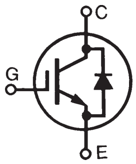
IXYS Preliminary Technical Information

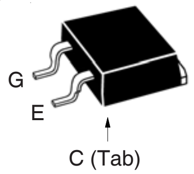
High Voltage, High Gain BiMOSFET™ Monolithic Bipolar MOS Transistor

IXBA12N300HV
IXBT12N300HV

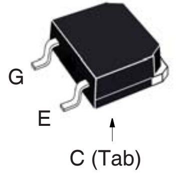
$V_{CES} = 3000V$
$I_{C110} = 12A$
$V_{CE(sat)} \leq 3.2V$



TO-263 (IXBA)



TO-268 (IXBT)



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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 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	30	A
I_{C110}	T_C = 110°C	12	A
I_{CM}	T_C = 25°C, 1ms	100	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 30Ω Clamped Inductive Load	I_{CM} = 98 1500	A V
P_C	T_C = 25°C	160	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
Weight	TO-263	2.5	g
	TO-268	4.0	g

Features

- High Voltage Package
- 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.	
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			1	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V			±100	nA
$V_{CE(sat)}$	I_C = 12A, V_{GE} = 15V, Note 1		2.8	3.2	V
	T_J = 125°C		3.5		V

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	 Typ.	 Max.	
g_{fS}	I_C = 12A, V_{CE} = 10V, Note 1	6.5	10.8		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		1290		pF
C_{oes}			56		pF
C_{res}			19		pF
$Q_{g(on)}$	I_C = 12A, V_{GE} = 15V, V_{CE} = 1000V		62		nC
Q_{ge}			13		nC
Q_{gc}			8.5		nC
$t_{d(on)}$	**Resistive Switching Times, T_J = 25°C** I_C = 12A, V_{GE} = 15V V_{CE} = 1250V, R_G = 10Ω		64		ns
t_r			140		ns
$t_{d(off)}$			180		ns
t_f			540		ns
$t_{d(on)}$	**Resistive Switching Times, T_J = 125°C** I_C = 12A, V_{GE} = 15V V_{CE} = 1250V, R_G = 10Ω		65		ns
t_r			395		ns
$t_{d(off)}$			175		ns
t_f			530		ns
R_{thJC}				0.78	°C/W

Reverse Diode

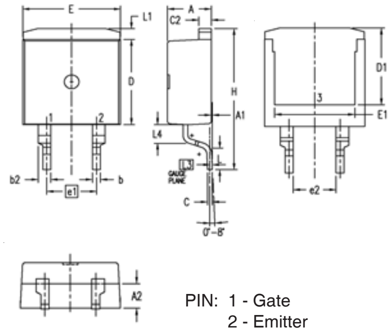
Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	 Typ.	 Max.	
V_F	I_F = 12A, V_{GE} = 0V			2.1	V
t_{rr}	I_F = 6A, V_{GE} = 0V, -di_F/dt = 100A/μs V_R = 100V, V_{GE} = 0V		1.4		μs
I_{RM}			21		A

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

PRELIMANARY 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.

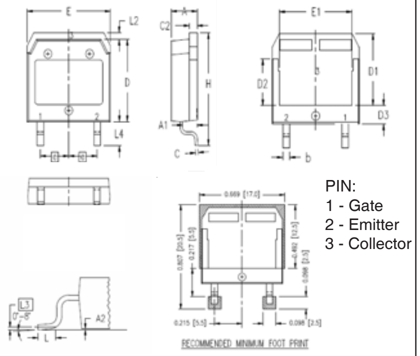
TO-263 (HV) Outline



PIN: 1 - Gate
2 - Emitter
3 - Collector

SYM	INCHES MIN	 MAX	MILLIMETER MIN	 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-268 (HV) Outline



PIN:
1 - Gate
2 - Emitter
3 - Collector

SYM	INCHES MIN	 MAX	MILLIMETER MIN	 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

