IXYS

Advance Technical Information

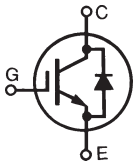
High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

IXBT16N360HV
IXBH16N360HV

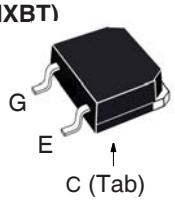
V_{CES} = 3600V

I_{C110} = 16A

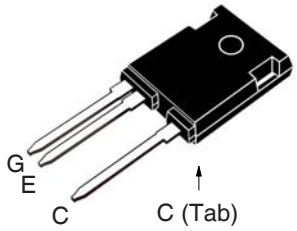
$V_{CE(sat)} \leq$ 3.0V



TO-268HV (IXBT)



TO-247HV (IXBH)



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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	3600	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	3600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	T_C = 25°C	48	A
I_{C110}	T_C = 110°C	16	A
I_{CM}	T_C = 25°C, 1ms	72	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 25Ω Clamped Inductive Load	I_{CM} = 60 $V_{CES} \leq$ 1500	A V
T_{SC} (SCSOA)	V_{GE} = 15V, T_J = 125°C, R_G = 82Ω, V_{CE} = 1500V, Non-Repetitive	10	μs
P_C	T_C = 25°C	270	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	Plastic Body for 10s	260	°C
M_d	Mounting Torque (TO-247HV)	1.13/10	Nm/lb.in
Weight	TO-268HV TO-247HV	4 6	g g

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250μA, V_{GE} = 0V	3600			V
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V T_J = 125°C			10 500	μA μA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V			±100	nA
$V_{CE(sat)}$	I_C = 16A, V_{GE} = 15V, Note 1 T_J = 125°C		2.5 3.1	3.0	V V

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

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IXBT16N360HV
IXBH16N360HV

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	I_C = 16A, V_{CE} = 10V, Note 1	7	12		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		1116		pF
C_{oes}			60		pF
C_{res}			25		pF
$Q_{g(on)}$	I_C = 16A, V_{GE} = 15V, V_{CE} = 1.5KV		65		nC
Q_{ge}			7		nC
Q_{gc}			30		nC
$t_{d(on)}$	**Resistive load, T_J = 25°C**		30		ns
t_r	I_C = 16A, V_{GE} = 15V		260		ns
$t_{d(off)}$	V_{CE} = 1.5KV, R_G = 25Ω		184		ns
t_f			110		ns
$t_{d(on)}$	**Resistive load, T_J = 125°C**		36		ns
t_r	I_C = 16A, V_{GE} = 15V		385		ns
$t_{d(off)}$	V_{CE} = 1.5KV, R_G = 25Ω		190		ns
t_f			115		ns
R_{thJC}				0.46	°C/W
R_{thCS}	TO-247HV		0.21		°C/W

Reverse Diode

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max	
V_F	I_F = 16A, V_{GE} = 0V, Note 1			3.5	V
t_{rr}	I_F = 16A, V_{GE} = 0V, $-di_F/dt$ = 100A/μs		620		ns
I_{RM}	V_R = 100V, V_{GE} = 0V		21.5		A
Q_{RM}			6.7		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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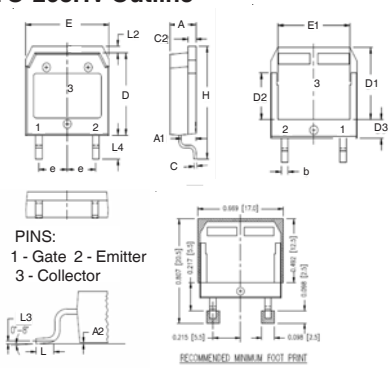
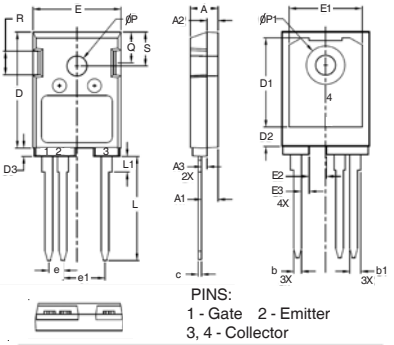
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585 7,005,734 B2 7,157,338B2 4,860,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692 7,063,975 B2 4,881,106 5,034,796 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



