

# High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

## IXBT22N300HV IXBH22N300HV



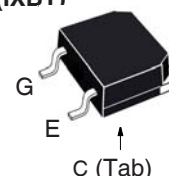
$$V_{CES} = 3000V$$

$$I_{C110} = 22A$$

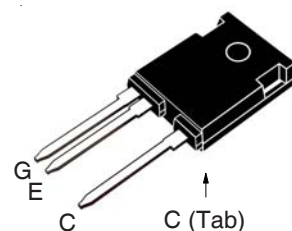
$$V_{CE(sat)} \leq 2.7V$$

Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ C$ to $150^\circ C$	3000	V
$V_{CGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GE} = 1M\Omega$	3000	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ C$	60	A
$I_{C110}$	$T_C = 110^\circ C$	22	A
$I_{CM}$	$T_C = 25^\circ C$ , 1ms	190	A
<b>SSOA</b> <b>(RBSOA)</b>	$V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 15\Omega$ Clamped Inductive Load	$I_{CM} = 180$ $V_{CES} \leq 1500$	A V
<b><math>T_{SC}</math></b> <b>(SCSOA)</b>	$V_{GE} = 15V$ , $T_J = 125^\circ C$ , $R_G = 52\Omega$ , $V_{CE} = 1500V$ , Non-Repetitive	10	$\mu s$
$P_C$	$T_C = 25^\circ C$	290	W
$T_J$		-55 ... +150	$^\circ C$
$T_{JM}$		150	$^\circ C$
$T_{stg}$		-55 ... +150	$^\circ C$
$T_L$	Maximum Lead Temperature for Soldering	300	$^\circ C$
$T_{SOLD}$	Plastic Body for 10s	260	$^\circ C$
$M_d$	Mounting Torque (TO-247HV)	1.13/10	Nm/lb.in
<b>Weight</b>	TO-268HV	4	g
	TO-247HV	6	g

TO-268HV (IXBT)



TO-247HV (IXBH)



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

### Features

- High Voltage Packages
- High Blocking Voltage
- High Peak Current Capability
- Low Saturation Voltage

### 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

Symbol	Test Conditions ( $T_J = 25^\circ C$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{CES}$	$I_C = 250\mu A$ , $V_{GE} = 0V$	3000		V
$V_{GE(th)}$	$I_C = 250\mu A$ , $V_{CE} = V_{GE}$	3.0		5.0 V
$I_{CES}$	$V_{CE} = V_{CES}$ , $V_{GE} = 0V$ $T_J = 125^\circ C$			25 $\mu A$ 1.5 mA
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 20V$			$\pm 100$ nA
$V_{CE(sat)}$	$I_C = 22A$ , $V_{GE} = 15V$ , Note 1 $T_J = 125^\circ C$		2.2	2.7 V
			2.7	V

Symbol Test Conditions		Characteristic Values		
(T <sub>J</sub> = 25°C Unless Otherwise Specified)		Min.	Typ.	Max.
<b>g<sub>fs</sub></b>	I <sub>C</sub> = 22A, V <sub>CE</sub> = 10V, Note 1	13	22	S
<b>C<sub>ies</sub></b>	V <sub>CE</sub> = 25V, V <sub>GE</sub> = 0V, f = 1MHz		2200	pF
<b>C<sub>oes</sub></b>			85	pF
<b>C<sub>res</sub></b>			30	pF
<b>Q<sub>g(on)</sub></b>	I <sub>C</sub> = 22A, V <sub>GE</sub> = 15V, V <sub>CE</sub> = 1500V		110	nC
<b>Q<sub>ge</sub></b>			13	nC
<b>Q<sub>gc</sub></b>			45	nC
<b>t<sub>d(on)</sub></b>	<b>Resistive Switching Times, T<sub>J</sub> = 25°C</b>		46	ns
<b>t<sub>r</sub></b>		I <sub>C</sub> = 22A, V <sub>GE</sub> = 15V	360	ns
<b>t<sub>d(off)</sub></b>		V <sub>CE</sub> = 960V, R <sub>G</sub> = 15Ω	205	ns
<b>t<sub>f</sub></b>			1820	ns
<b>t<sub>d(on)</sub></b>		<b>Resistive Switching Times, T<sub>J</sub> = 125°C</b>		43
<b>t<sub>r</sub></b>	I <sub>C</sub> = 22A, V <sub>GE</sub> = 15V		700	ns
<b>t<sub>d(off)</sub></b>	V <sub>CE</sub> = 960V, R <sub>G</sub> = 15Ω		220	ns
<b>t<sub>f</sub></b>			1650	ns
<b>R<sub>thJC</sub></b>				0.43
<b>R<sub>thCS</sub></b>	TO-247HV	0.21		°C/W