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

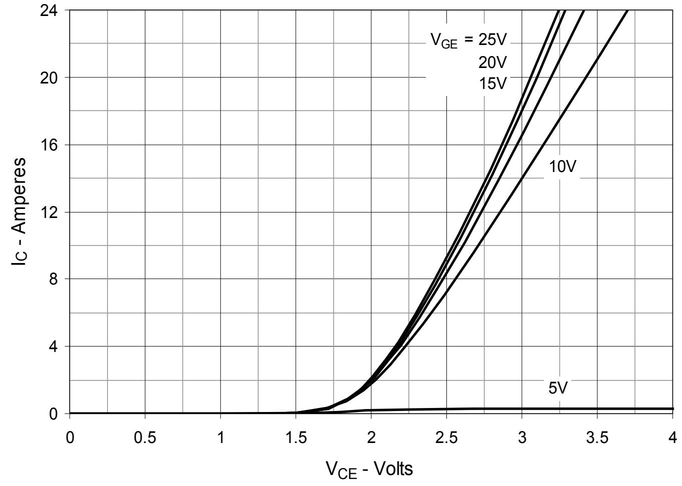


Fig. 1. Output Characteristics @ T_J = 25ºC

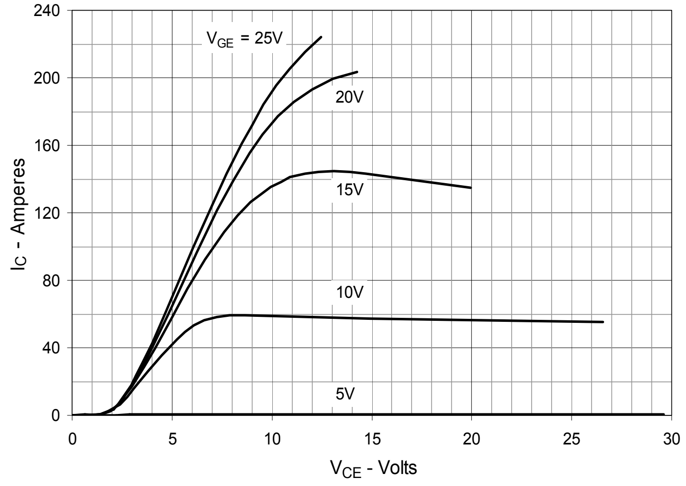


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

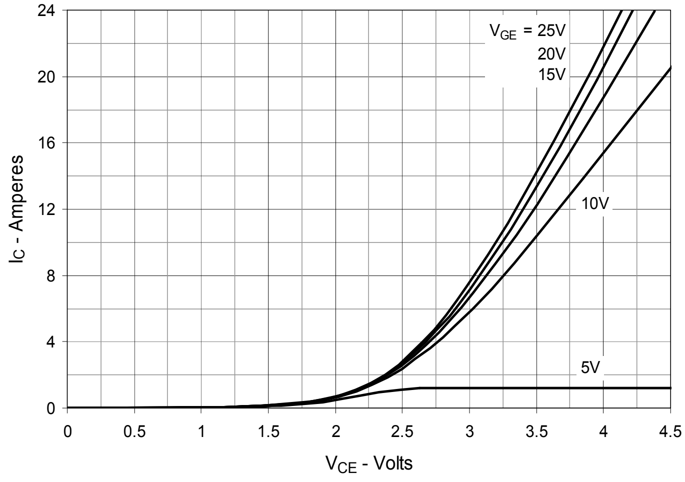


Fig. 3. Output Characteristics @ T_J = 125ºC

