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

Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
OFF						
Collector Emitter Breakdown Voltage	BV_{CES}	V_{GE} = 0V, I_C = 1mA	1350	--	--	V
Zero Gate Voltage Collector Current	I_{CES}	V_{CE} = 1350V, V_{GE} = 0V	--	--	1	mA
Gate Emitter Leakage Current	I_{GES}	V_{CE} = 0V, V_{GE} = ± 25V	--	--	± 500	nA
ON						
Gate Emitter Threshold Voltage	$V_{GE(TH)}$	V_{GE} = V_{CE}, I_C = 40mA	4.0	6.0	8.0	V
Collector Emitter Saturation Voltage	$V_{CE(SAT)}$	V_{GE} = 15V, I_C = 40A, T_{vj} = 25 ℃	--	1.70	2.20	V
		V_{GE} = 15V, I_C = 40A, T_{vj} = 125 ℃	--	2.00	--	
		V_{GE} = 15V, I_C = 40A, T_{vj} = 175 ℃	--	2.17	--	
DYNAMIC						
Input Capacitance	C_{IES}	V_{CE} = 30V, V_{GE} = 0V f = 1MHz	--	4735	--	pF
Output Capacitance	C_{OES}		--	92	--	
Reverse Transfer Capacitance	C_{RES}		--	61	--	
SWITCHING (Note 2)						
Turn-On Delay Time	$t_{d(on)}$	V_{CC} = 600V, I_C = 40A R_G = 10 , V_{GE} = 15V Inductive Load, T_{vj} = 25 ℃	--	55	--	ns
Rise Time	t_r		--	51	--	ns
Turn-Off Delay Time	$t_{d(off)}$		--	379	--	ns
Fall Time	t_f		--	105	157	ns
Turn-On Switching Loss	E_{ON}		--	3.93	5.90	mJ
Turn-Off Switching Loss	E_{OFF}		--	2.17	3.26	mJ
Total Switching Loss	E_{TS}		--	6.10	9.16	mJ
Turn-On Delay Time	$t_{d(on)}$	V_{CC} = 600V, I_C = 40A R_G = 10 , V_{GE} = 15V Inductive Load, T_{vj} = 175 ℃	--	56	--	ns
Rise Time	t_r		--	52	--	ns
Turn-Off Delay Time	$t_{d(off)}$		--	413	--	ns
Fall Time	t_f		--	350	--	ns
Turn-On Switching Loss	E_{ON}		--	5.27	7.91	mJ
Turn-Off Switching Loss	E_{OFF}		--	3.37	5.06	mJ
Total Switching Loss	E_{TS}		--	8.64	12.97	mJ
Total Gate Charge	Q_g	V_{CC} = 600V, I_C = 40A V_{GE} = 15V	--	227	340	nC
Gate-Emitter Charge	Q_{ge}		--	35	53	
Gate-Collector Charge	Q_{gc}		--	101	151	

Notes :
(2) 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 = 20A, T_{vj} = 25 ℃	--	1.58	--	V
		I_F = 20A, T_{vj} = 175 ℃	--	1.63	--	V
		I_F = 40A, T_{vj} = 25 ℃	--	1.95	--	V
		I_F = 40A, T_{vj} = 175 ℃	--	2.13	--	V
Reverse Recovery Time	t_{rr}	I_F = 20A, di/dt = 200A/μs, T_{vj} = 25 ℃	--	307	--	ns
Reverse Recovery Current	I_{rr}		--	14.5	--	A
Reverse Recovery Charge	Q_{rr}					