## Reverse Diode

Symbol Test Conditions		Characteristic Values		
(T <sub>J</sub> = 25°C Unless Otherwise Specified)		Min.	Typ.	Max
<b>V<sub>F</sub></b>	I <sub>F</sub> = 22A, V <sub>GE</sub> = 0V, Note 1			2.7 V
<b>t<sub>rr</sub></b>	I <sub>F</sub> = 11A, V <sub>GE</sub> = 0V, -di <sub>F</sub> /dt = 100A/μs		1.4	μs
<b>I<sub>RM</sub></b>		V <sub>R</sub> = 100V, V <sub>GE</sub> = 0V	30	A
<b>Q<sub>RM</sub></b>			21	μC

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

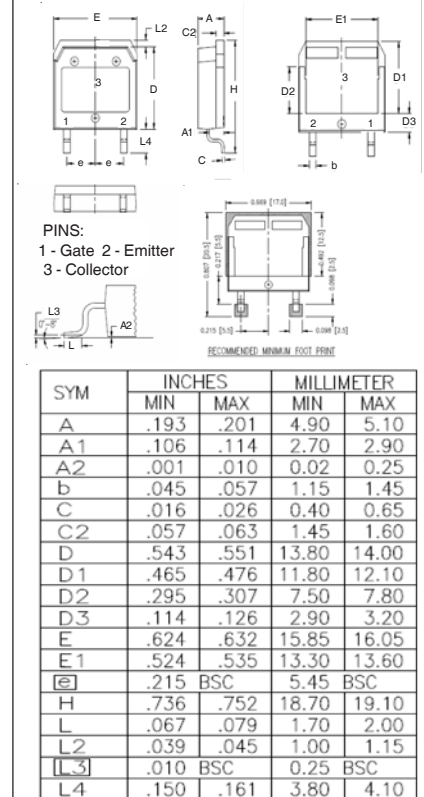
## ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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IXYS MOSFETs and IGBTs are covered 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  
by one or more of the following U.S. patents: 4,860,072 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