SYM	INCHES MIN	INCHES MAX	MILLIMETER MIN	MILLIMETER MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.465	.476	11.80	12.10
D2	.295	.307	7.50	7.80
D3	.114	.126	2.90	3.20
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.067	.079	1.70	2.00
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

TO-247HV Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.193	.201	4.90	5.10
A1	.114	.122	2.90	3.10
A2	.075	.083	1.90	2.10
A3	.035	.043	0.90	1.10
b	.053	.059	1.35	1.50
b1	.075	.083	1.90	2.10
c	.022	.030	0.55	0.75
D	.819	.843	20.80	21.40
D1	.638	.646	16.20	16.40
D2	.134	.146	3.40	3.70
D3	.055	.063	1.40	1.60
E	.622	.638	15.80	16.20
E1	.520	.528	13.20	13.40
E2	.118	.126	3.00	3.20
E3	.051	.059	1.30	1.50
e	.100 BSC		2.54 BSC	
e1	.300 BSC		7.62 BSC	
L	.732	.748	18.60	19.00
L1	.106	.118	2.70	3.00
øP	.138	.142	3.50	3.60
øP1	.272	.280	6.90	7.10
Q	.216	.224	5.50	5.70
R	.165	.169	4.20	4.30
S	.240	.248	6.10	6.30

