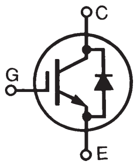
IXYS

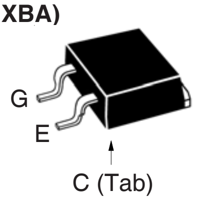
High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

IXBA10N300HV
IXBH10N300HV

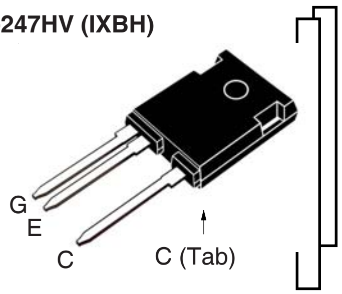
V_{CES} = 3000V
I_{C110} = 10A
$V_{CE(sat)} \leq$ 2.8V



TO-263HV (IXBA)



TO-247HV (IXBH)



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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_C = 25°C to 150°C	3000	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	3000	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	T_C = 25°C	34	A
I_{C110}	T_C = 110°C	10	A
I_{CM}	T_C = 25°C, 1ms	88	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 10Ω Clamped Inductive Load	I_{CM} = 80 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	180	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}	1.6 mm (0.062in.) from Case for 10s	260	°C
F_C	Mounting Force (TO-263HV)	10..65 / 22..14.6	N/lb
M_d	Mounting Torque (TO-247HV)	1.13/10	Nm/lb.in
Weight	TO-263HV TO-247HV	2.5 6.0	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	3000			V
$V_{GE(th)}$	I_C = 250µA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = 0.8 • V_{CES}, V_{GE} = 0V			25	µA
	T_J = 125°C			500	µA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V			±100	nA
$V_{CE(sat)}$	I_C = 10A, V_{GE} = 15V, Note 1		2.2	2.8	V
	T_J = 125°C		2.7		V

Features

- High Blocking Voltage
- Anti-Parallel Diode
- Low Conduction Losses

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

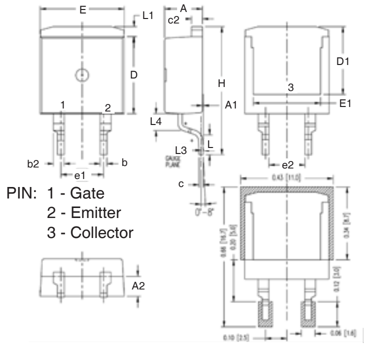
Symbol	**Test Conditions** ($T_J = 25°C$ Unless Otherwise Specified)	**Characteristic Values** Min.	Typ.	Max.	
g_{fS}	$I_C = 10A$, $V_{CE} = 10V$, Note 1	6	11		S
C_{ies}	$V_{CE} = 25V$, $V_{GE} = 0V$, $f = 1MHz$		1044		pF
C_{oes}			42		pF
C_{res}			14		pF
Q_g	$I_C = 10A$, $V_{GE} = 15V$, $V_{CE} = 1000V$		46		nC
Q_{ge}			5		nC
Q_{gc}			20		nC
$t_{d(on)}$	**Resistive Switching Times, $T_J = 25°C$** $I_C = 10A$, $V_{GE} = 15V$ $V_{CE} = 960V$, $R_G = 10\Omega$		36		ns
t_r			340		ns
$t_{d(off)}$			100		ns
t_f			1850		ns
$t_{d(on)}$	**Resistive Switching Times, $T_J = 125°C$** $I_C = 10A$, $V_{GE} = 15V$ $V_{CE} = 960V$, $R_G = 10\Omega$		40		ns
t_r			765		ns
$t_{d(off)}$			120		ns
t_f			2010		ns
R_{thJC}				0.69	°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	$I_F = 10A$, $V_{GE} = 0V$			2.7	V
t_{rr}	$I_F = 5A$, $V_{GE} = 0V$, $-di_F/dt = 100A/\mu s$ $V_R = 100V$, $V_{GE} = 0V$		1.6		μs
I_{RM}			23		A
Q_{RM}			18.6		μC

Note 1: Pulse test, $t \leq 300\mu s$, duty cycle, $d \leq 2\%$.

