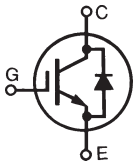
IXYS

High Voltage BIMOSFET™ Monolithic Bipolar MOS Transistor Extended FBSOA

IXCH36N250
IXCK36N250

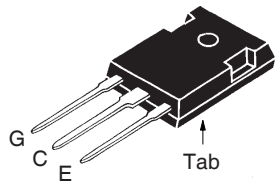
V_{CES} = 2500V
I_{C110} = 36A
$V_{CE(sat)} \leq$ 3.3V



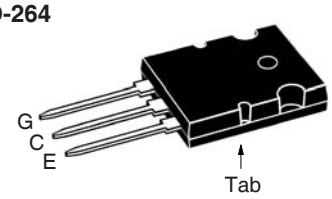
Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_C = 25°C to 150°C	2500	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	2500	V
V_{GES}	Continuous	± 25	V
V_{GEM}	Transient	± 35	V
I_{C25}	T_C = 25°C	73	A
I_{C110}	T_C = 110°C	36	A
I_{CM}	T_C = 25°C, 1ms	360	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 20Ω Clamped Inductive Load	I_{CM} = 144 $V_{CE} \leq$ 0.8 • V_{CES}	A
T_{SC} (SCSOA)	V_{GE} = 15V, T_J = 125°C, R_G = 82Ω, V_{CE} = 1250V, Non-Repetitive	10	μs
P_C	T_C = 25°C	595	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6mm (0.062 in.) from Case for 10s	300	°C
T_{SOLD}	Plastic Body for 10 seconds	260	°C
M_d	Mounting Torque	1.13/10	Nm/lb.in.
Weight	TO-247	6	g
	TO-264	10	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250μA, V_{GE} = 0V	2500			V
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	4.0		6.5	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			50	μA
	T_J = 125°C			1.75	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±25V			±100	nA
$V_{CE(sat)}$	I_C = 36A, V_{GE} = 15V, Note 1		2.6	3.3	V
	T_J = 125°C		3.0		V

TO-247 AD



TO-264



G = Gate
C = Collector
E = Emitter
Tab = Collector

Features

- High Blocking Voltage
- High Peak Current Capability
- Anti-Parallel Diode
- Low Saturation Voltage
- Extended FBSOA and SCSOA

Advantages

- Low Gate Drive Requirement
- High Power Density

Applications

- Switch-Mode and Resonant-Mode Power Supplies
- Uninterruptible Power Supplies (UPS)
- Laser Generators
- Capacitor Discharge Circuits
- AC Switches
- Protection Circuits

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Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.
g_{fS}	I_C = 36A, V_{CE} = 10V, Note 1	22	33	S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		3980	pF
C_{oes}			170	pF
C_{res}			60	pF
Q_g	I_C = 36A, V_{GE} = 15V, V_{CE} = 1000V		177	nC
Q_{ge}			30	nC
Q_{gc}			80	nC
$t_{d(on)}$	**Resistive Switching Times, T_J = 25°C**		115	ns
t_r	I_C = 36A, V_{GE} = 15V		580	ns
$t_{d(off)}$	V_{CE} = 1250V, R_G = 20Ω		430	ns
t_f			880	ns
$t_{d(on)}$	**Resistive Switching Times, T_J = 125°C**		105	ns
t_r	I_C = 36A, V_{GE} = 15V		830	ns
$t_{d(off)}$	V_{CE} = 1250V, R_G = 20Ω		480	ns
t_f			900	ns
R_{thJC}			0.21	°C/W
R_{thCS}	TO-247		0.21	°C/W
	TO-264		0.15	°C/W

Reverse Diode

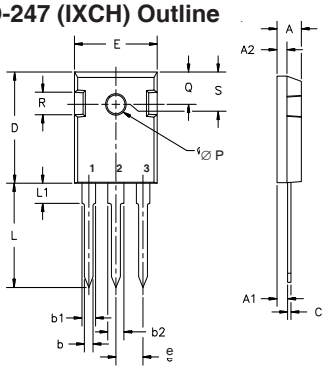
Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max
V_F	I_F = 36A, V_{GE} = 0V, Note 1			2.5 V
t_{rr}	I_F = 23A, V_{GE} = 0V, $-di_F/dt$ = 100A/μs		1.7	μs
I_{RM}	V_R = 100V, V_{GE} = 0V		43	A

Note:

1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.