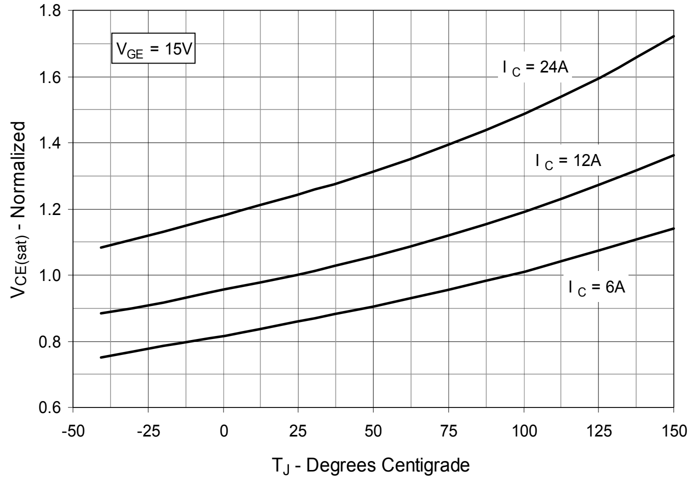


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

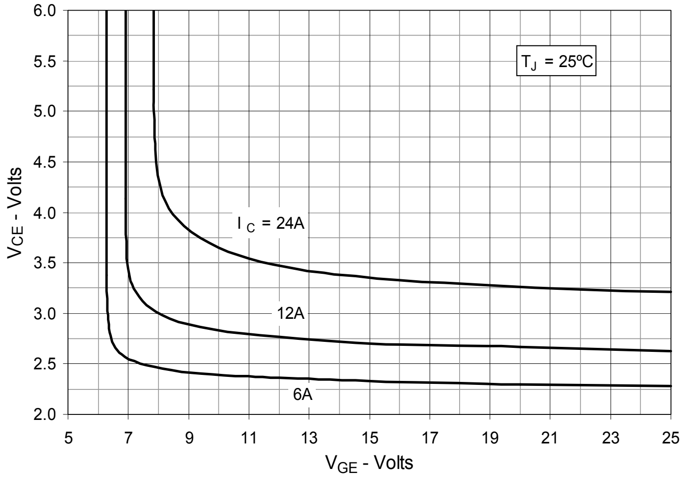


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

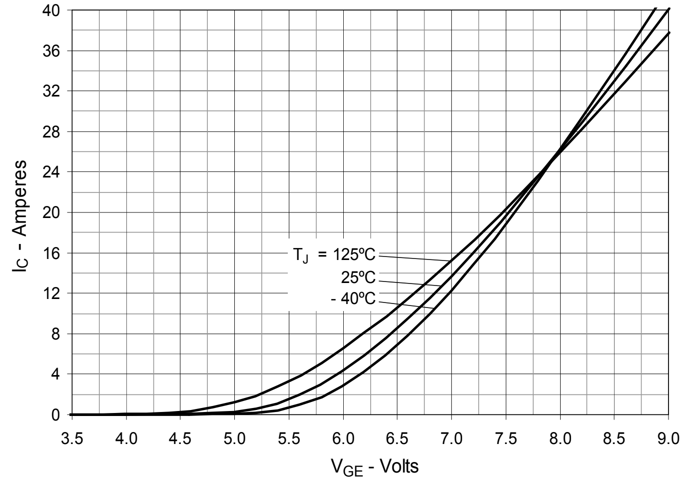


Fig. 6. Input Admittance

Fig. 7. Transconductance

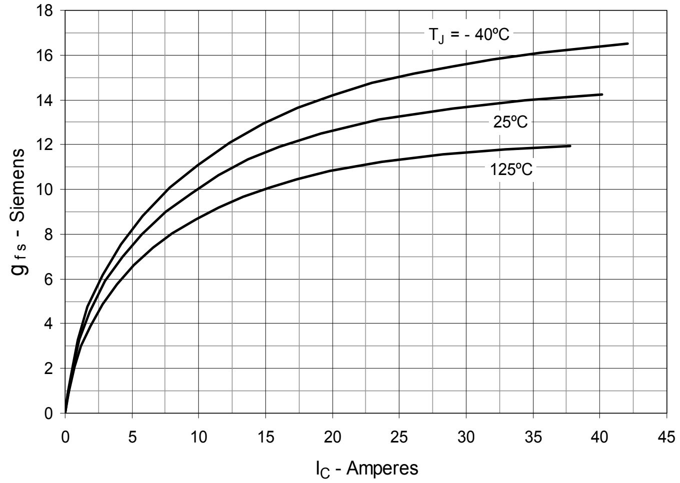