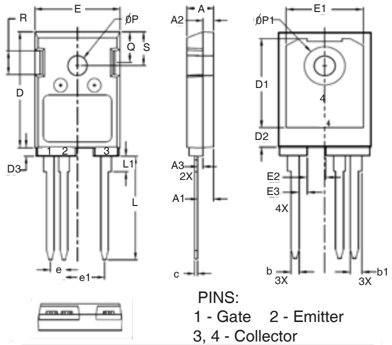
TO-263HV-2L Outline



PIN: 1 - Gate
2 - Emitter
3 - Collector

SYM	INCHES MIN	INCHES MAX	MILLIMETER MIN	MILLIMETER MAX
A	.170	.185	4.30	4.70
A1	.000	.008	0.00	0.20
A2	.091	.098	2.30	2.50
b	.028	.035	0.70	0.90
b2	.046	.054	1.18	1.38
C	.018	.024	0.45	0.60
C2	.049	.055	1.25	1.40
D	.354	.370	9.00	9.40
D1	.311	.327	7.90	8.30
E	.386	.402	9.80	10.20
E1	.307	.323	7.80	8.20
e1	.200 BSC		5.08 BSC	
(e2)	.163	.174	4.13	4.43
H	.591	.614	15.00	15.60
L	.079	.102	2.00	2.60
L1	.039	.055	1.00	1.40
L3	.010 BSC		0.254 BSC	
(L4)	.071	.087	1.80	2.20

