

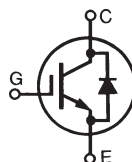
High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

IXBH42N250

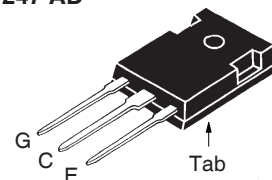
$$V_{CES} = 2500V$$

$$I_{C110} = 42A$$

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



TO-247 AD



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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_C = 25^\circ C$ to $150^\circ C$	2500	V
V_{CGR}	$T_J = 25^\circ C$ to $150^\circ C$, $R_{GE} = 1M\Omega$	2500	V
V_{GES}	Continuous	± 25	V
V_{GEM}	Transient	± 35	V
I_{C25}	$T_C = 25^\circ C$	104	A
I_{C110}	$T_C = 110^\circ C$	42	A
I_{CM}	$T_C = 25^\circ C$, 1ms	400	A
SSOA (RBSOA)	$V_{GE} = 15V$, $T_{VJ} = 125^\circ C$, $R_G = 20\Omega$ Clamped Inductive Load	$I_{CM} = 84$ 1250	A V
T_{SC} (SCSOA)	$V_{GE} = 15V$, $T_J = 125^\circ C$, $R_G = 82\Omega$, $V_{CE} = 1250V$, Non-Repetitive	10	μs
P_C	$T_C = 25^\circ C$	500	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}	1.6 mm (0.062in.) from Case for 10s	260	$^\circ C$
M_d	Mounting Torque	1.13/10	Nm/lb.in
Weight		6	g

Features

- High Blocking Voltage
- International Standard Package
- 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 ($T_J = 25^\circ C$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 1mA$, $V_{GE} = 0V$	2500		V
$V_{GE(th)}$	$I_C = 1mA$, $V_{CE} = V_{GE}$	3.0		5.0 V
I_{CES}	$V_{CE} = 0.8 \cdot V_{CES}$, $V_{GE} = 0V$ $T_J = 125^\circ C$		250	50 μA μA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 25V$			± 200 nA
$V_{CE(sat)}$	$I_C = 42A$, $V_{GE} = 15V$, Note 1 $T_J = 125^\circ C$		2.5 3.1	3.0 V V

Symbol Test Conditions

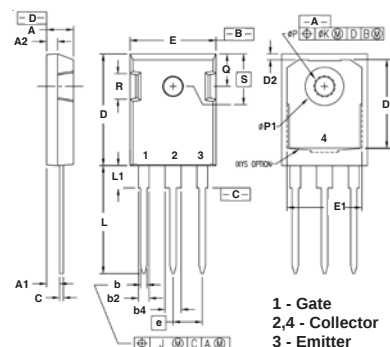
($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)

Characteristic Values

Min. Typ. Max.

g_{fs}	$I_C = 42\text{A}, V_{CE} = 10\text{V}$, Note 1	28	45	S
C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		4780	pF
C_{oes}			170	pF
C_{res}			56	pF
R_{Gi}	Gate Input Resistance		3.0	Ω
Q_g	$I_C = 42\text{A}, V_{GE} = 15\text{V}, V_{CE} = 1000\text{V}$		200	nC
Q_{ge}			28	nC
Q_{gc}			75	nC
$t_{d(on)}$	Resistive Switching Times, $T_J = 25^\circ\text{C}$ $I_C = 42\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 1250\text{V}, R_G = 20\Omega$		72	ns
t_r			330	ns
$t_{d(off)}$			445	ns
t_f			610	ns
$t_{d(on)}$	Resistive Switching Times, $T_J = 125^\circ\text{C}$ $I_C = 42\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 1250\text{V}, R_G = 20\Omega$		72	ns
t_r			580	ns
$t_{d(off)}$			460	ns
t_f			490	ns
R_{thJC}			0.25	$^\circ\text{C/W}$
R_{thCS}		0.21		$^\circ\text{C/W}$