Fig. 8. Forward Voltage Drop of Intrinsic Diode

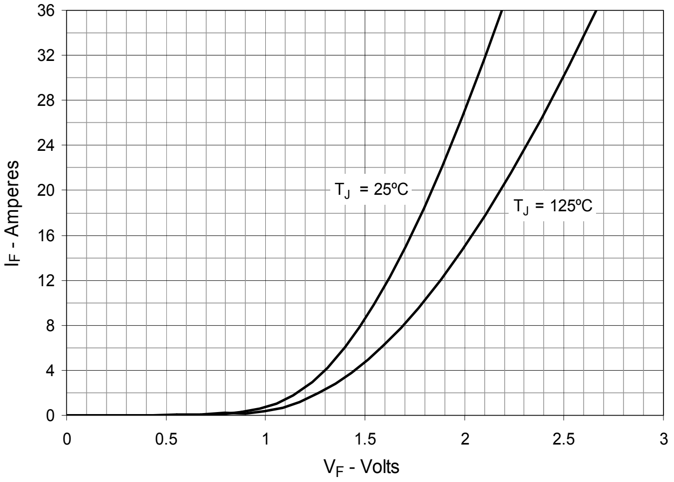


Fig. 9. Gate Charge

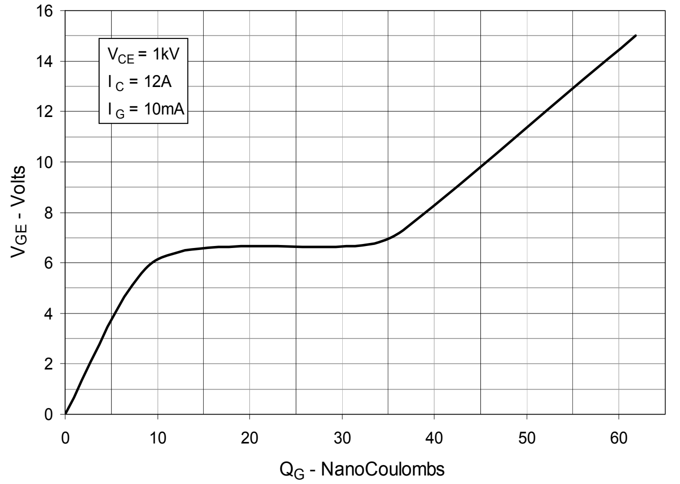


Fig. 10. Capacitance

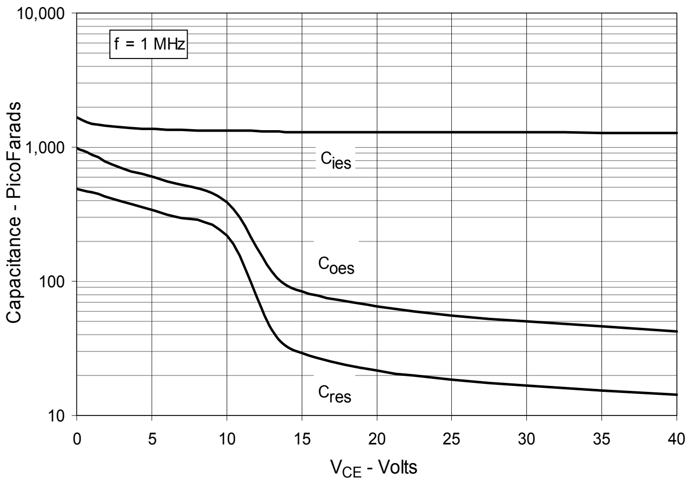


Fig. 11. Reverse-Bias Safe Operating Area

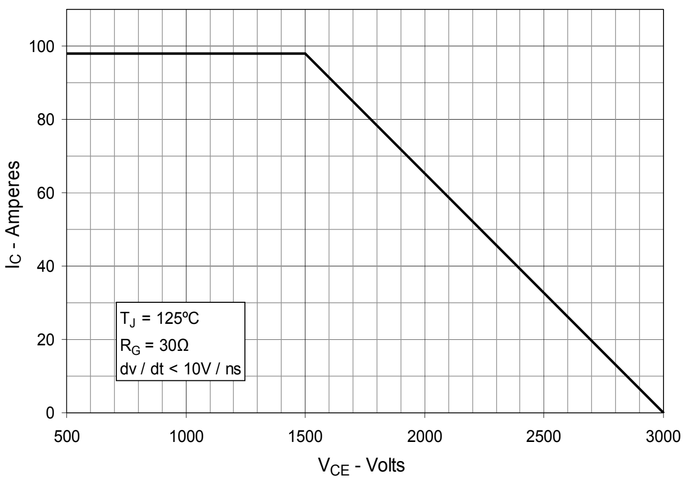
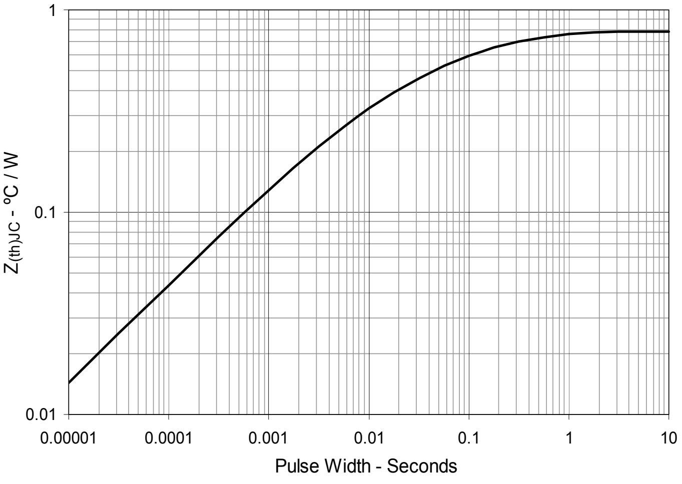


