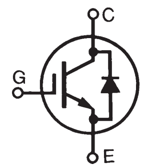
IXYS

Advance Technical Information

Polar™ High Speed
IGBT
with Anti-Parallel Diode
for PDP Sustain Circuit

IXGQ85N33PCD1

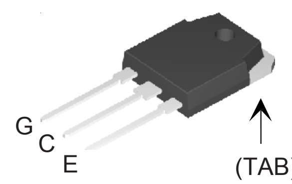
V_{CES} = 330 V
I_{CP} = 340 A
$V_{CE(sat)}$ ≤ 2.1 V



Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	330	V
V_{GEM}		±30	V
I_{C25}	T_C = 25°C, IGBT chip capability	85	A
I_{CP}	T_J ≤ 150°C, tp ≤ 1 µs, D ≤ 1%	340	A
I_{DP}	T_J ≤ 150°C, tp < 10 µs	40	A
$I_{C(RMS)}$	Lead current limit	75	A
SSOA (RBSOA)	V_{GE} = 15 V, T_{VJ} = 150°C, R_G = 20 Ω Clamped inductive load, V_{CE} < 300 V	I_{CM} = 96	A
P_C	T_C = 25°C	150	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	°C
Plastic body		260	
M_d	Mounting torque	1.3/10	Nm/lb.in.
Weight		5.5	g

≤

TO-3P



G = Gate C = Collector
E = Emitter TAb = Collector

Features
- International standard package
- Fast tfi for minimum turn off switching losses
- MOS Gate turn-on
  - drive simplicity
- Positive dVsat/dt for paralleling

Symbol	Test Conditions (T_J = 25°C unless otherwise specified)		Characteristic Values Min.	Typ.	Max.	
$V_{GE(th)}$	I_C = 1 mA, V_{CE} = V_{GE}		3.0		6.0	V
I_{CES}	V_{CE} = 330 V				1	µA
	V_{GE} = 0 V	T_J = 125°C			200	µA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±100	nA
$V_{CE(sat)}$	V_{GE} = 15V,	I_C = 50 A		1.43	2.1	V
	Note 1	T_J = 125°C		1.47		V
		I_C = 100 A		1.85	3.0	V
		T_J = 125°C		2.0		V

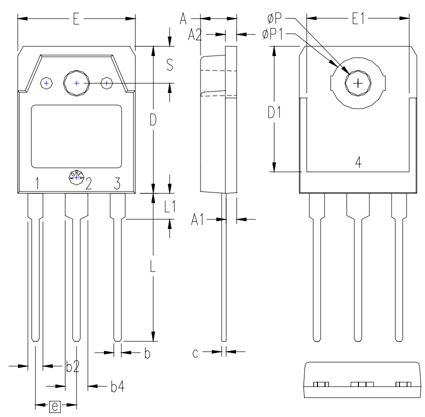
Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Min.	Typ.	Max.	
g_{fs}	I_C = 43 A, V_{CE} = 10 V	30	49		S
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		2200		pF
C_{oes}			155		pF
C_{res}			25		pF
Q_g	I_C = 43 A, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}		80		nC
Q_{ge}			15		nC
Q_{gc}			23		nC
$t_{d(on)}$	Resistive load, T_J = 25°C, I_C = 50 A, V_{GE} = 15 V, V_{CE} = 240 V, R_G = 5 Ω		20		ns
t_{ri}			43		ns
$t_{d(off)}$			87		ns
t_{fi}			72	350	ns
$t_{d(on)}$	Resistive load, T_J = 125°C, I_C = 50 A, V_{GE} = 15 V, V_{CE} = 240 V, R_G = 5 Ω		20		ns
t_{ri}			95		ns
$t_{d(off)}$			88		ns
t_{fi}			130		ns
R_{thJC}				0.833	K/W
R_{thCK}			0.25		K/W

Reverse Diode — Characteristic Values (T_J = 25°C unless otherwise specified)

Symbol	Test Conditions	Min.	Typ.	Max.	
V_F	I_F = 20A, V_{GE} = 0 V, Note 1			2.0	V
	I_F = 40A, V_{GE} = 0 V, Note 1			2.8	V
R_{thJC}				2.5	K/W
t_{rr}				250	ns