TO-247HV Outline



PINS:
1 - Gate 2 - Emitter
3, 4 - Collector

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 = 25ºC

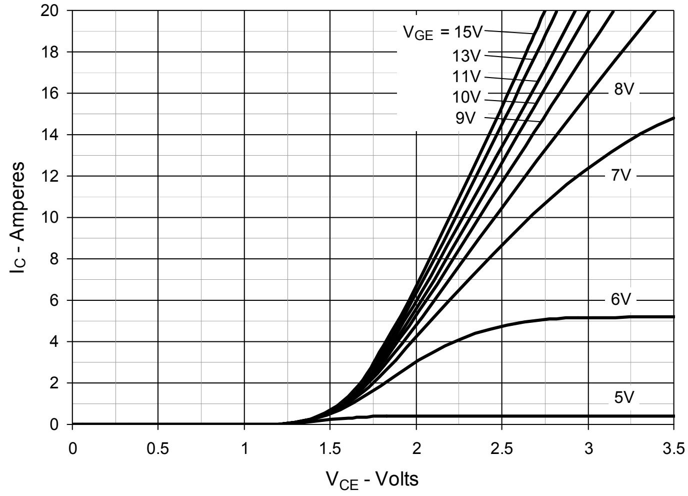


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

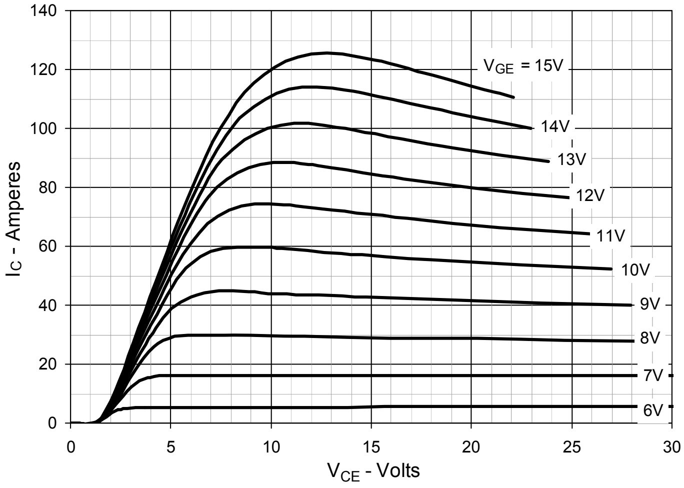


Fig. 3. Output Characteristics @ T_J = 125ºC

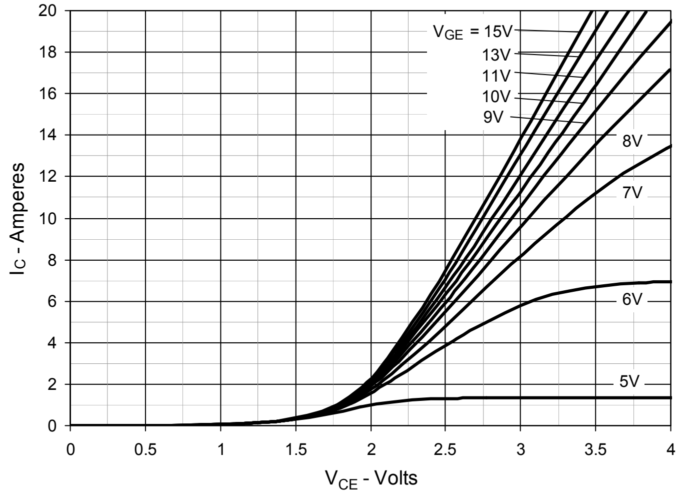


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