Additional provisions for lead to lead voltage isolation are required at V_{CE} > 1200V.

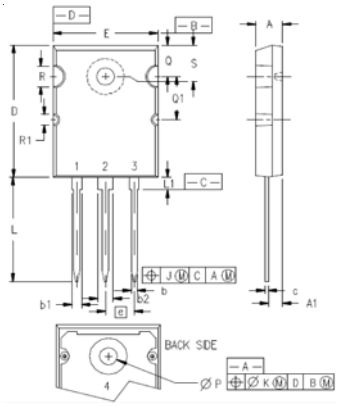
TO-247 (IXCH) Outline



Terminals: 1 - Gate 2 - Collector
3 - Emitter

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
∅P	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15 BSC		242 BSC	

TO-264 (IXCK) Outline



Terminals: 1 = Gate
2,4 = Collector
3 = Emitter

SYM	INCHES MIN	MAX	MILLIMETERS MIN	MAX
A	.185	.209	4.70	5.31
A1	.102	.118	2.59	3.00
b	.037	.055	0.94	1.40
b1	.087	.102	2.21	2.59
b2	.110	.126	2.79	3.20
c	.017	.029	0.43	0.74
D	1.007	1.047	25.58	26.59
E	.760	.799	19.30	20.29
e	.215BSC		5.46 BSC	
J	.000	.010	0.00	0.25
K	.000	.010	0.00	0.25
L	.779	.842	19.79	21.39
L1	.087	.102	2.21	2.59
∅P	.122	.138	3.10	3.51
Q	.240	.256	6.10	6.50
Q1	.330	.346	8.38	8.79
∅R	.155	.187	3.94	4.75
∅R1	.085	.093	2.16	2.36
S	.243	.253	6.17	6.43

IXYS Reserves the Right to Change Limits, Test Conditions and Dimensions.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585 7,005,734 B2 7,157,338B2 4,850,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692 7,063,975 B2 4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 B1 6,583,505 6,710,463 6,771,478 B2 7,071,537