Note 1: Pulse test, t ≤ 300 μs, duty cycle ≤ 2 %

TO-3P (IXTQ) Outline



1 – GATE
2 – DRAIN (COLLECTOR)
3 – SOURCE (EMITTER)
4 – DRAIN (COLLECTOR)

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.193	4.70	4.90
A1	.051	.059	1.30	1.50
A2	.057	.065	1.45	1.65
b	.035	.045	0.90	1.15
b2	.075	.087	1.90	2.20
b4	.114	.126	2.90	3.20
c	.022	.031	0.55	0.80
D	.780	.799	19.80	20.30
D1	.665	.677	16.90	17.20
E	.610	.622	15.50	15.80
E1	.531	.539	13.50	13.70
e	.215 BSC		5.45 BSC	
L	.779	.795	19.80	20.20
L1	.134	.142	3.40	3.60
øP	.126	.134	3.20	3.40
øP1	.272	.280	6.90	7.10
S	.193	.201	4.90	5.10

Fig. 1. Output Characteristics @ 25 ºC

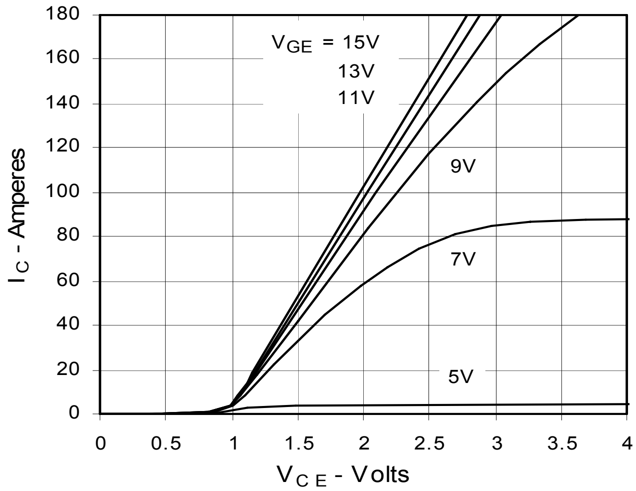


Fig. 2. Extended Output Characteristics @ 25 ºC

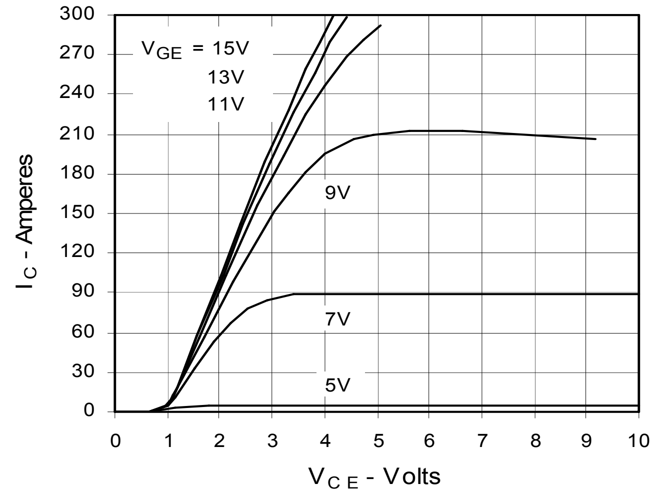


Fig. 3. Output Characteristics @ 125 ºC

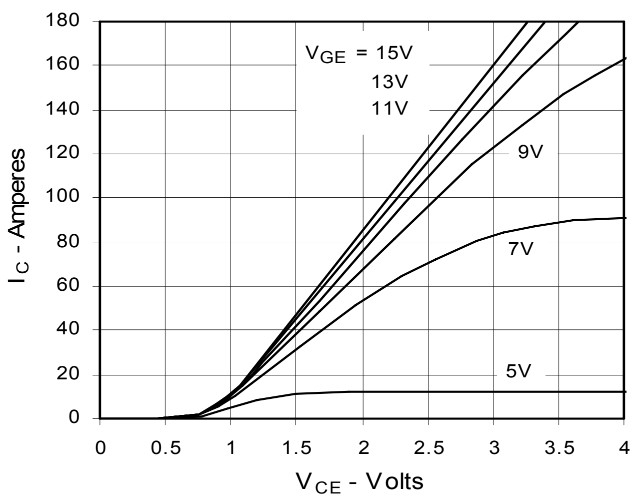


Fig. 4. Dependence of $V_{CE(sat)}$ on Temperature