Fig. 1. Output Characteristics @ T_J = 25°C

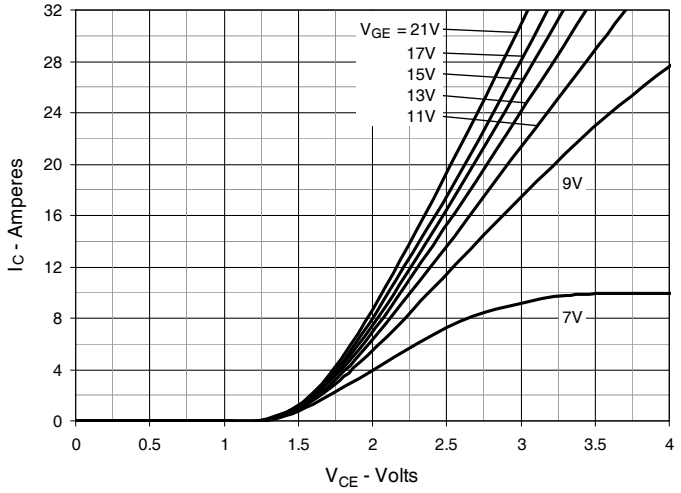


Fig. 2. Extended Output Characteristics @ T_J = 25°C

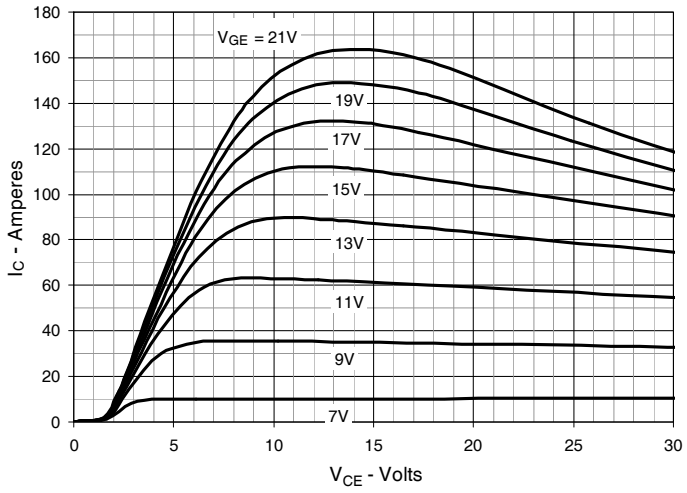


Fig. 3. Output Characteristics @ T_J = 125°C

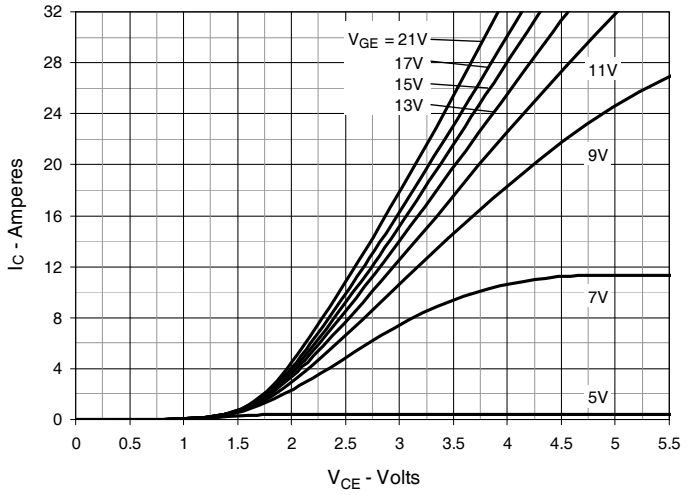


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

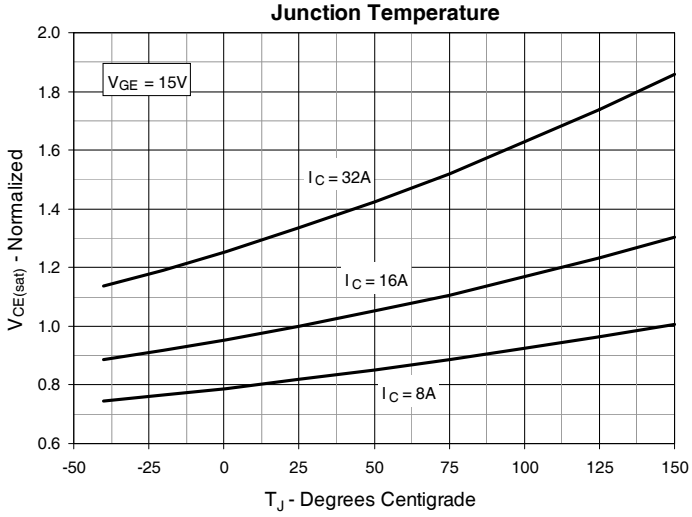