Fig. 1. Output Characteristics @ T_J = 25ºC

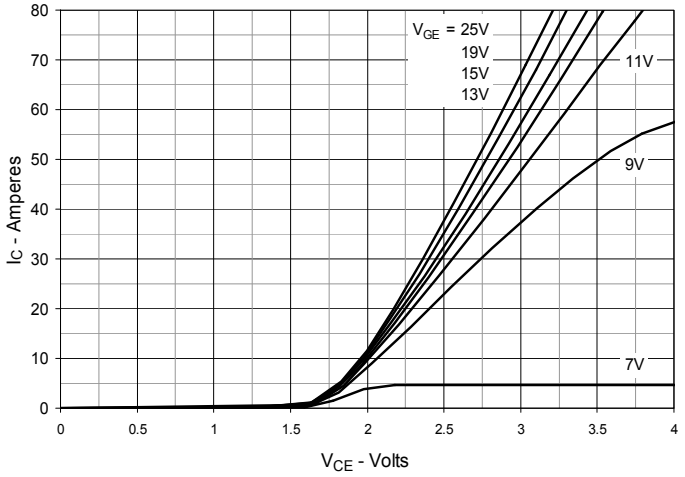


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

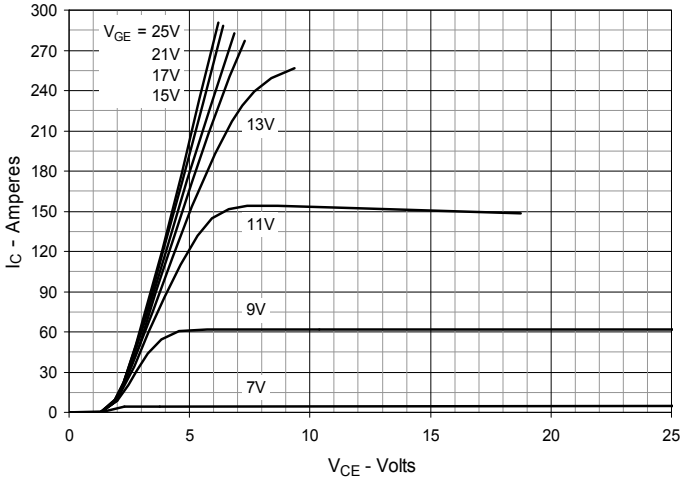


Fig. 3. Output Characteristics @ T_J = 125ºC

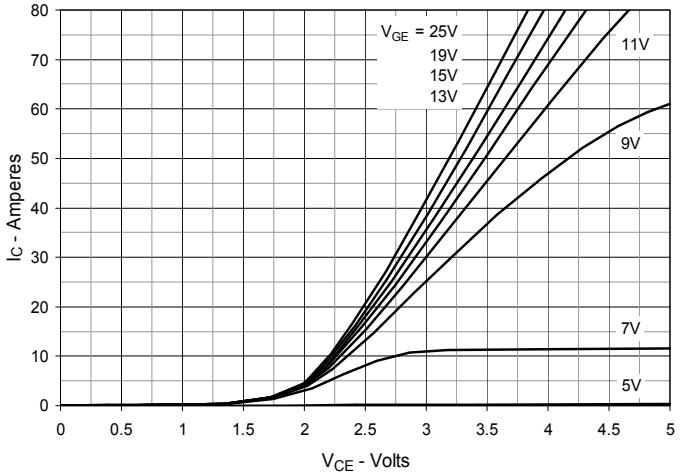


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