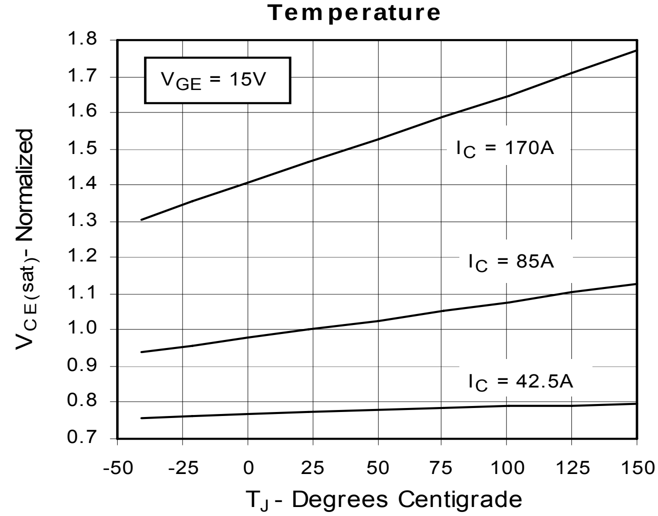


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter voltage

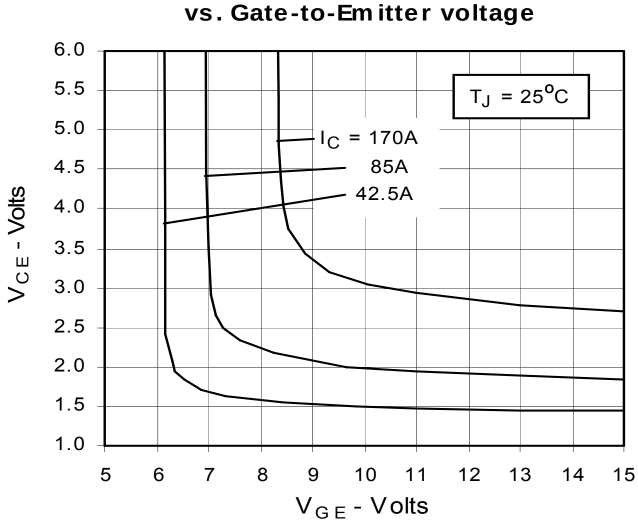


Fig. 6. Input Admittance

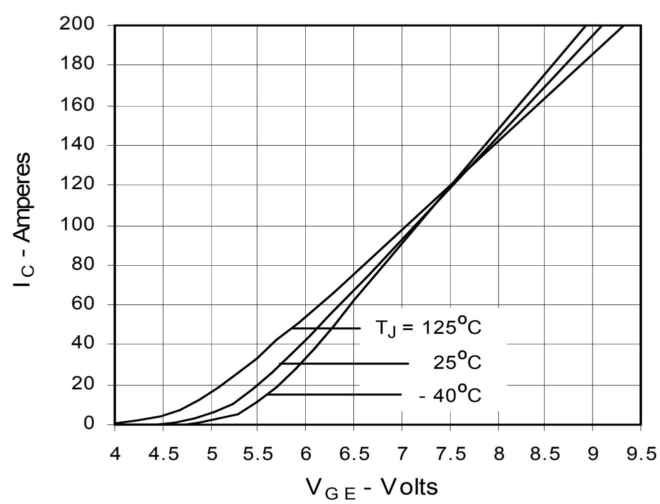


Fig. 7. Transconductance

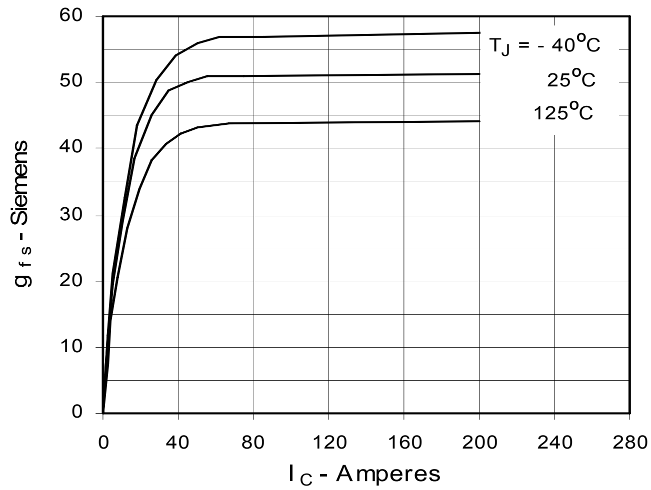


Fig. 8. Resistive Turn-On Rise Time vs. Junction Temperature

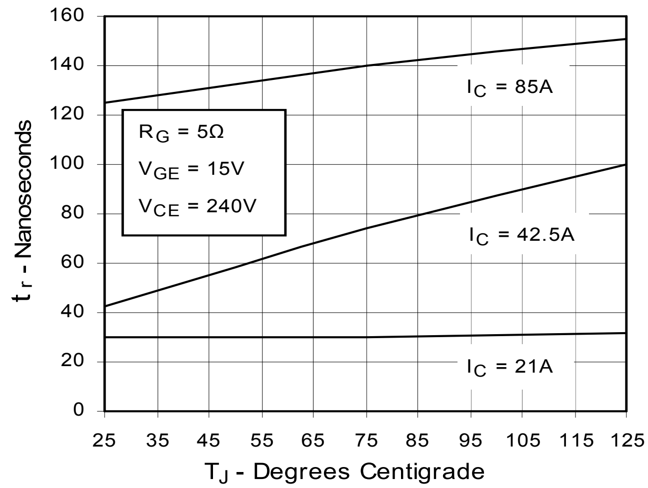