## TO-268HV Outline



## TO-247HV Outline

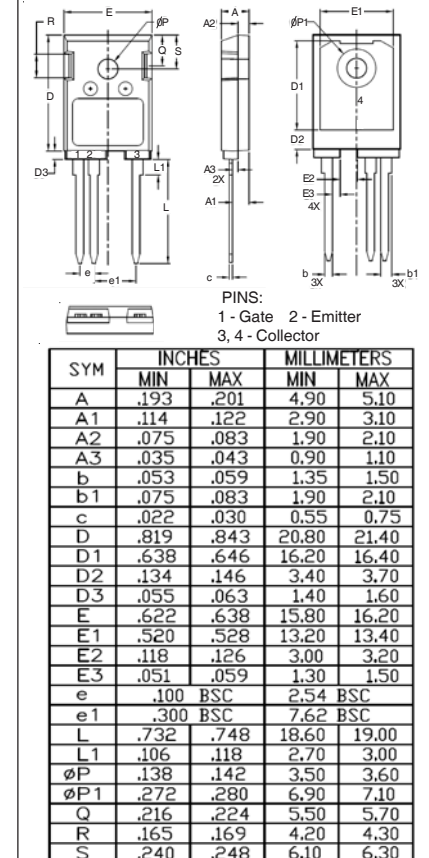


Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$

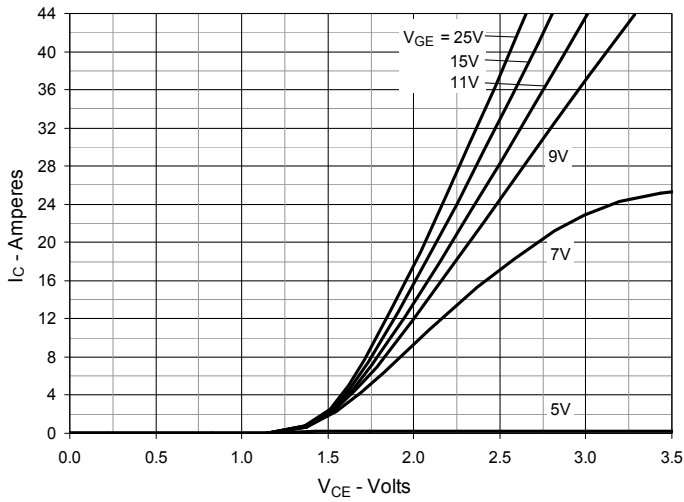


Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$

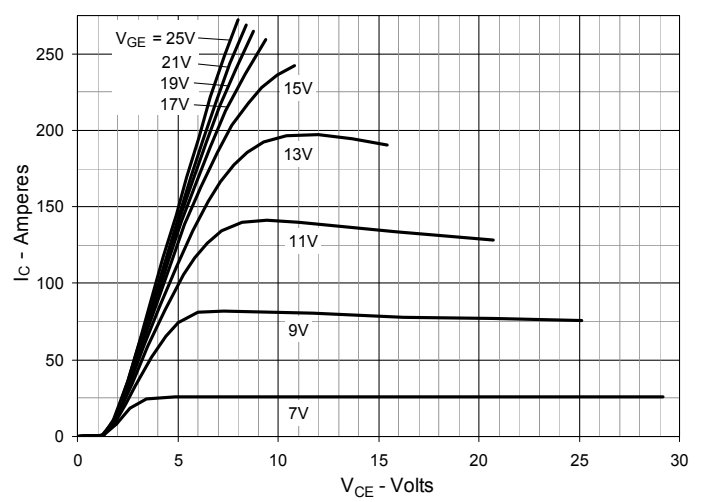


Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$