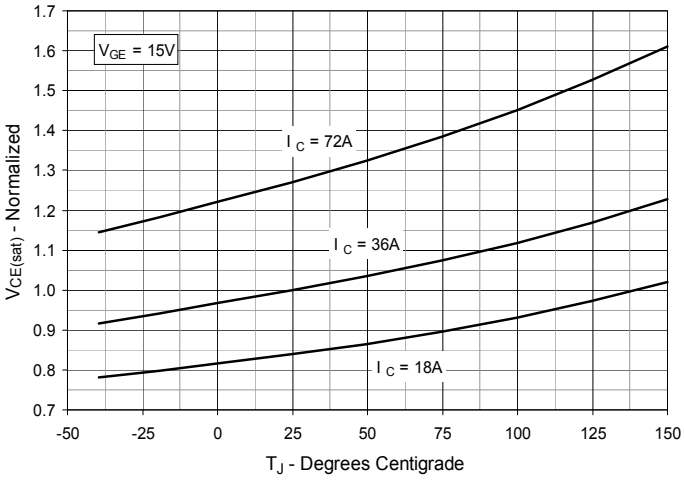


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

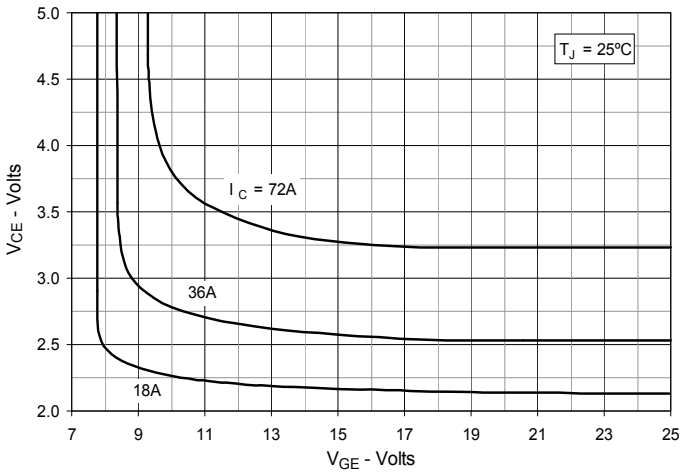


Fig. 6. Input Admittance

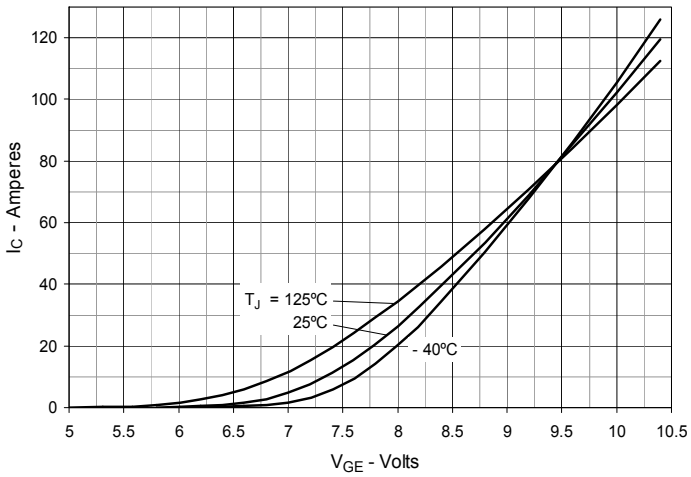


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Fig. 7. Transconductance

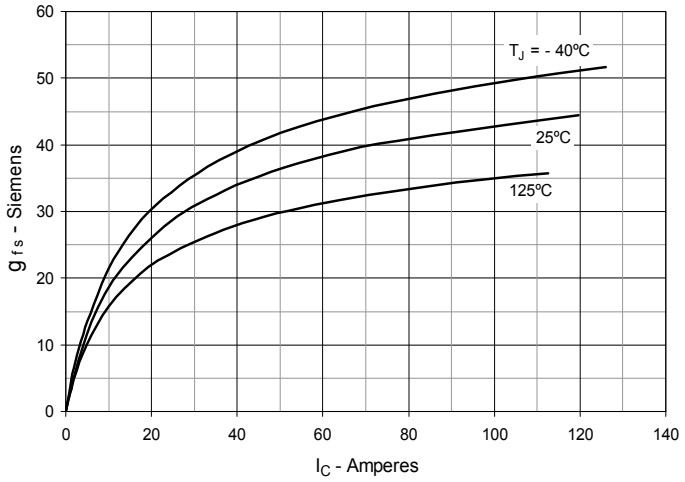