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

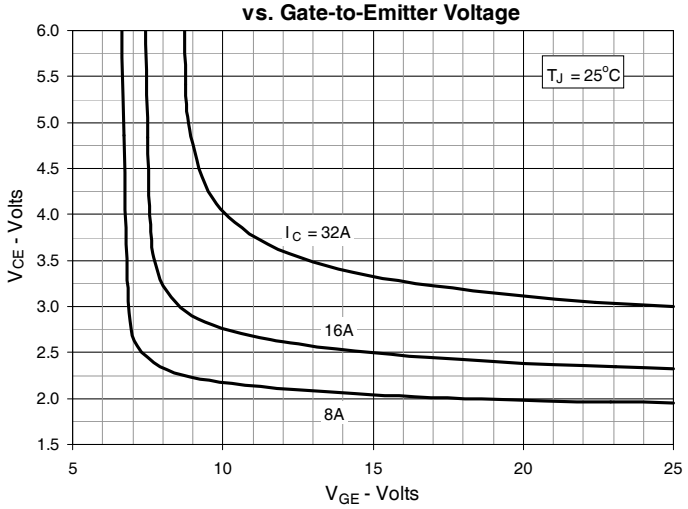


Fig. 6. Input Admittance

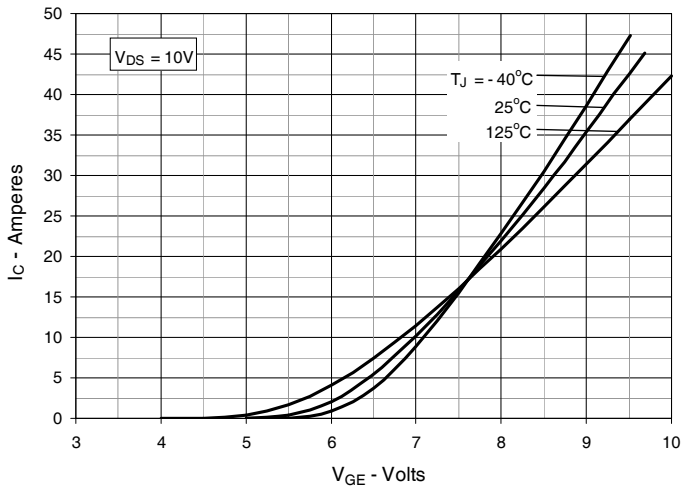


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Fig. 7. Transconductance

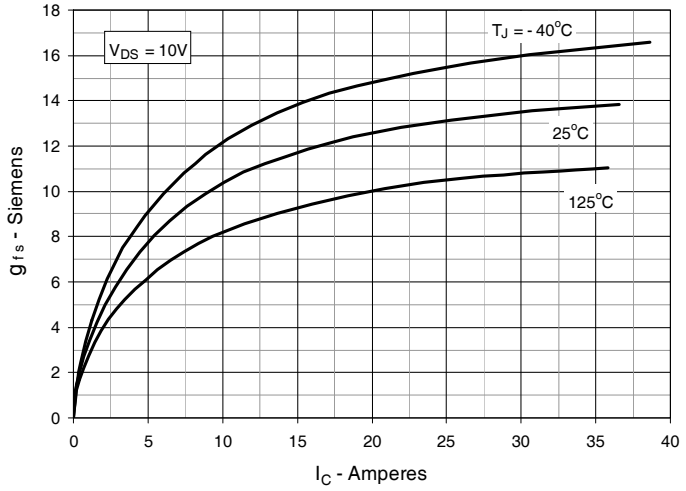

Fig. 8. Forward Voltage Drop of Intrinsic Diode

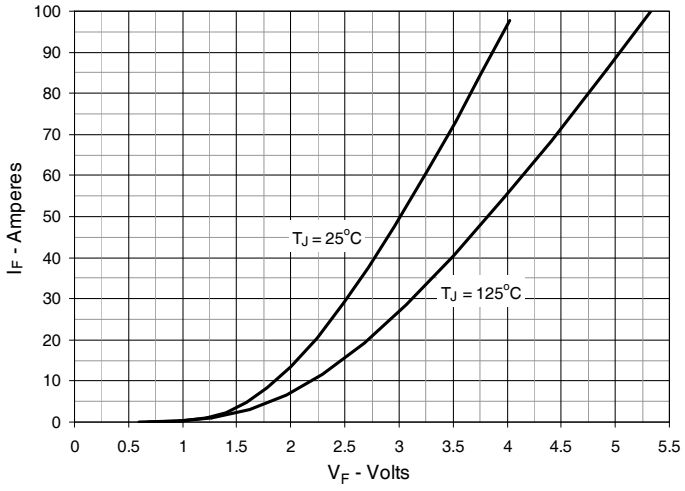

Fig. 9. Gate Charge