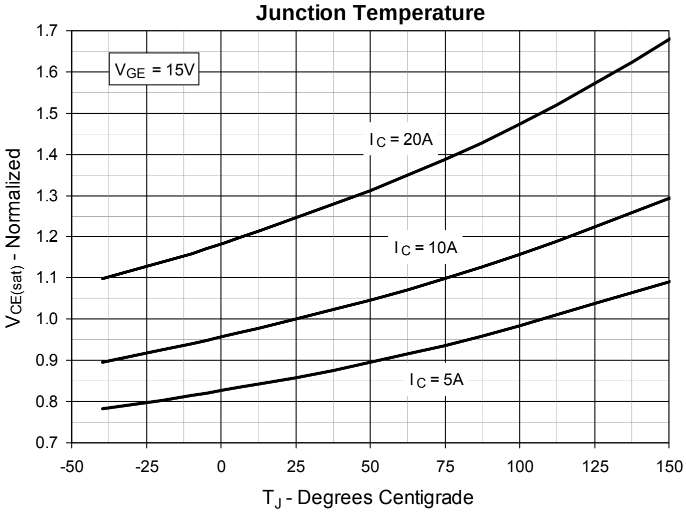


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

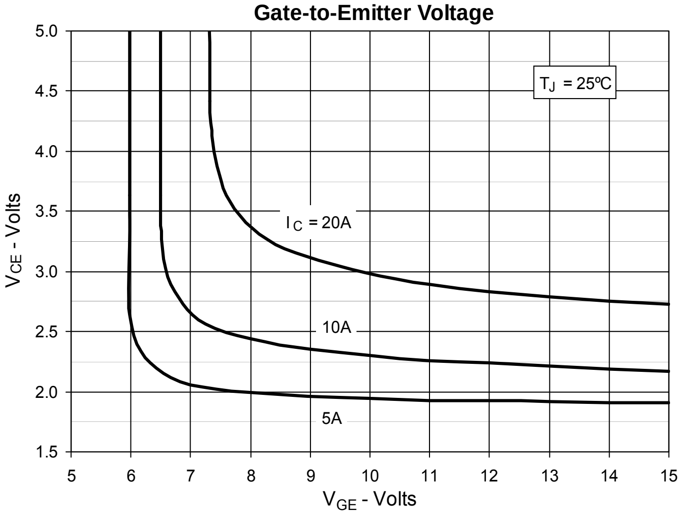


Fig. 6. Input Admittance

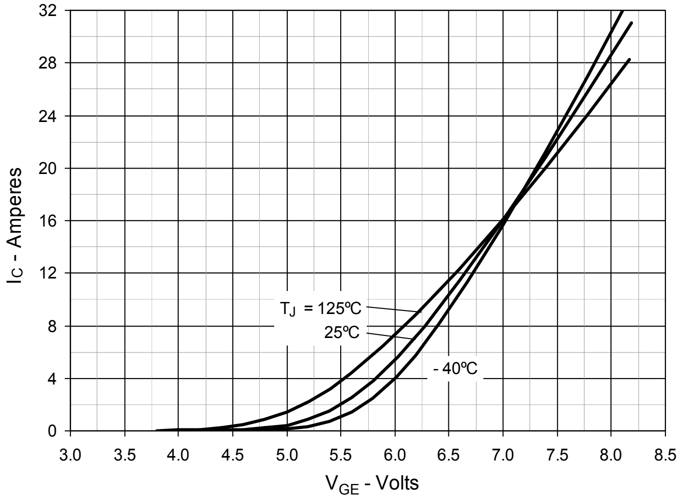


Fig. 7. Transconductance

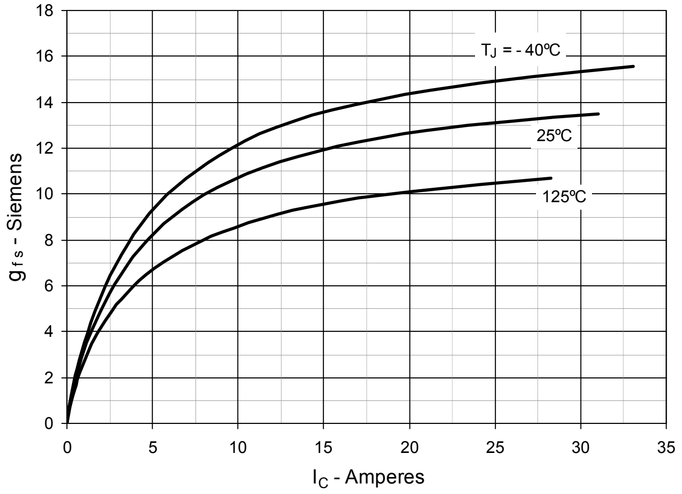


Fig. 8. Forward Voltage Drop of Intrinsic Diode

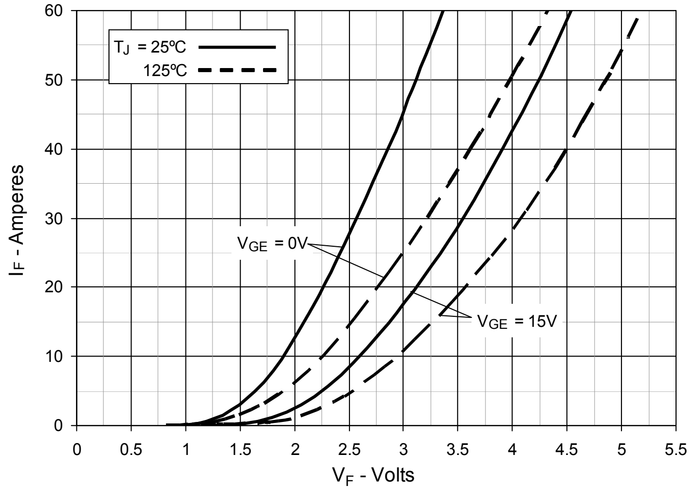