Fig. 9. Resistive Turn-On Rise Time vs. Collector Current

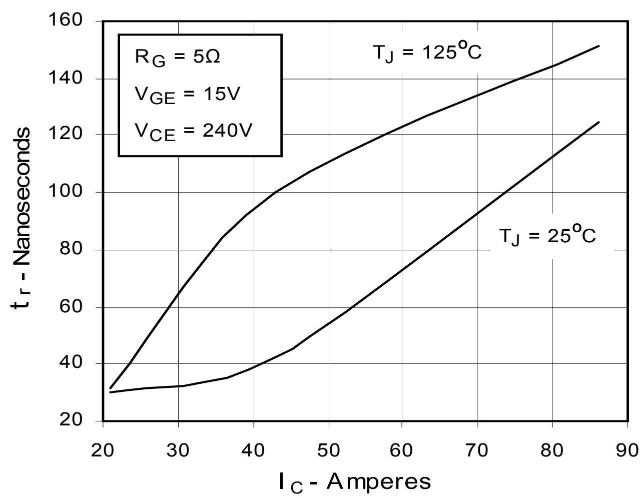


Fig. 10. Resistive Turn-On Rise Time vs. Gate Resistance

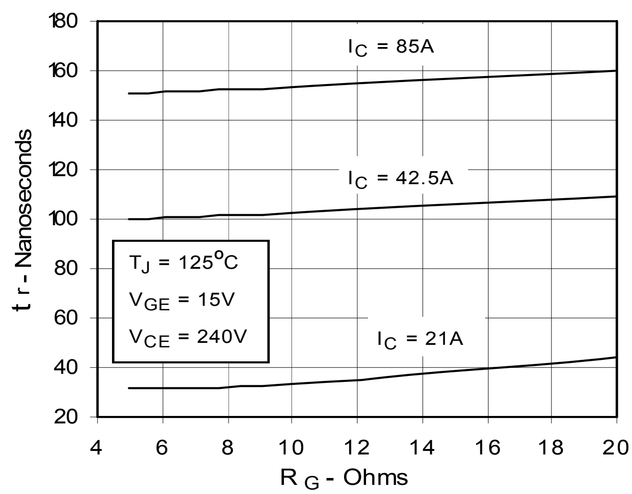


Fig. 11. Resistive Turn-On Delay Time vs. Gate Resistance

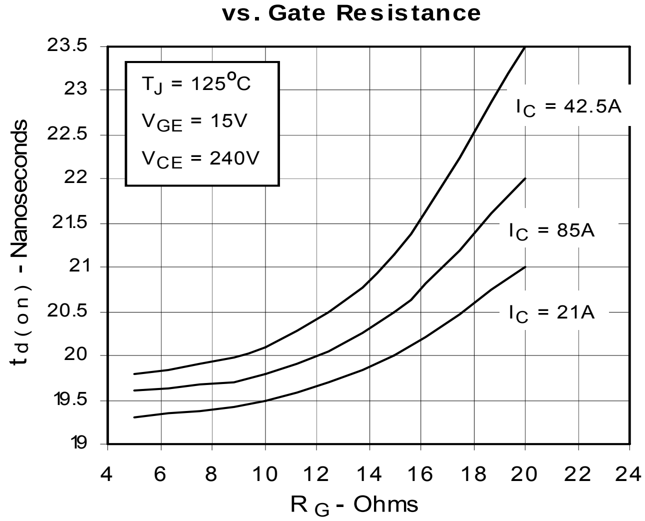


Fig. 12. Resistive Turn-Off Switching Time vs. Junction Temperature

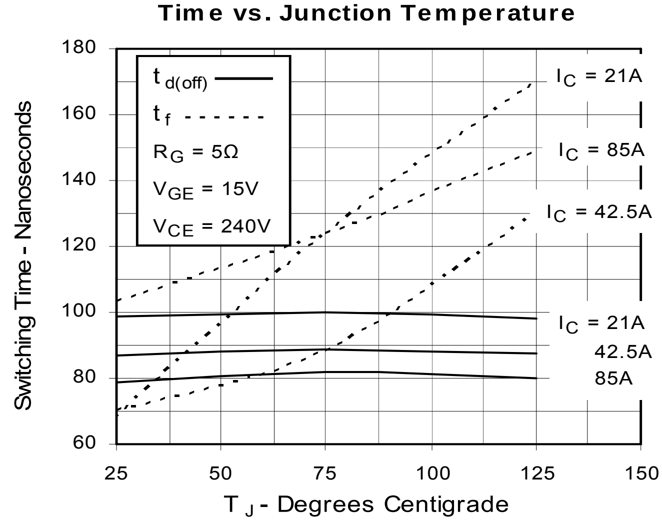


Fig. 13. Resistive Turn-Off Switching Time vs. Collector Current