Fig. 8. Forward Voltage Drop of Intrinsic Diode

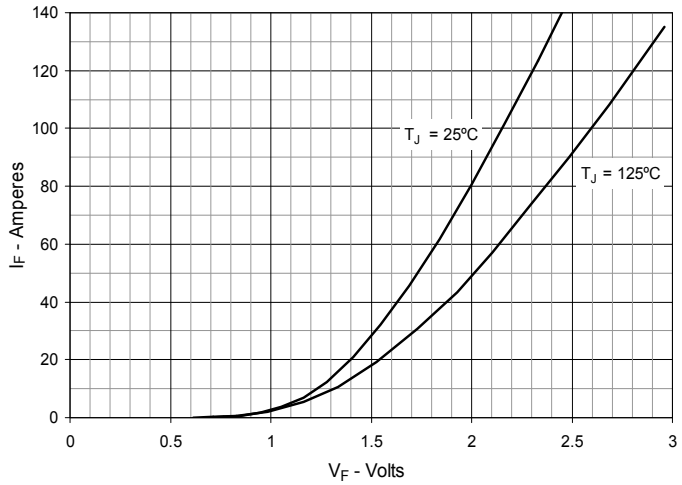

Fig. 9. Gate Charge

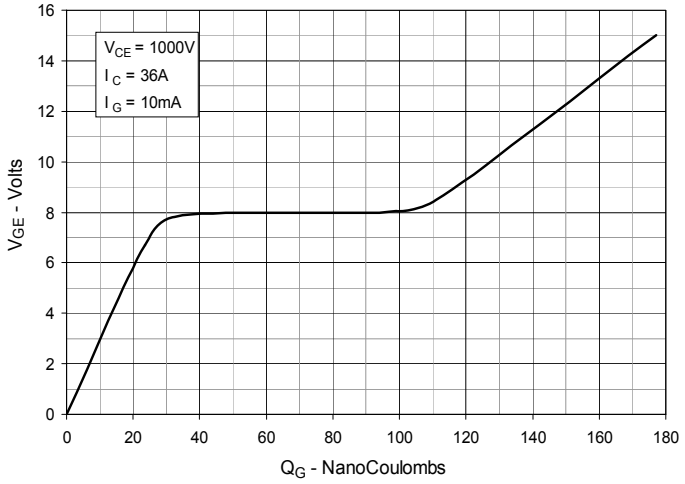

Fig. 10. Capacitance

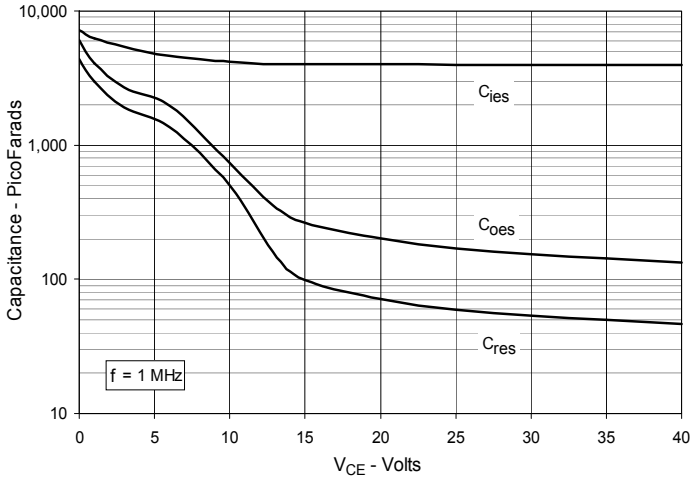

Fig. 11. Reverse-Bias Safe Operating Area

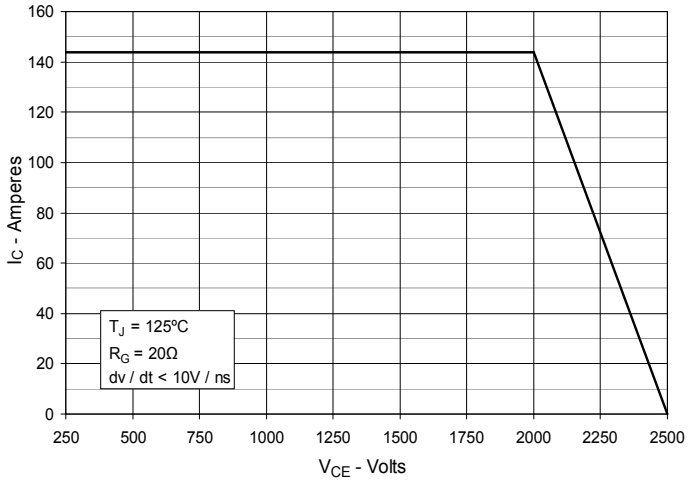

Fig. 12. Maximum Transient Thermal Impedance