IGBT Characteristics

Figure 1. IGBT Output Characteristics

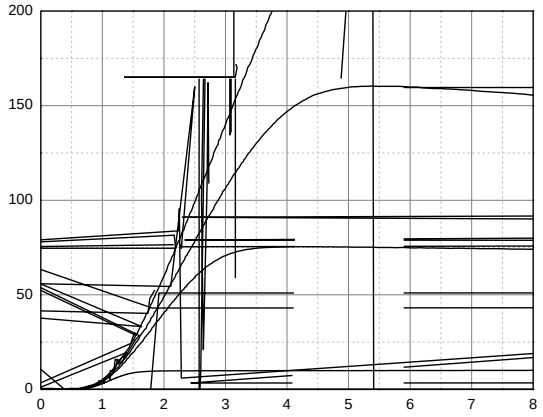


Figure 2. IGBT Output Characteristics

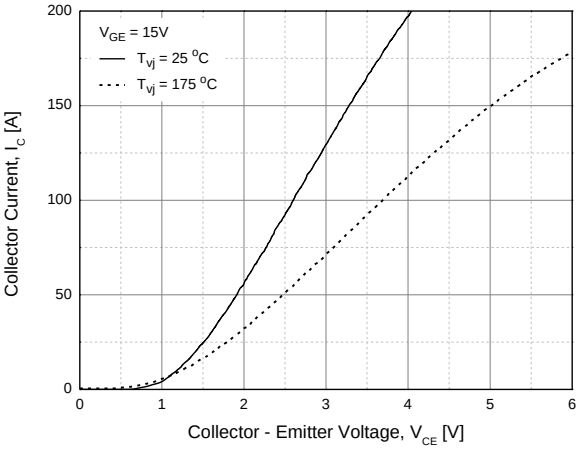
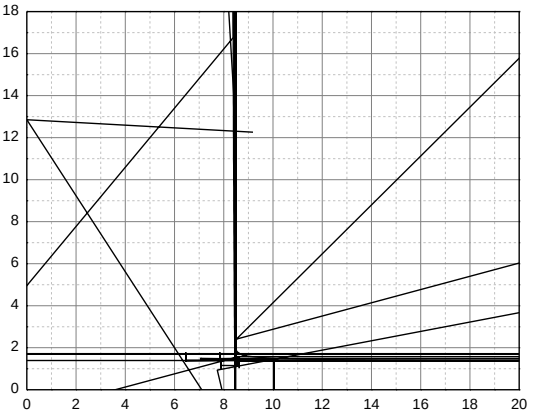


Figure 3. IGBT Saturation Voltage vs. Junction Temperature

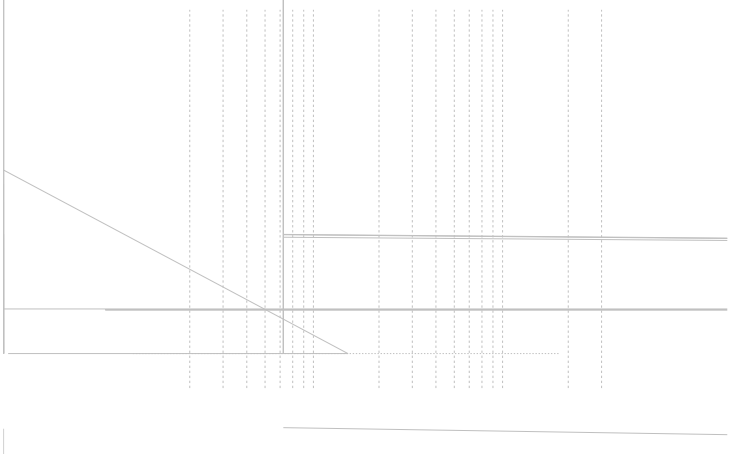
Figure 4. IGBT Saturation Voltage vs. Gate Bias



80A T /F1 7 25 2295 28693897 1965 q8 54 8 5108 55 Tf 1 0 0 1 26BT 8 2 217IBT 6386151740523581(40A)I TJ ETO3187 7Iv /F1 7 25 2295 29116 97.47 5.9.68 5 /

Figure 5. IGBT Saturation Voltage vs. Gate Bias

Figure 6. IGBT Capacitance Characteristics



IGBT Characteristics

Figure 7. Turn-on Time vs. Gate Resistor

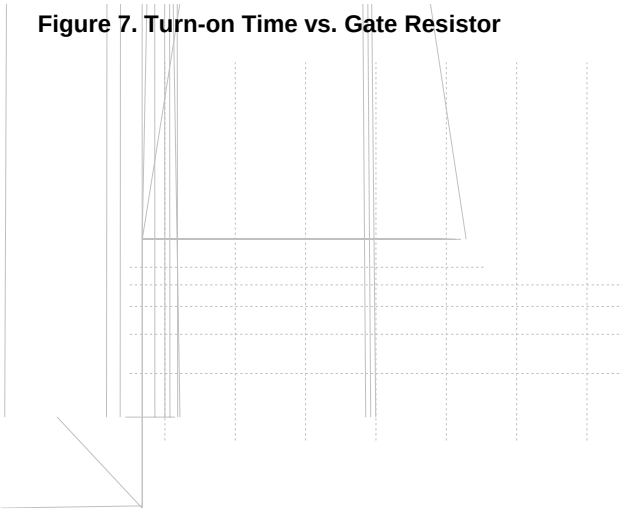
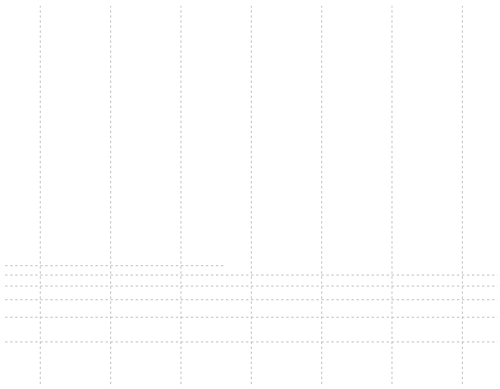