TO-247 (IXBH) Outline



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.70	5.30	0.185	0.209
A1	2.21	2.59	0.087	0.102
A2	1.50	2.49	0.059	0.098
b	0.99	1.40	0.039	0.055
b2	1.65	2.39	0.065	0.094
b4	2.59	3.43	0.102	0.135
c	0.38	0.89	0.015	0.035
D	20.79	21.45	0.819	0.845
D1	13.07	-	0.515	-
D2	0.51	1.35	0.020	0.053
E	15.48	16.24	0.610	0.640
E1	13.45	-	0.53	-
E2	4.31	5.48	0.170	0.216
e	5.45 BSC		0.215 BSC	
L	19.80	20.30	0.078	0.800
L1	-	4.49	-	0.177
OP	3.55	3.65	0.140	0.144
OP1	-	7.39	-	0.290
Q	5.38	6.19	0.212	0.244
S	6.14 BSC		0.242 BSC	

Reverse Diode

Symbol Test Conditions

($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)

Characteristic Values

Min. Typ. Max

V_F	$I_F = 42\text{A}, V_{GE} = 0\text{V}$, Note 1		2.5	V
t_{rr}	$I_F = 21\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}, V_{GE} = 0\text{V}$		1.7	μs
I_{RM}			43	A

Note 1. Pulse test, $t < 300\mu\text{s}$, 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.

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
	4,860,072	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	