Fig. 12. Maximum Transient Thermal Impedance



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

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

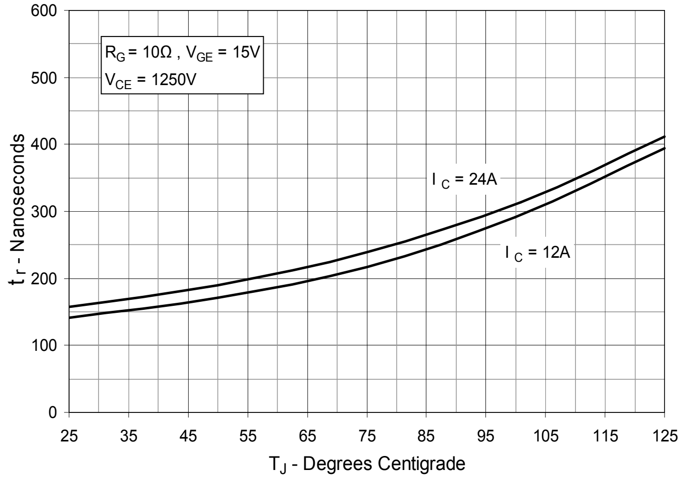


Fig. 14. Resistive Turn-on Rise Time vs. Collector Current

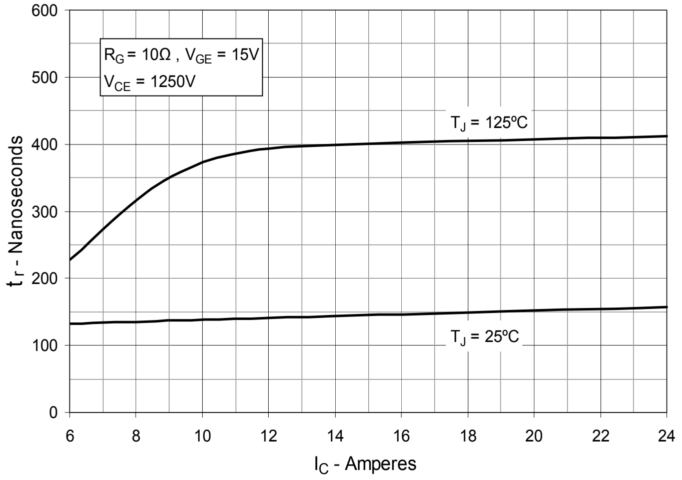


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