Figure 8. Turn-off Time vs. Gate Resistor



ng Loss sto

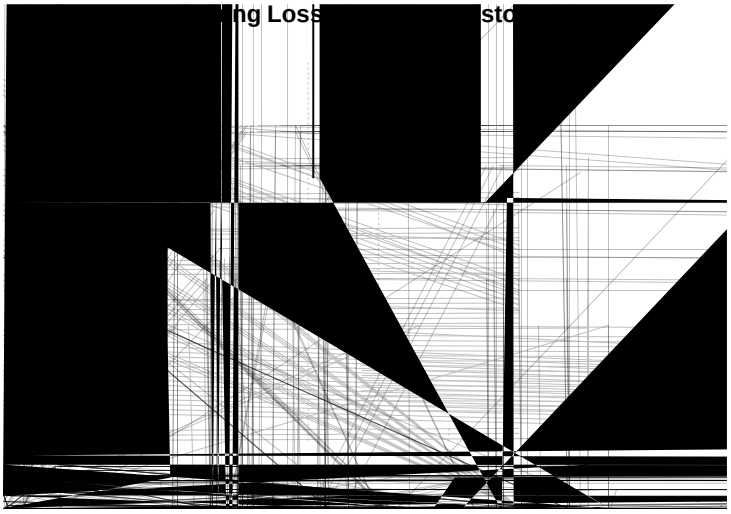


Figure 10. Turn-on Time vs. Collector Current

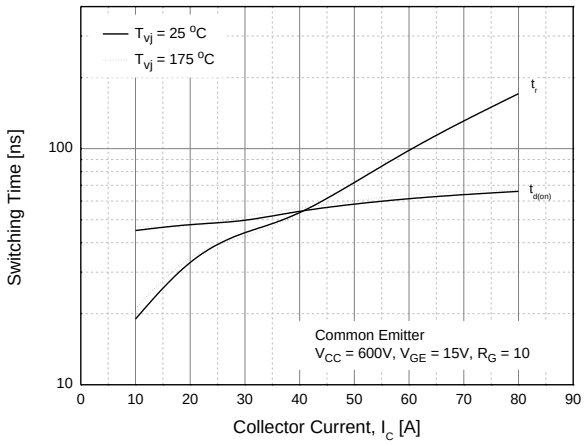


Figure 11. Turn-off Time vs. Collector Current

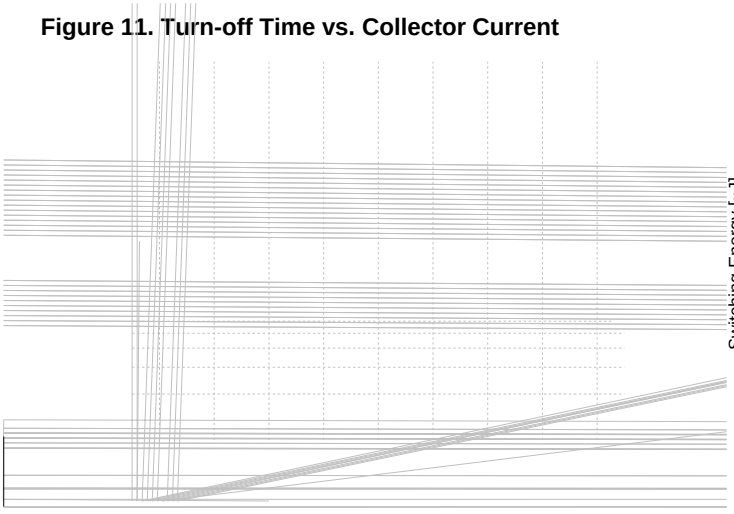
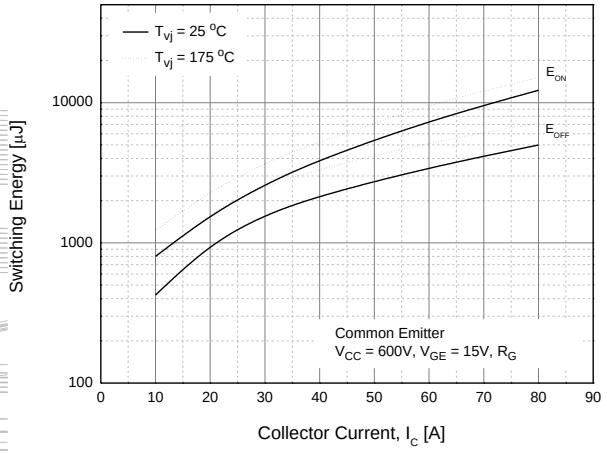