Fig. 9. Gate Charge

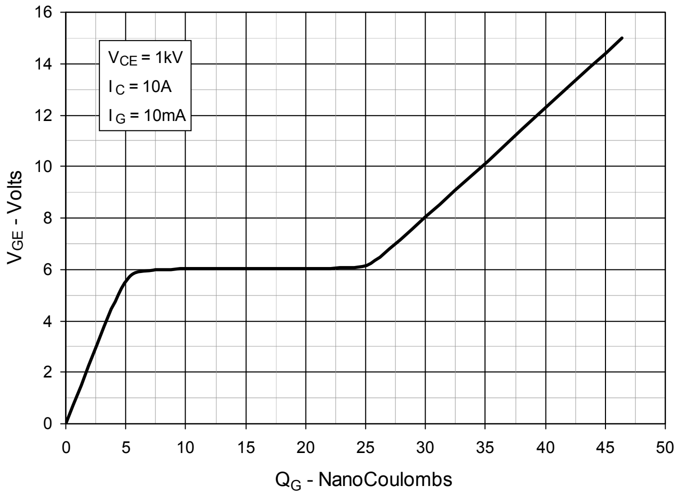


Fig. 10. Capacitance

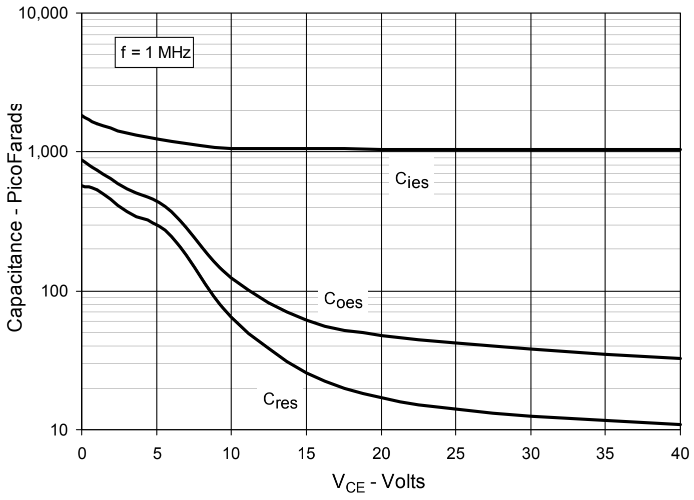


Fig. 11. Reverse-Bias Safe Operating Area

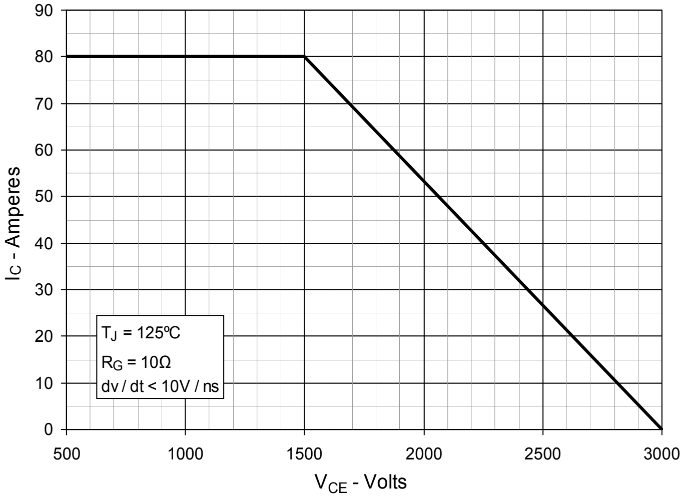


Fig. 12. Maximum Transient Thermal Impedance

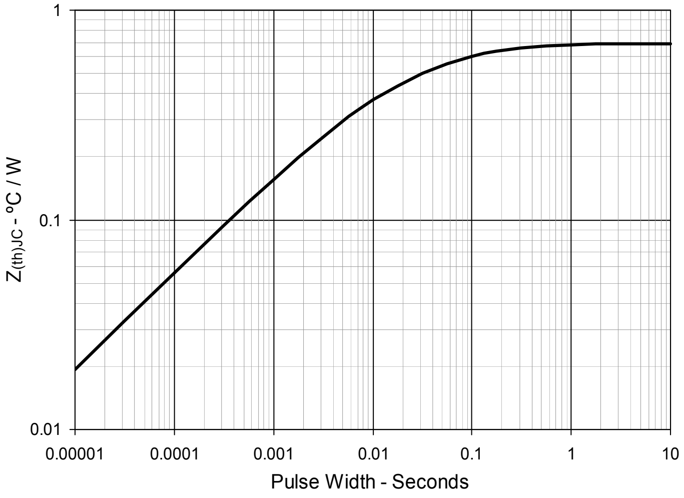


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

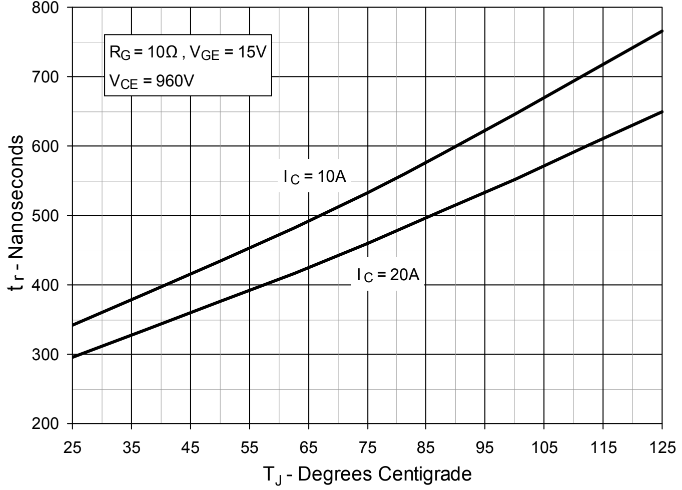