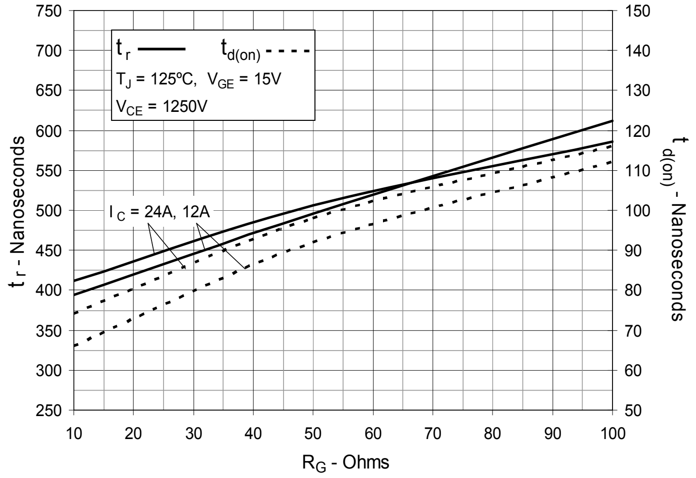


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

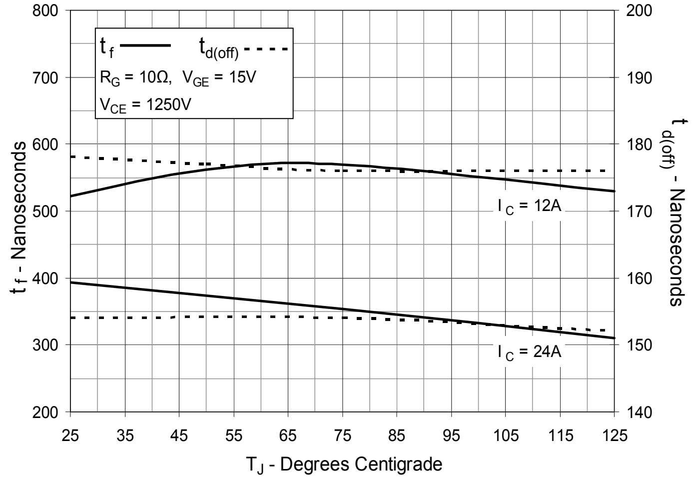


Fig. 17. Resistive Turn-off Switching Times vs. Collector Current

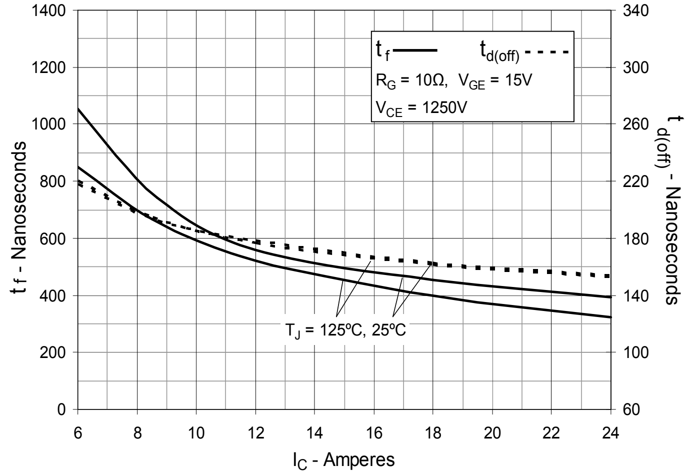
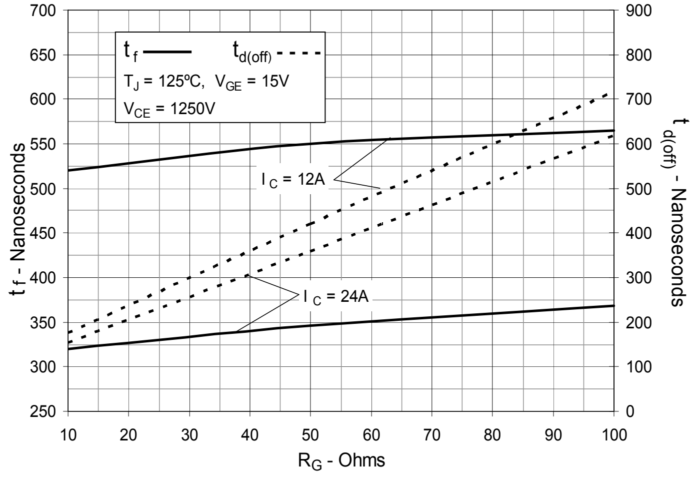


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance



IXYS REF: B_12N300(4P)03-05-09