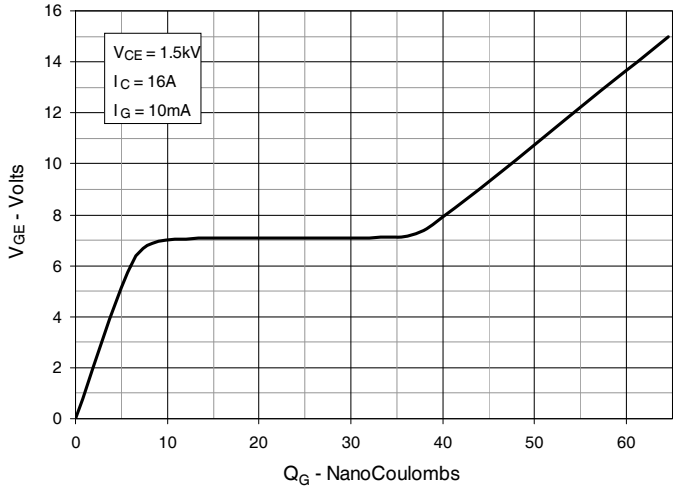

Fig. 10. Capacitance

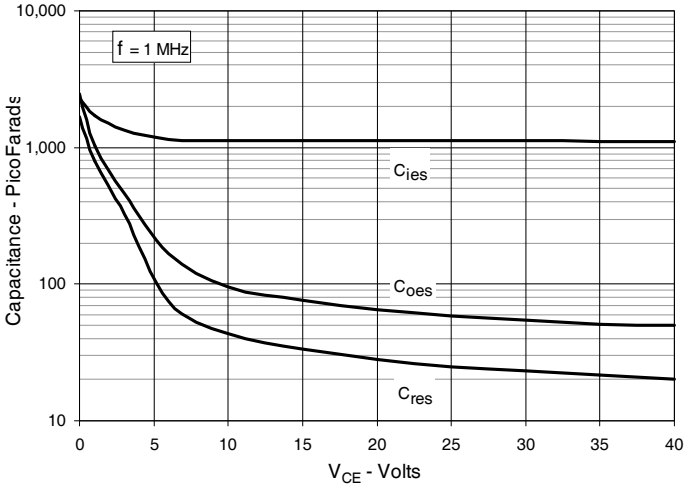

Fig. 11. Reverse-Bias Safe Operating Area

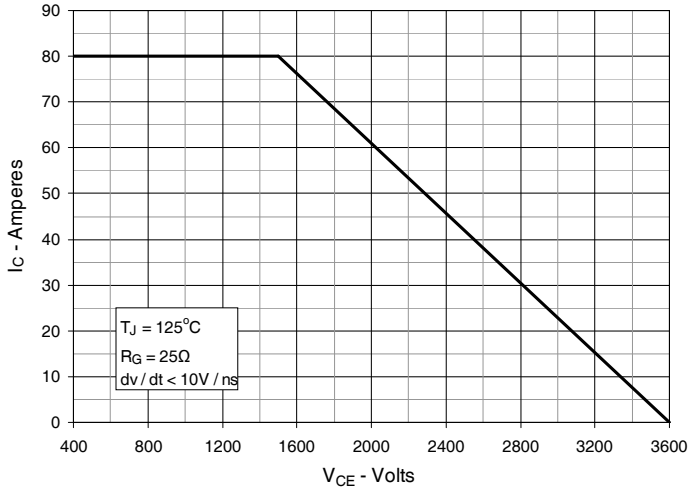

Fig. 12. Maximum Transient Thermal Impedance

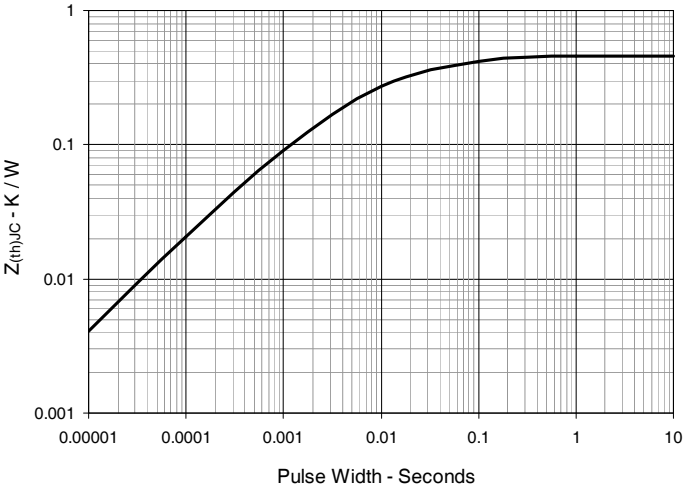

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Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