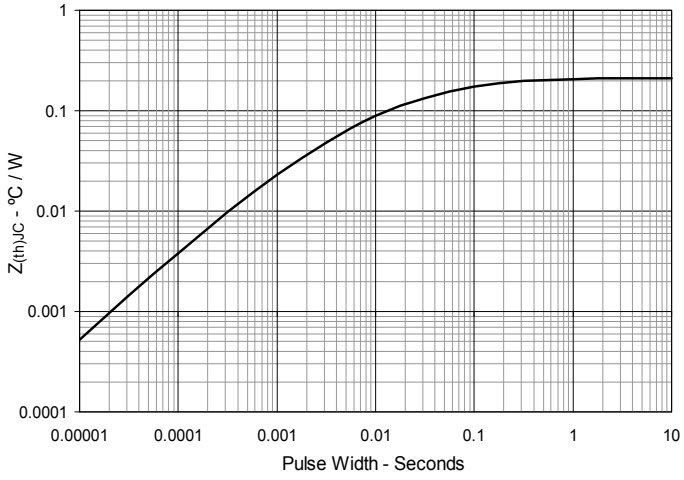

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Fig. 13. Forward-Bias Safe Operating Area @ T_C = 25ºC

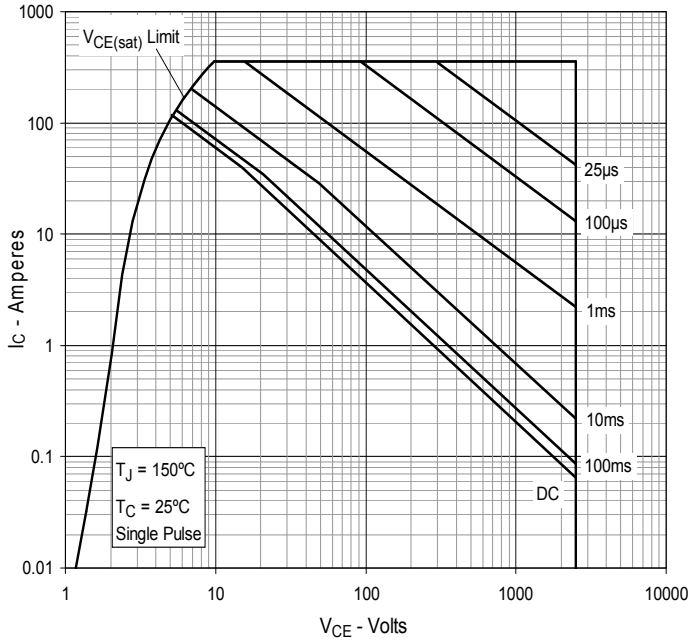
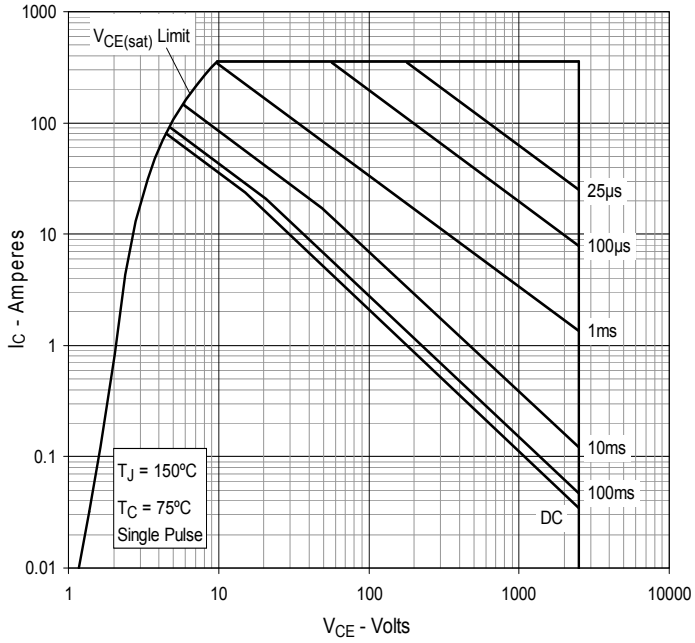


Fig. 14. Forward-Bias Safe Operating Area @ T_C = 75ºC



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