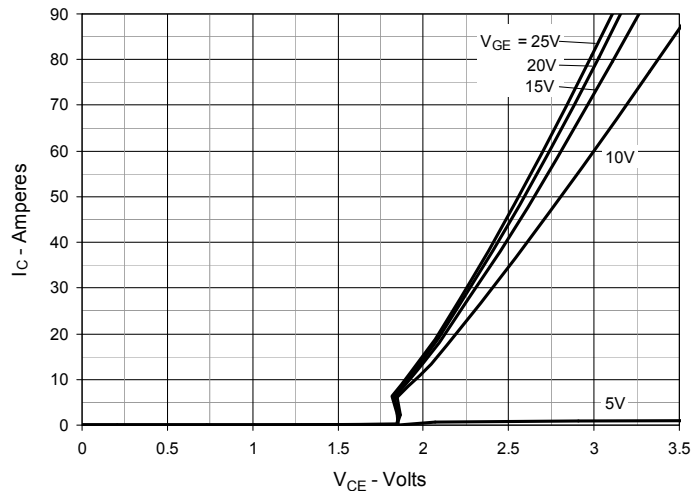
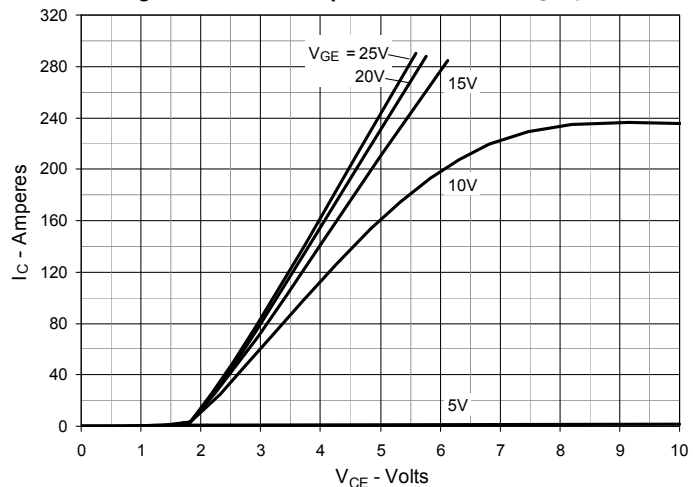
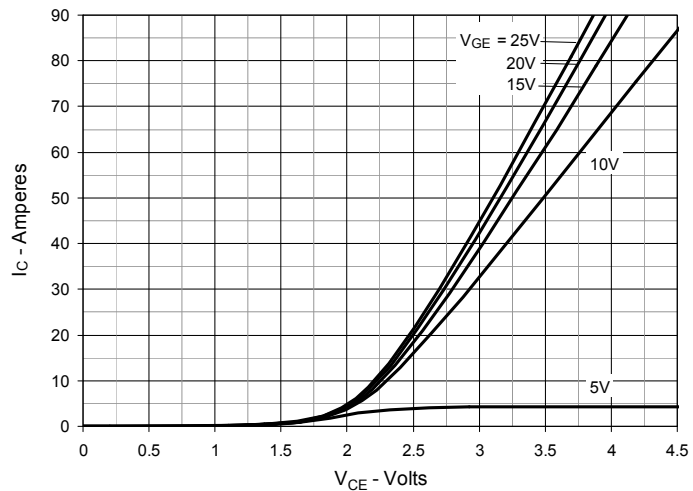
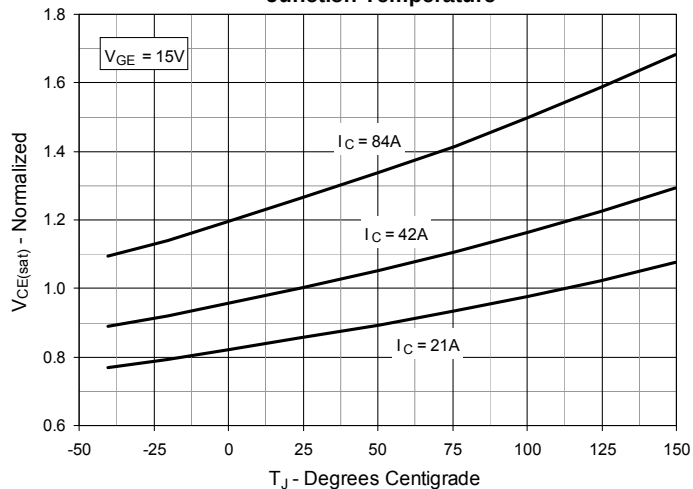
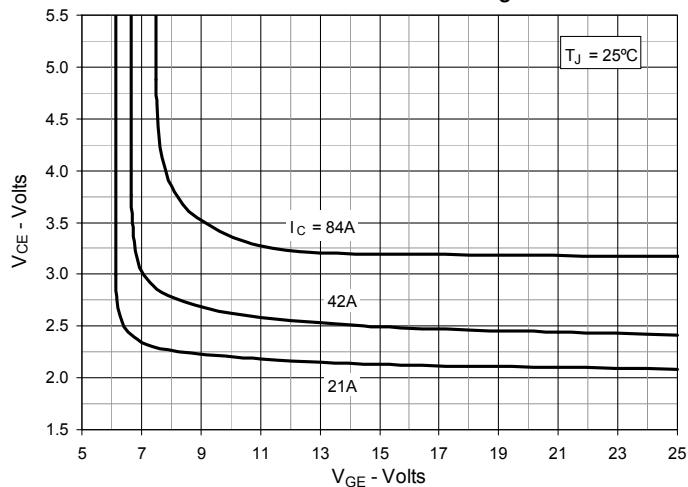
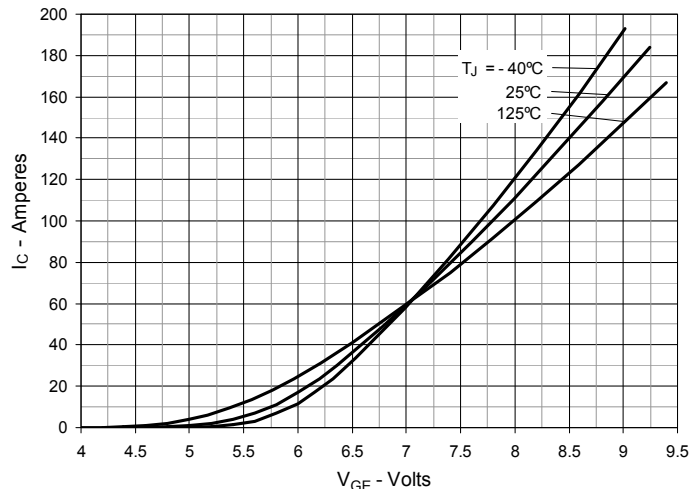
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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