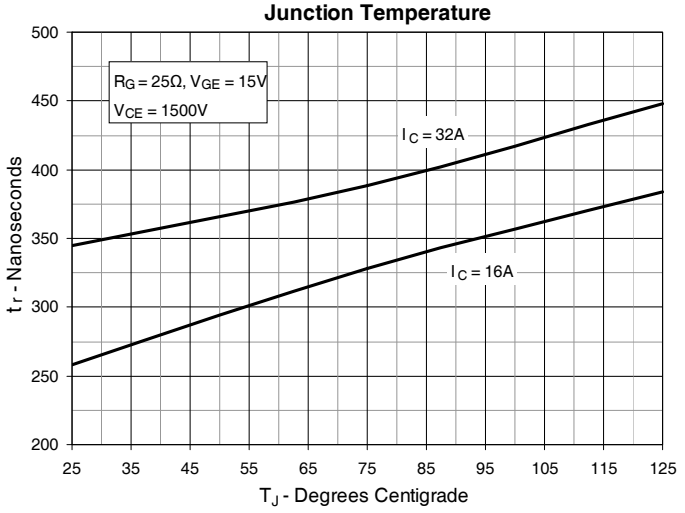

Fig. 14. Resistive Turn-on Rise Time vs. Collector Current

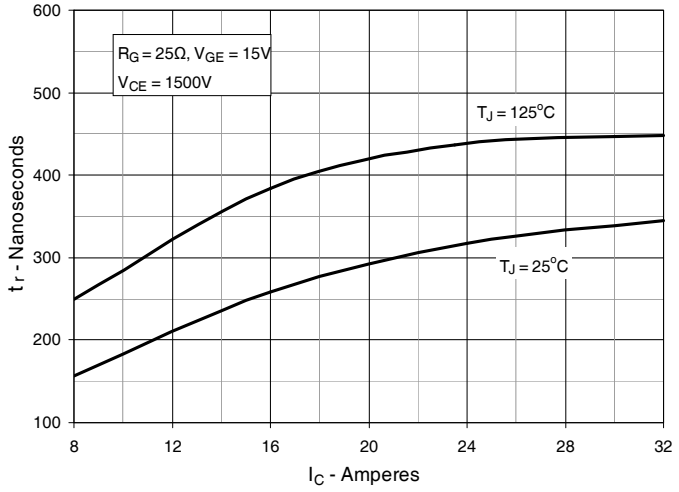

Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

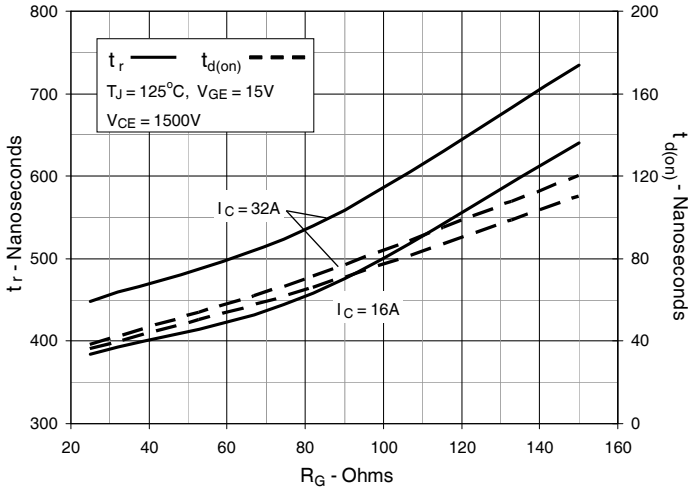

Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

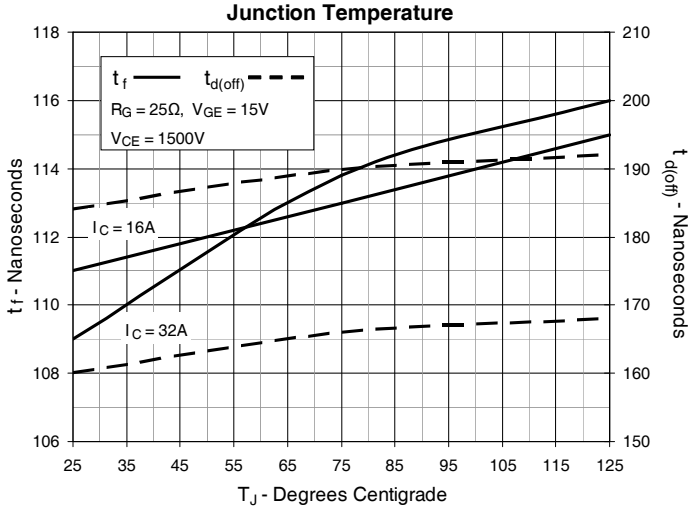

Fig. 17. Resistive Turn-off Switching Times vs. Collector Current