Fig. 14. Resistive Turn-on Rise Time vs. Collector Current

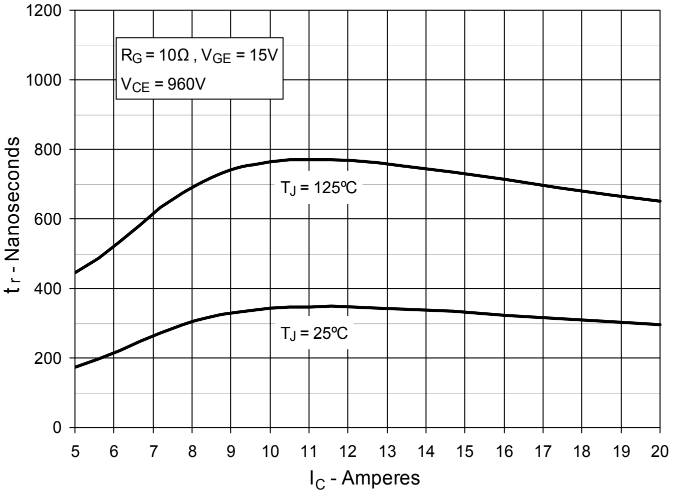


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

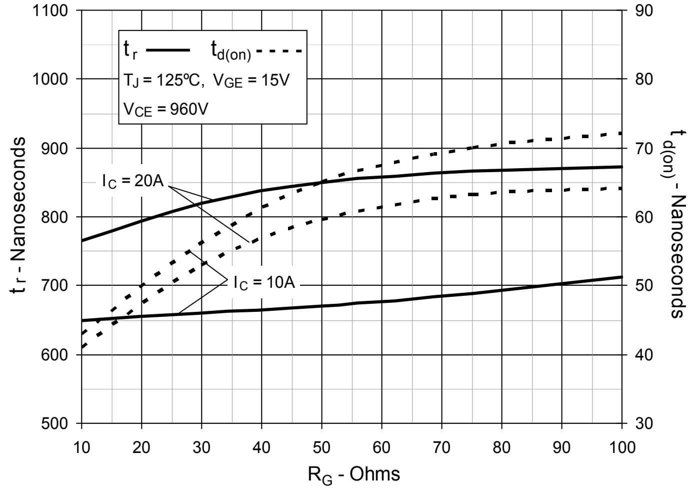


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

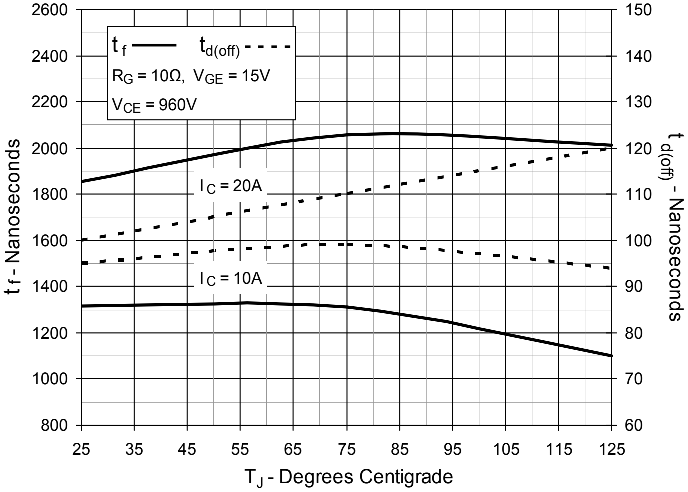


Fig. 17. Resistive Turn-off Switching Times vs. Collector Current