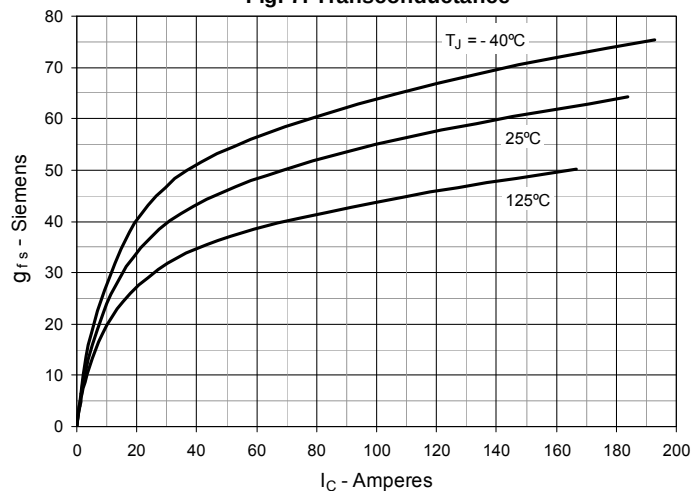


Fig. 8. Forward Voltage Drop of Intrinsic Diode

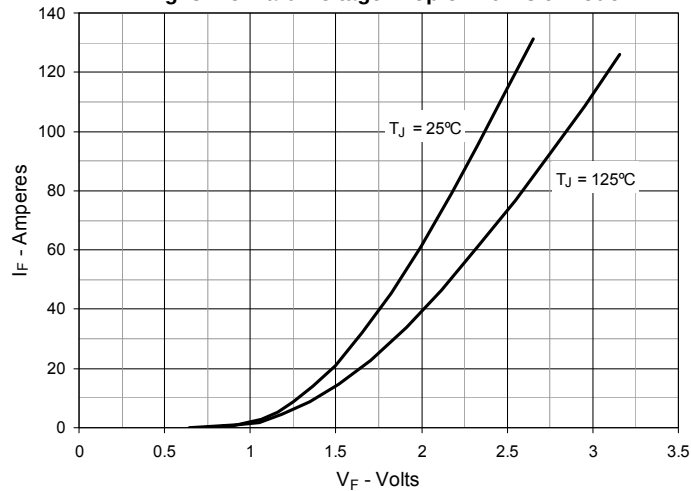


Fig. 9. Gate Charge

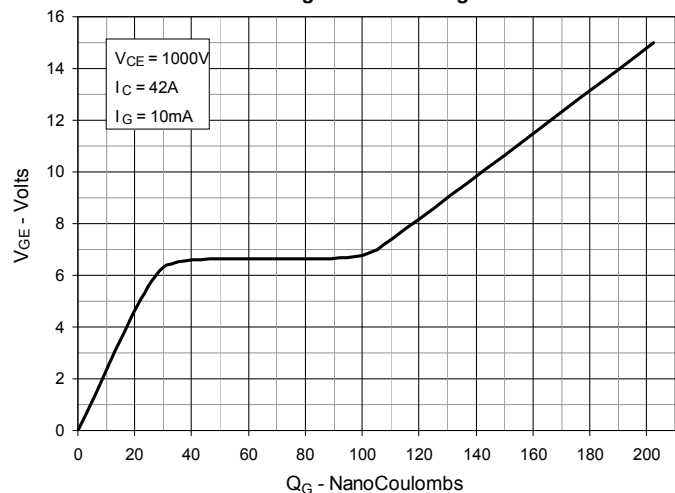


Fig. 10. Capacitance

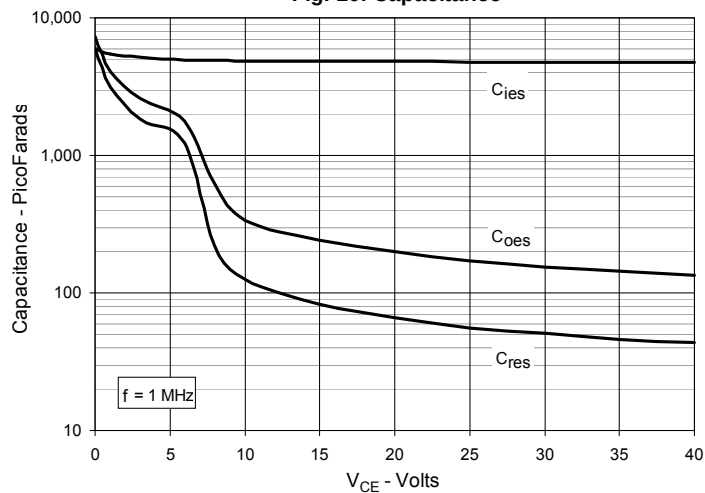