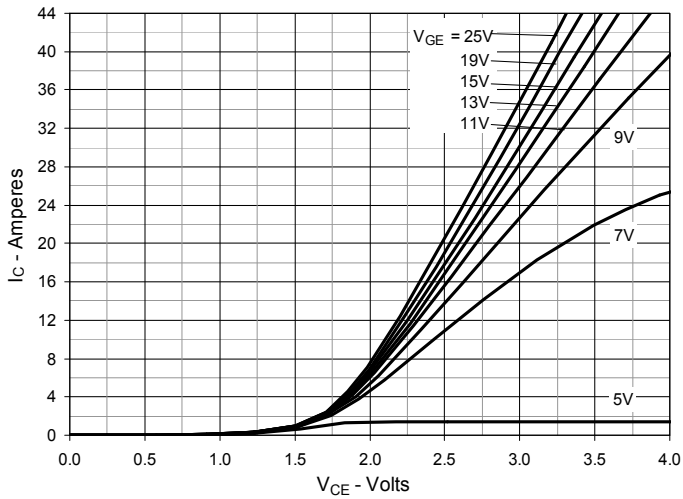


Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature

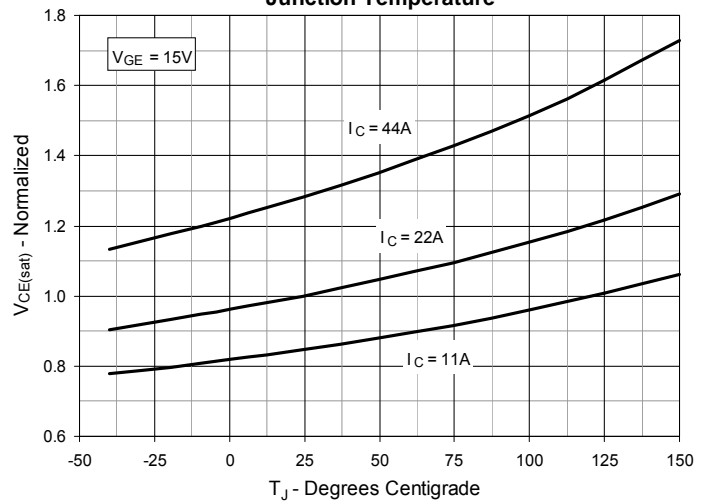


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

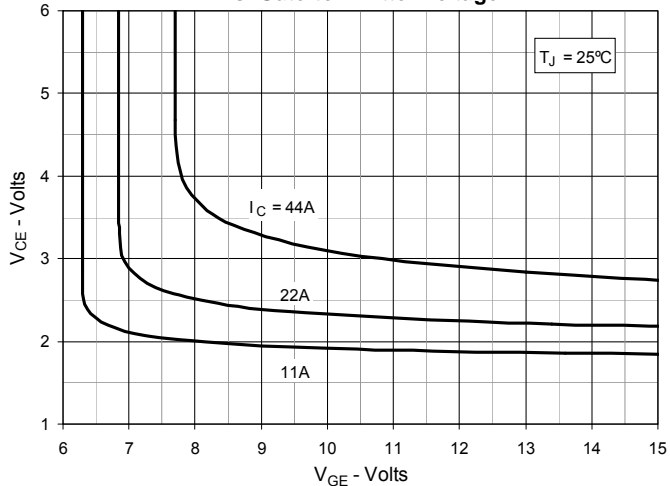


Fig. 6. Input Admittance

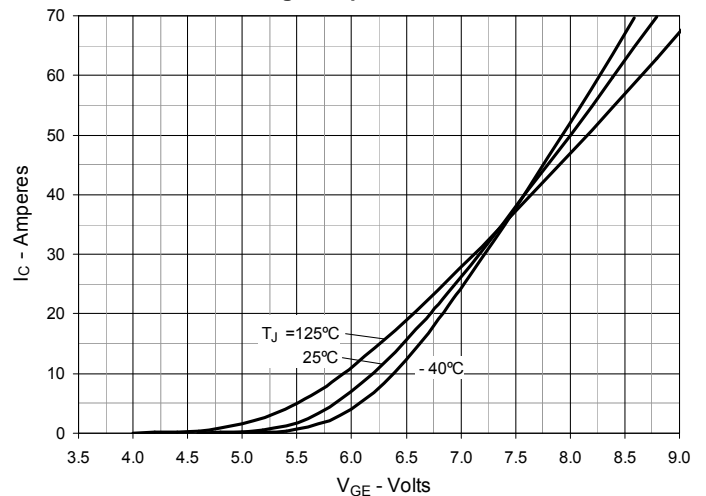


Fig. 7. Transconductance