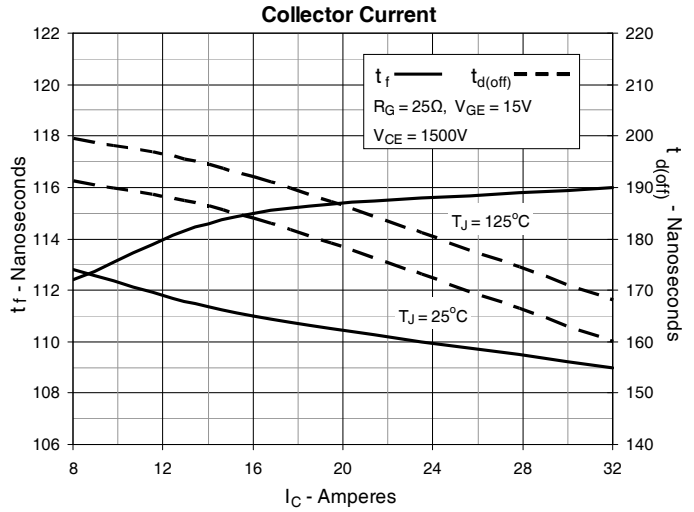

Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

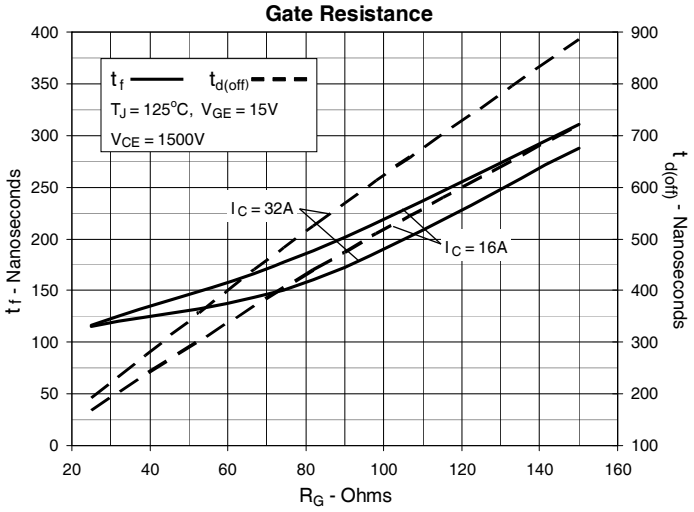

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Fig. 19. Forward-Bias Safe Operating Area @ T_C = 25°C

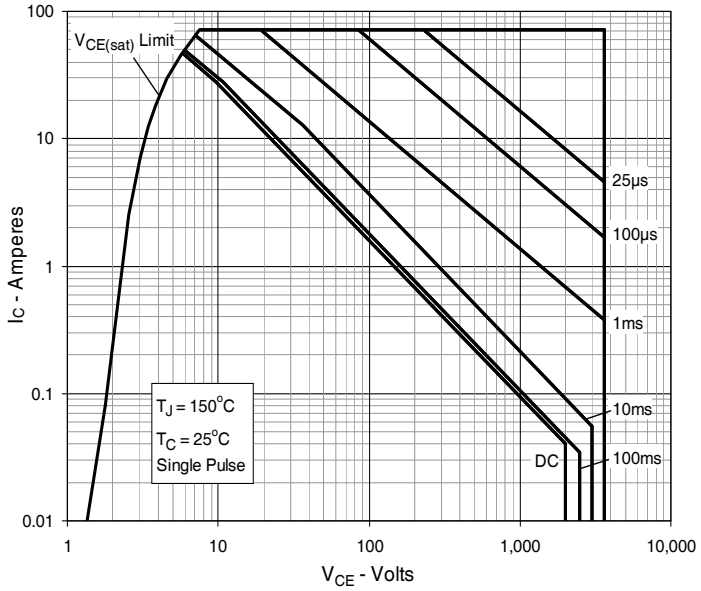
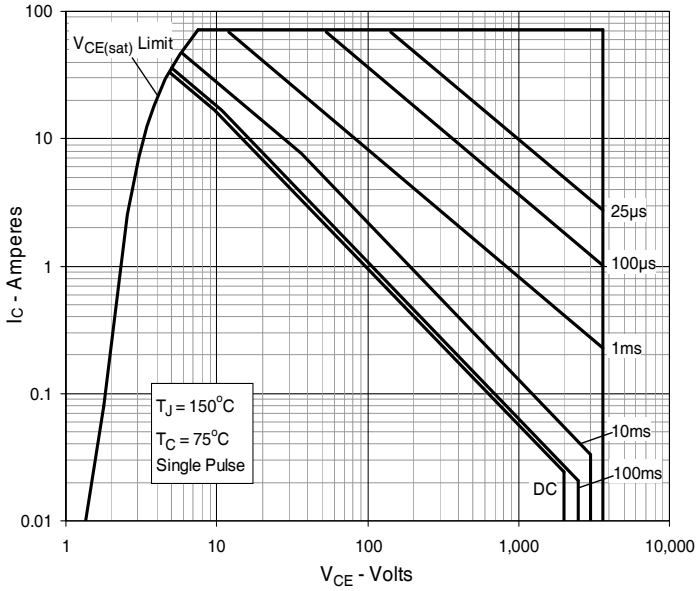


Fig. 20. Forward-Bias Safe Operating Area @ T_C = 75°C



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