Fig. 11. Reverse-Bias Safe Operating Area

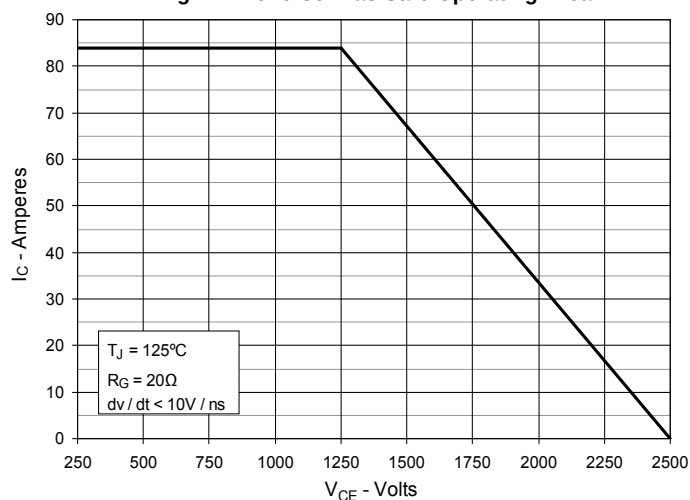


Fig. 12. Maximum Transient Thermal Impedance

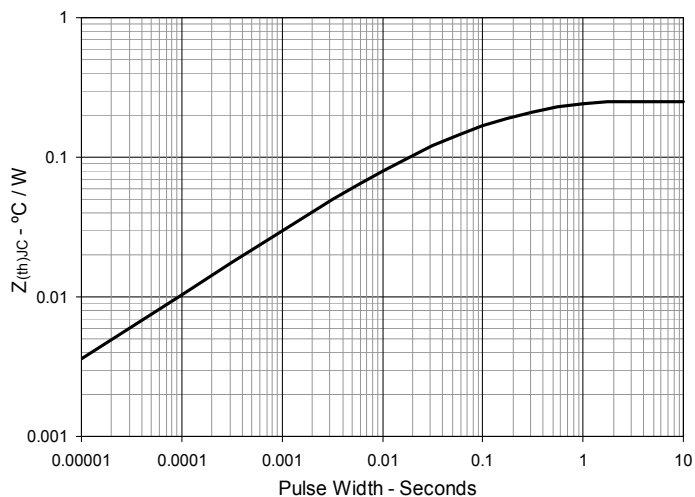


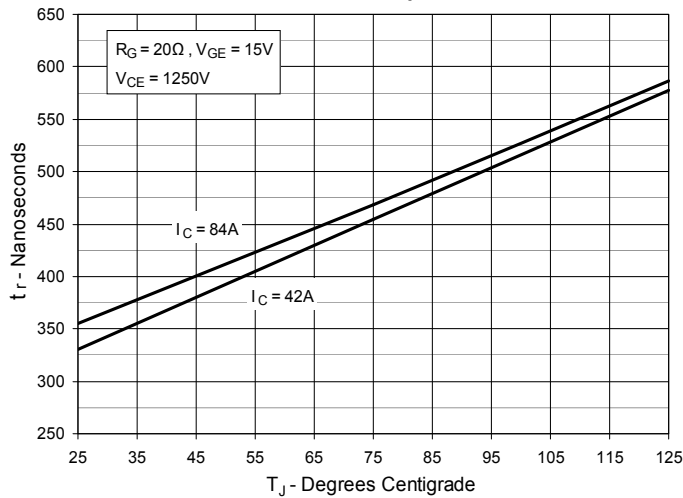
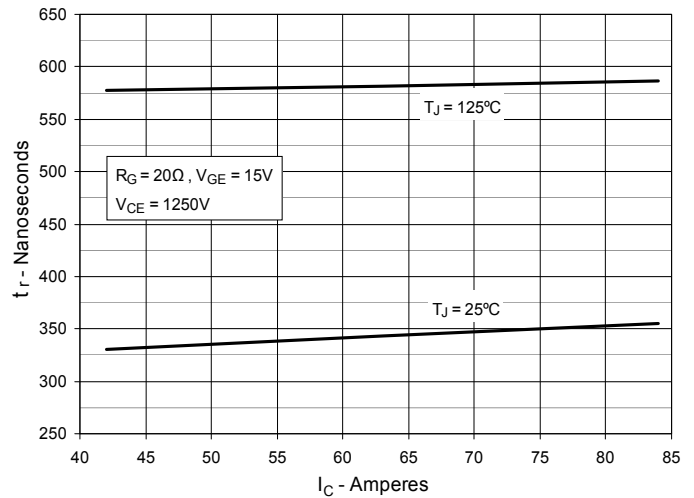