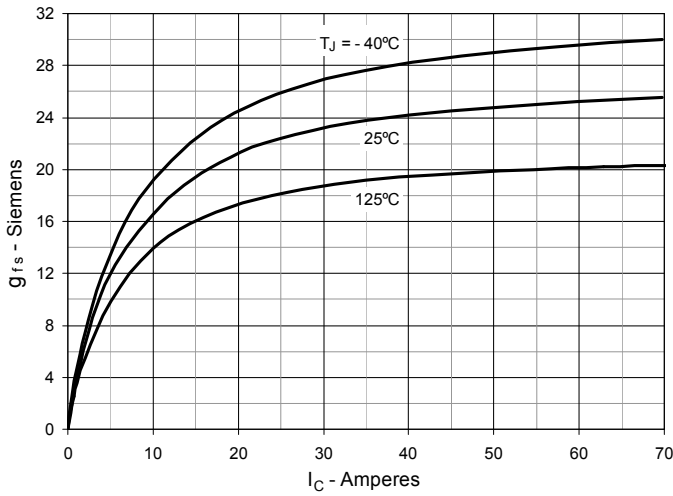


Fig. 8. Gate Charge

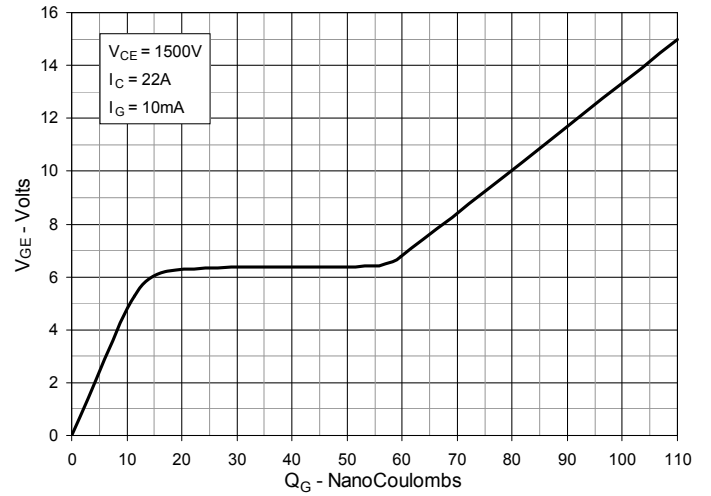


Fig. 9. Forward Voltage Drop of Intrinsic Diode

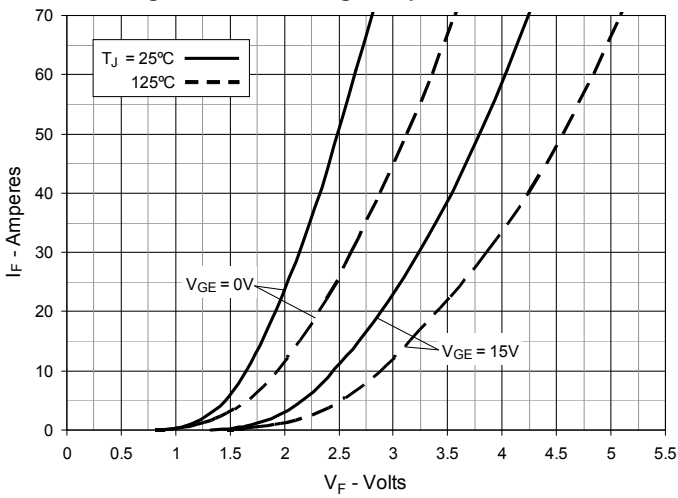


Fig. 10. Capacitance

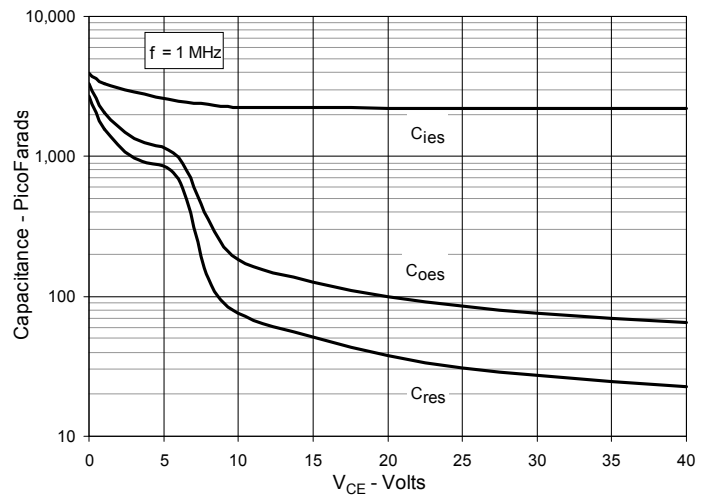


Fig. 11. Reverse-Bias Safe Operating Area

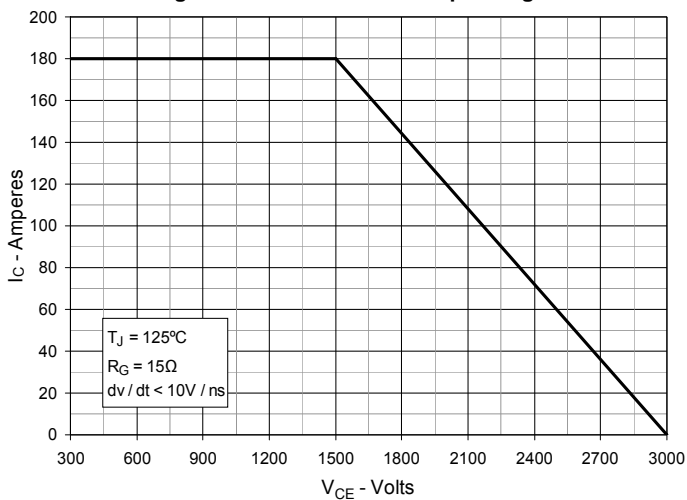