Figure 12. Switching Loss vs. Collector Current



IGBT Characteristics

Figure 13. Gate Charge Characteristics

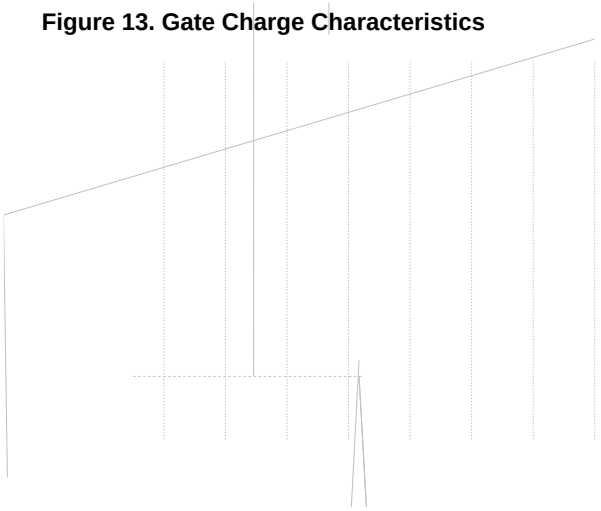


Figure 14. SOA

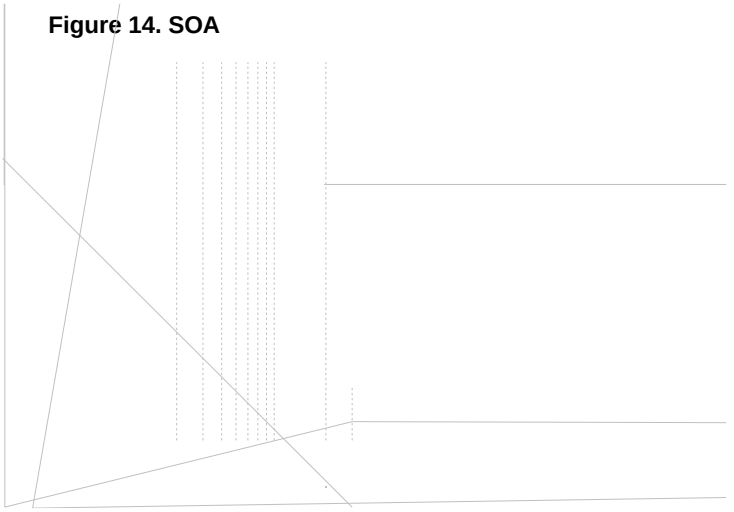


Figure 15. RBSOA

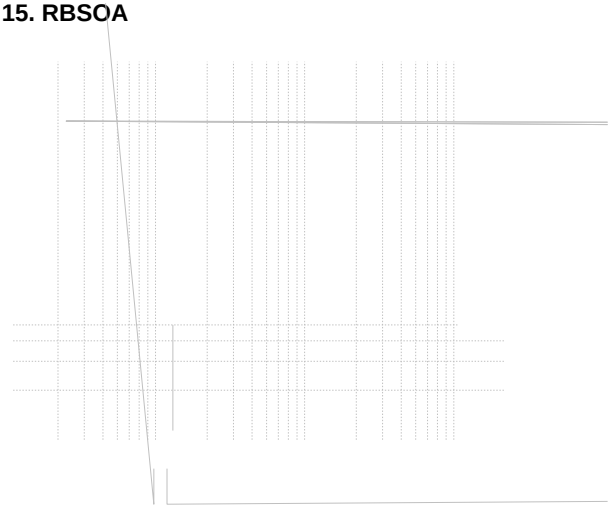


Figure 16. Transient Thermal Impedance of IGBT

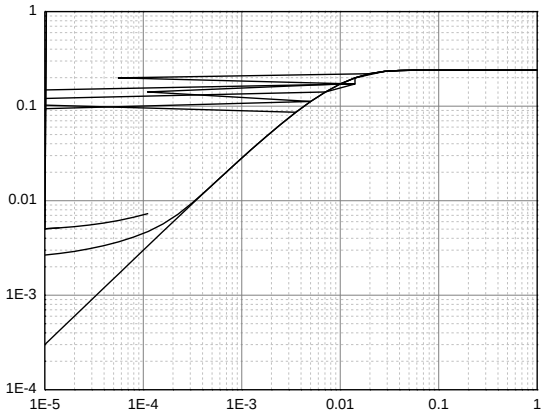
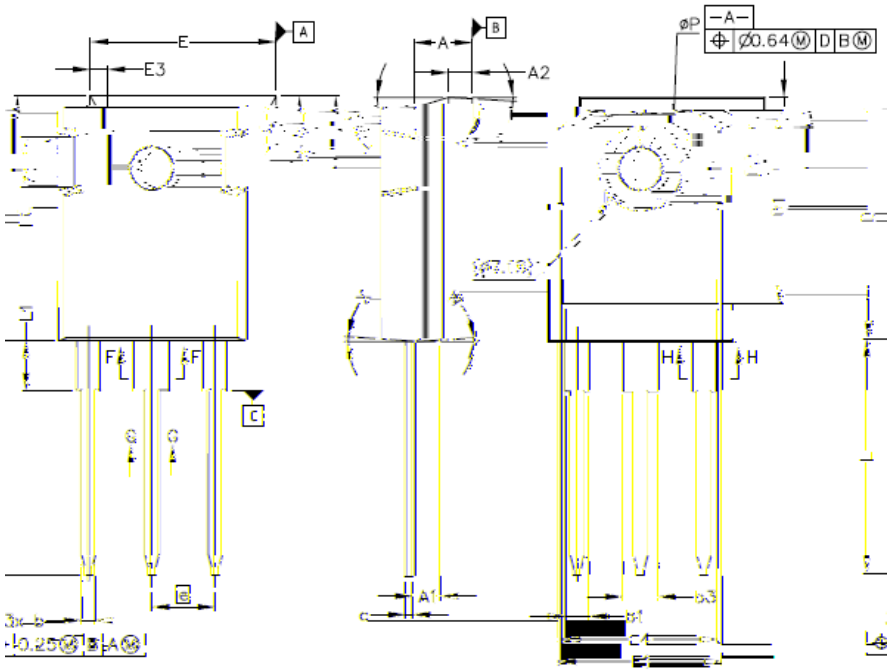
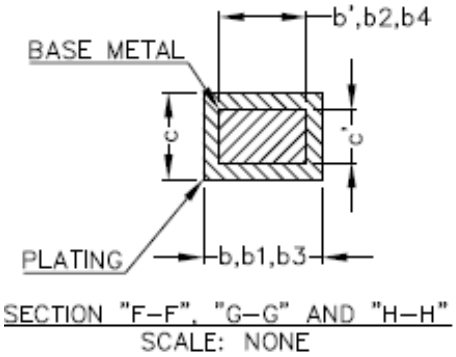


Figure 17. Load Current vs. Frequency

TO-247 MECHANICAL DATA





SECTION "F–F", "G–G" AND "H–H"
SCALE: NONE

SYM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.83	5.21	.190	.205
A1	2.29	2.54	.090	.100
A2	1.91	2.16	.075	.085
b'	1.07	1.28	.042	.050
b	1.07	1.33	.042	.052
b1	1.91	2.41	.075	.095
b2	1.91	2.16	.075	.085
b3	2.87	3.38	.113	.133
b4	2.87	3.13	.113	.123
c'	0.55	0.65	.022	.026
c	0.55	0.68	.022	.027
D	20.80	21.10	.819	.831
D1	16.25	17.65	.640	.695
D2	0.95	1.25	.037	.049
E	15.75	16.13	.620	.635
E1	13.10	14.15	.516	.557
E2	3.68	5.10	.145	.201
E3	1.00	1.90	.039	.075
E4	12.38	13.43	.487	.529
e	5.44 BSC		.214 BSC	
N	3		3	
L	19.81	20.32	.780	.800
L1	4.10	4.40	.161	.173
øP	3.51	3.65	.138	.144
Q	5.49	6.00	.216	.236
S	6.04	6.30	.238	.248
T	17.5° REF.			
W	3.5° REF.			
X	4° REF.			