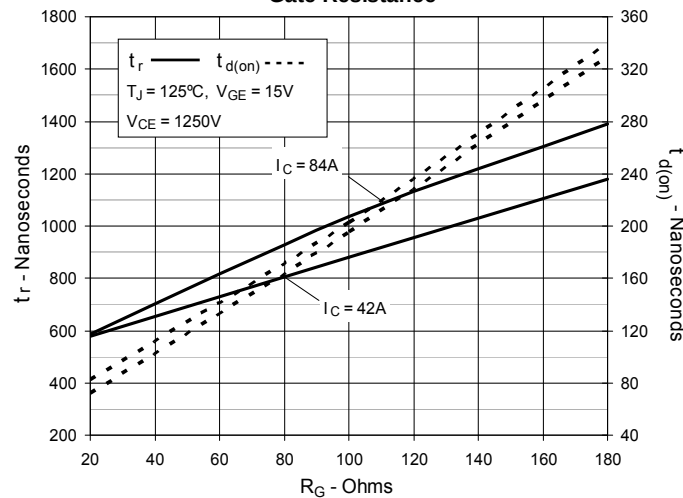
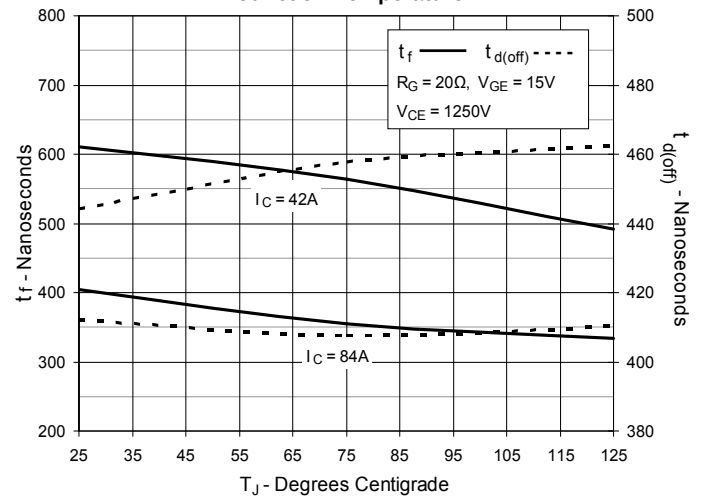
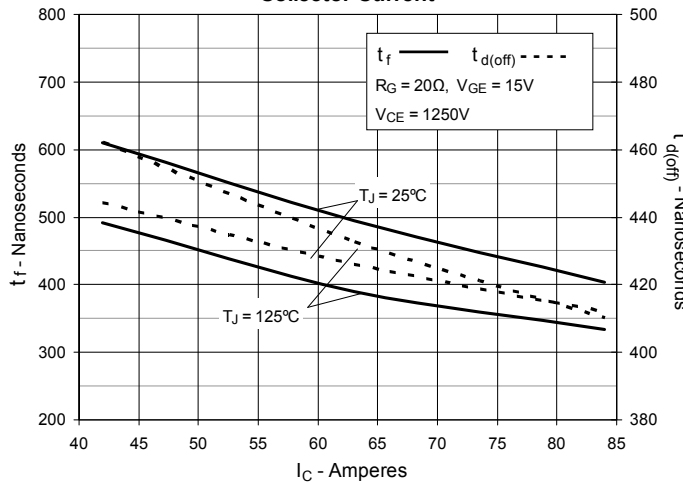
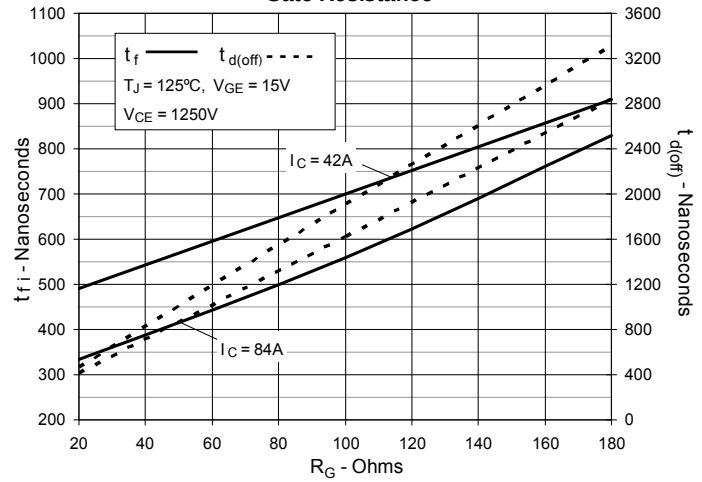
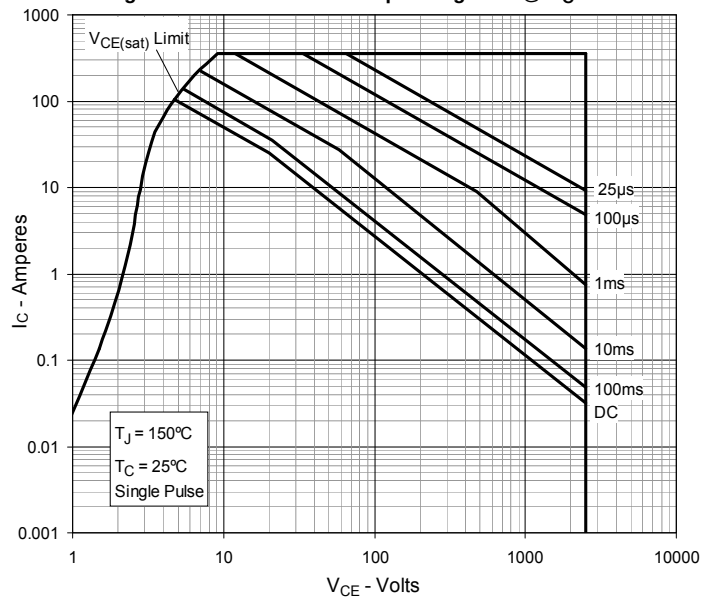
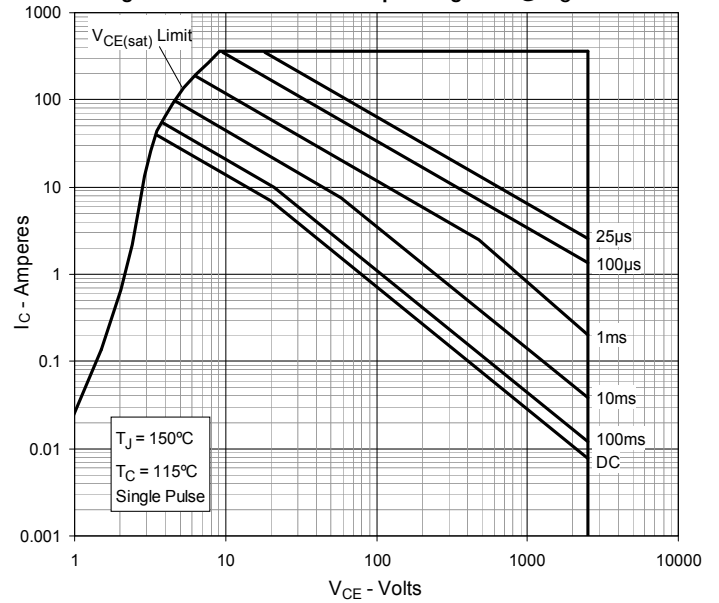
Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

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


Fig. 19. Forward-Bias Safe Operating Area @ $T_C = 25^\circ\text{C}$

Fig. 20. Forward-Bias Safe Operating Area @ $T_C = 115^\circ\text{C}$


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