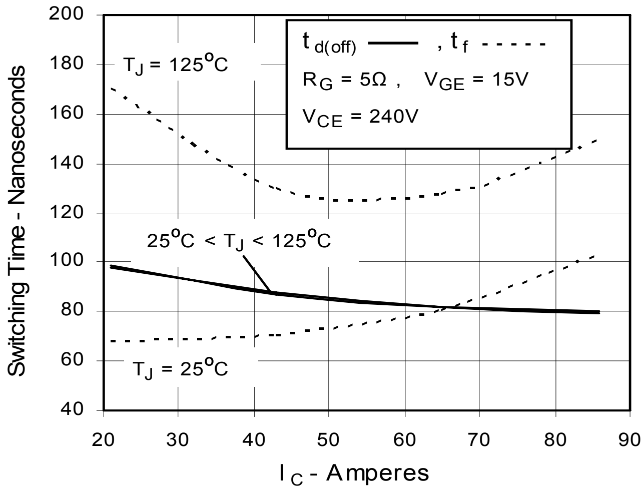


Fig. 14. Resistive Turn-off Switching Time vs. Gate Resistance

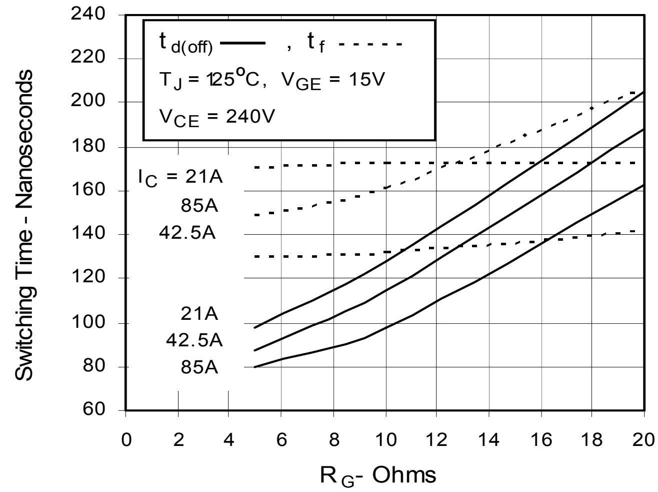


Fig. 15. Reverse-Bias Safe Operating Area

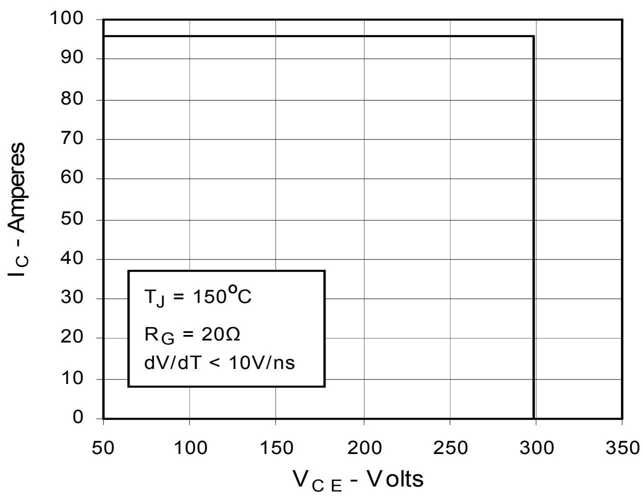


Fig. 16. Gate Charge

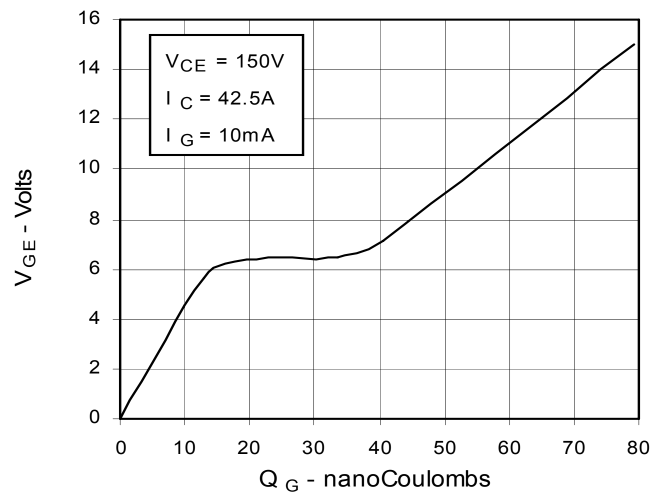


Fig. 17. Capacitance

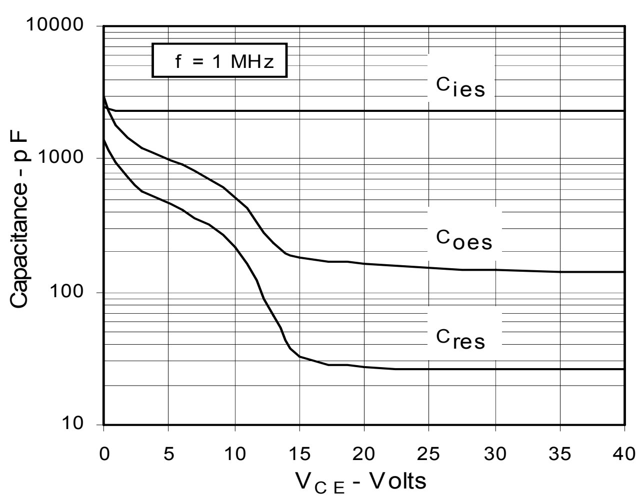


Fig. 18. Maximum Transient Thermal Resistance