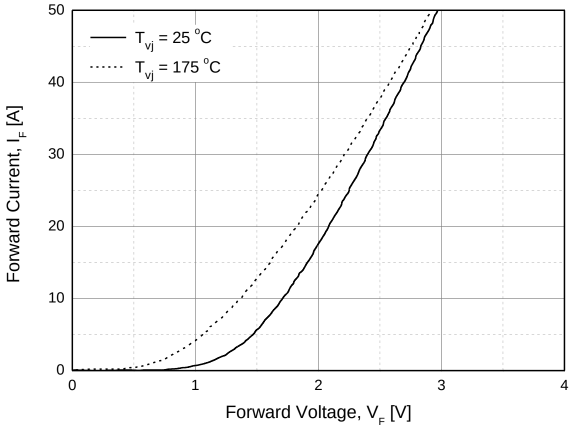


Fig. 19 Reverse Recovery Current vs. Forward Current

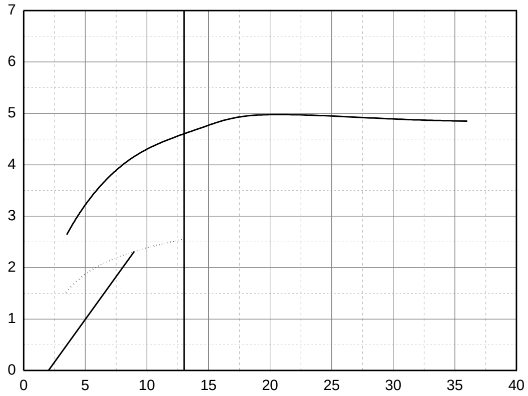


Fig. 20 Reverse Recovery Charge vs. Forward Current

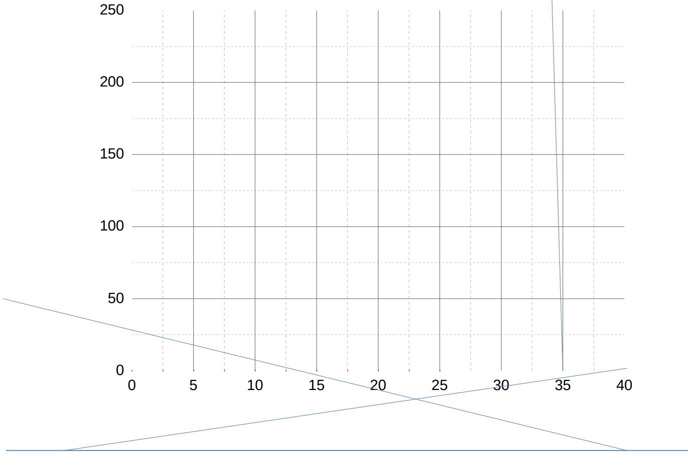
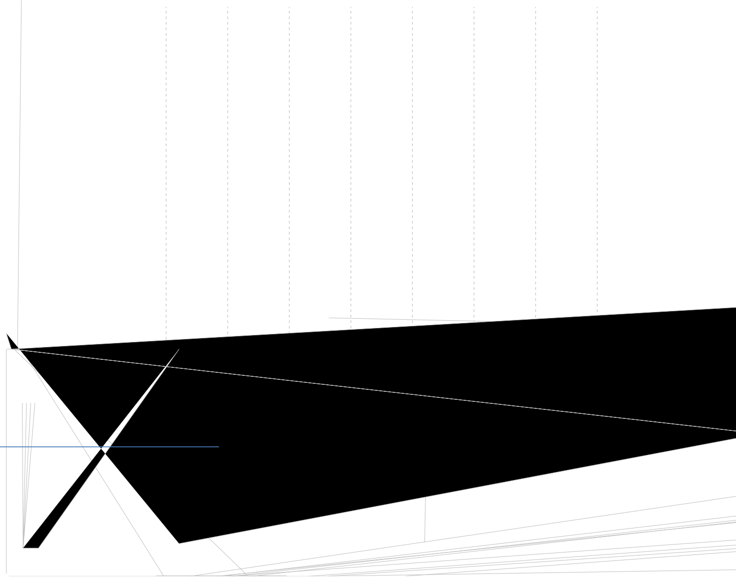
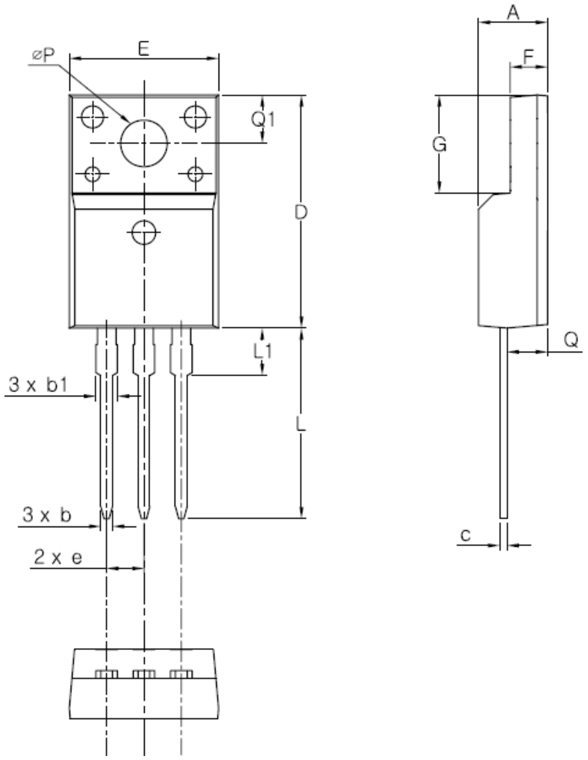


Fig. 21 Reverse Recovery Time vs. Forward Current



TO-220F-3L MECHANICAL DATA



SYMBOL	MIN	MAX
A	4.50	4.93
b	0.70	0.91
b1	1.15	1.47
c	0.36	0.60
D	15.67	16.07
E	6.96	10.36
e	2.54 BSC	
F	2.34	2.74
G	6.48	6.90
L	12.37	13.18
L1	2.23	3.43
Q	2.56	2.96
Q1	3.10	3.50
ØP	2.98	3.38

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