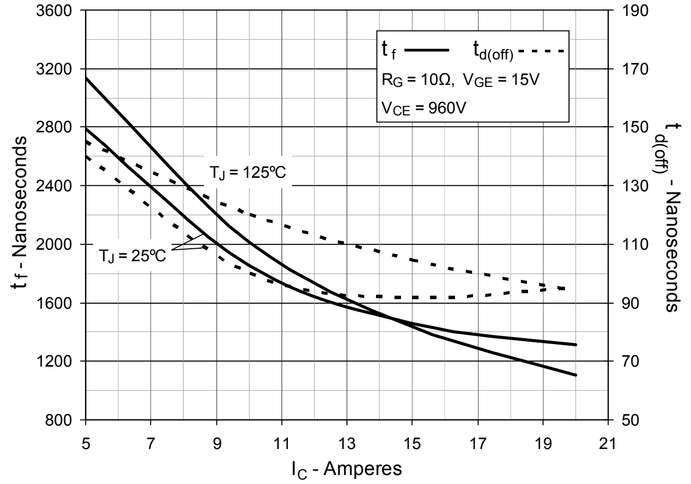


Fig. 28. Resistive Turn-off Switching Times vs. Gate Resistance

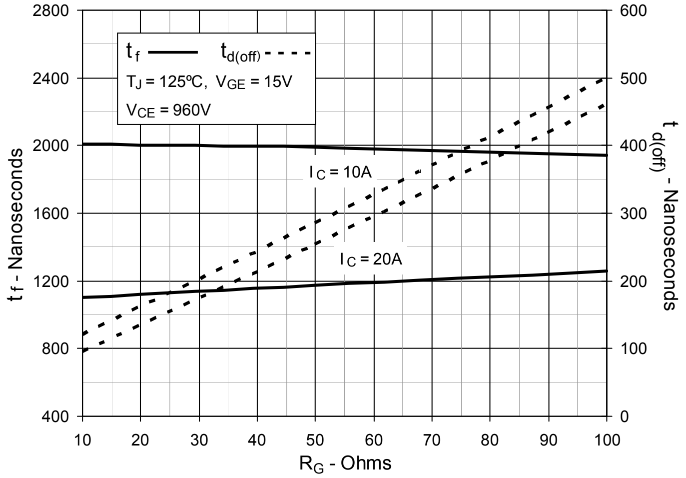


Fig. 19. Forward-Bias Safe Operating Area
@ T_C = 25ºC

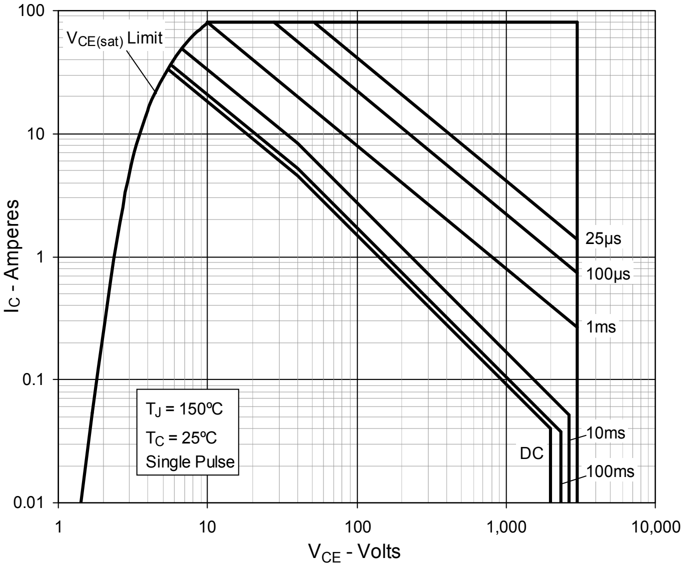
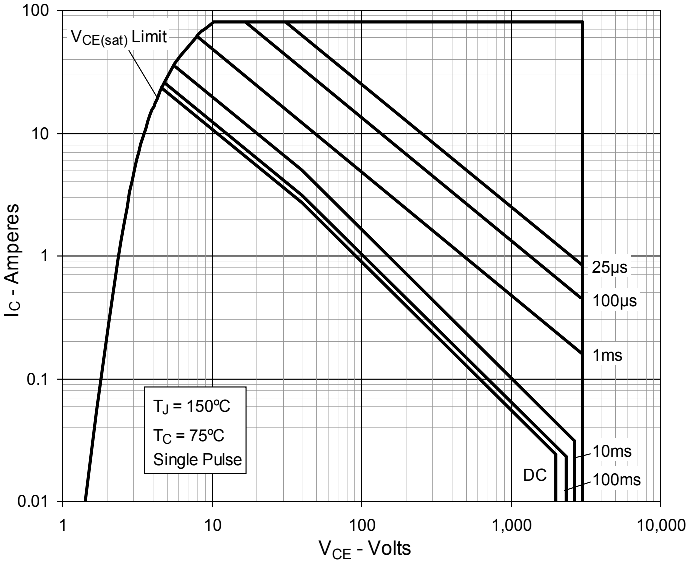


Fig. 20. Forward-Bias Safe Operating Area
@ T_C = 75ºC



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