Fig. 12. Maximum Transient Thermal Impedance

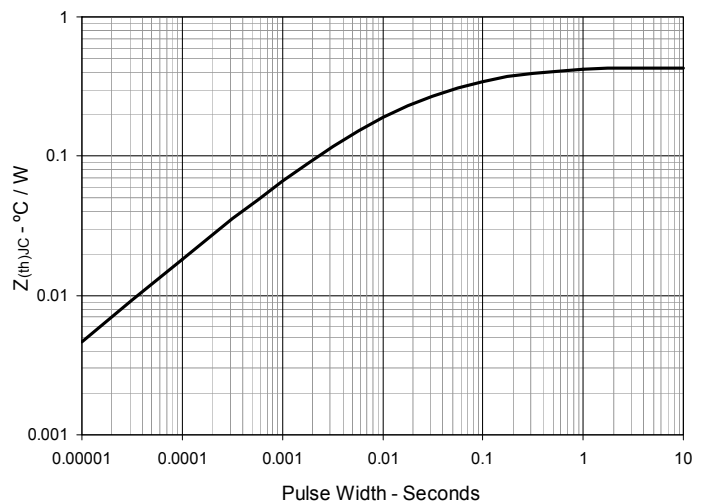


Fig. 13. Forward-Bias Safe Operating Area @  $T_C = 25^\circ\text{C}$

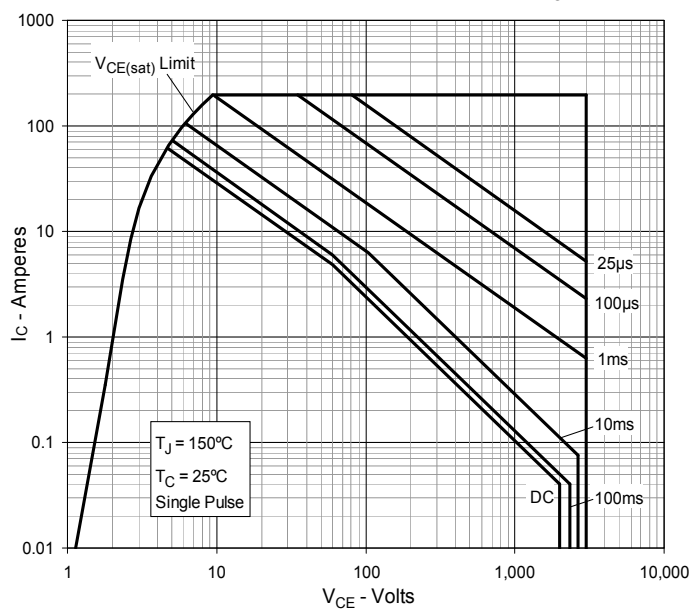
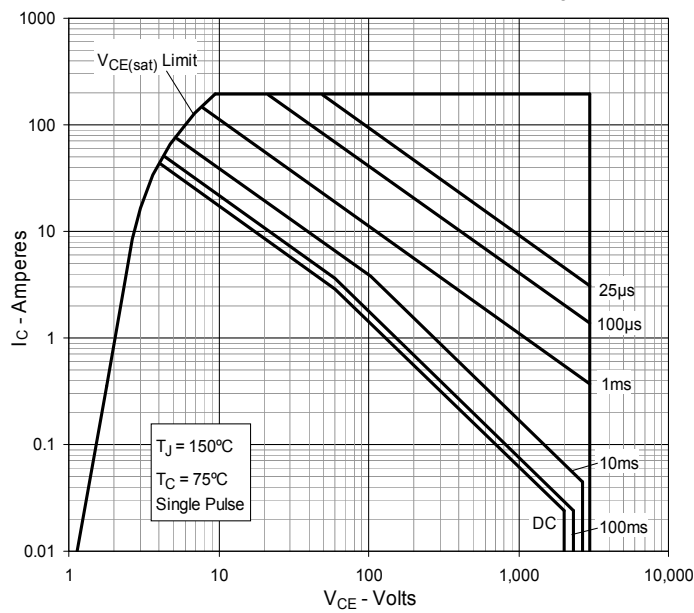


Fig. 14. Forward-Bias Safe Operating Area @  $T_C = 75^\circ\text{C}$





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