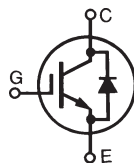


High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

IXBH42N170 IXBT42N170



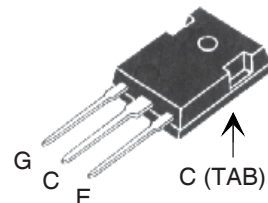
$$V_{CES} = 1700V$$

$$I_{C90} = 42A$$

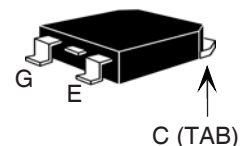
$$V_{CE(sat)} \leq 2.8V$$

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_C = 25^\circ C$ to $150^\circ C$	1700	V
V_{CGR}	$T_J = 25^\circ C$ to $150^\circ C$, $R_{GE} = 1M\Omega$	1700	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ C$	80	A
I_{LRMS}	Terminal Current Limit	75	A
I_{C90}	$T_C = 90^\circ C$	42	A
I_{CM}	$T_C = 25^\circ C$, 1ms	300	A
SSOA	$V_{GE} = 15V$, $T_{VJ} = 125^\circ C$, $R_G = 10\Omega$	$I_{CM} = 100$	A
(RBSOA)	Clamped inductive load	$V_{CES} \leq 1350$	V
P_C	$T_C = 25^\circ C$	360	W
T_J		-55 ... +150	$^\circ C$
T_{JM}		150	$^\circ C$
T_{stg}		-55 ... +150	$^\circ C$
T_L	1.6mm (0.062 in.) from case for 10s	300	$^\circ C$
T_{SOLD}	Plastic body for 10 seconds	260	$^\circ C$
M_d	Mounting torque (TO-247)	1.13/10	Nm/lb.in.
Weight	TO-247	6	g
	TO-268	4	g

TO-247 (IXBH)



TO-268 (IXBT)



G = Gate C = Collector
E = Emitter TAB = Collector

Features

- High blocking voltage
- International standard packages
- Low conduction losses

Advantages

- Low gate drive requirement
- High power density

Applications:

- Switched-mode and resonant-mode power supplies
- Uninterruptible power supplies (UPS)
- Laser generator
- Capacitor discharge circuit
- AC switches

Symbol	Test Conditions ($T_J = 25^\circ C$ unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu A$, $V_{GE} = 0V$	1700		V
$V_{GE(th)}$	$I_C = 250\mu A$, $V_{CE} = V_{GE}$	2.5		5.5 V
I_{CES}	$V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0V$ $T_J = 125^\circ C$			50 μA 1.5 mA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 100 nA
$V_{CE(sat)}$	$I_C = 42A$, $V_{GE} = 15V$, Note 1 $T_J = 125^\circ C$		2.7	2.8 V V

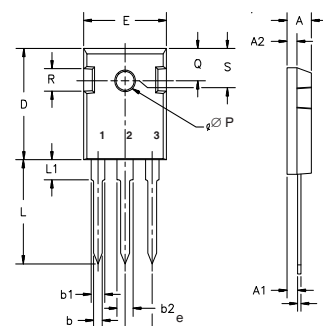
Symbol (T _J = 25°C unless otherwise specified)	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	I _C = 42A, V _{CE} = 10V, Note 1	24	32	S
C_{ies}	V _{CE} = 25V, V _{GE} = 0V, f = 1MHz		3990	pF
C_{oes}			225	pF
C_{res}			70	pF
Q_g	I _C = 42A, V _{GE} = 15V, V _{CE} = 0.5 • V _{CES}		188	nC
Q_{ge}			29	nC
Q_{gc}			76	nC
t_{d(on)}	Resistive Switching times, T_J = 25°C I _C = 42A, V _{GE} = 15V V _{CE} = 850V, R _G = 10Ω		37	ns
t_r			139	ns
t_{d(off)}			340	ns
t_f			665	ns
t_{d(on)}	Resistive Switching times, T_J = 125°C I _C = 42A, V _{GE} = 15V V _{CE} = 850V, R _G = 10Ω		36	ns
t_r			188	ns
t_{d(off)}			330	ns
t_f			740	ns
R_{thJC}	(TO-247)		0.25	0.35 °C/W
R_{thCS}				°C/W

Reverse Diode

Symbol Test Conditions (T _J = 25°C unless otherwise specified)		Characteristic Values	
		Min.	Typ.
V _F	I _F = 42A, V _{GE} = 0V		2.8
t _{rr}	I _F = 21A, V _{GE} = 0V, -di _F /dt = 100A/μs V _R = 100V	1.32	μs
I _{RM}		36	A

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

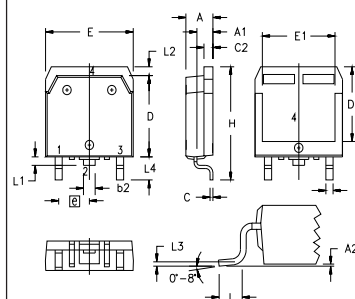
TO-247 (IXBH) Outline



Terminals: 1 - Gate 2 - Drain
3 - Source Tab - Drain

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A ₁	2.2	2.54	.087	.102
A ₂	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b ₁	1.65	2.13	.065	.084
b ₂	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
ØP	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15	BSC	.242	BSC

TO-268 (IXBT) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	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
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
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	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
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.

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
	4,850,072	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	

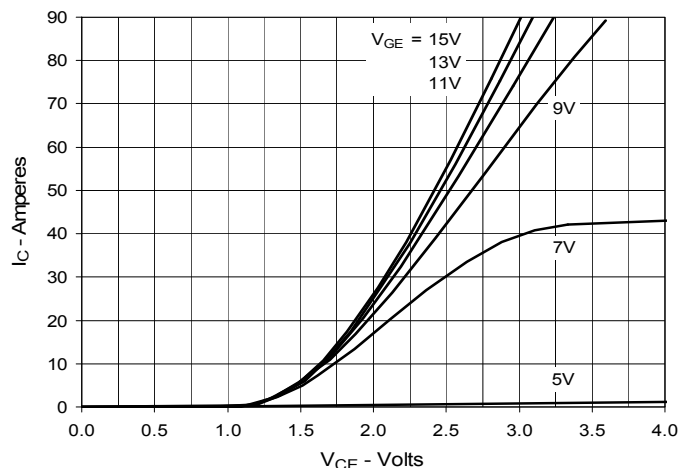
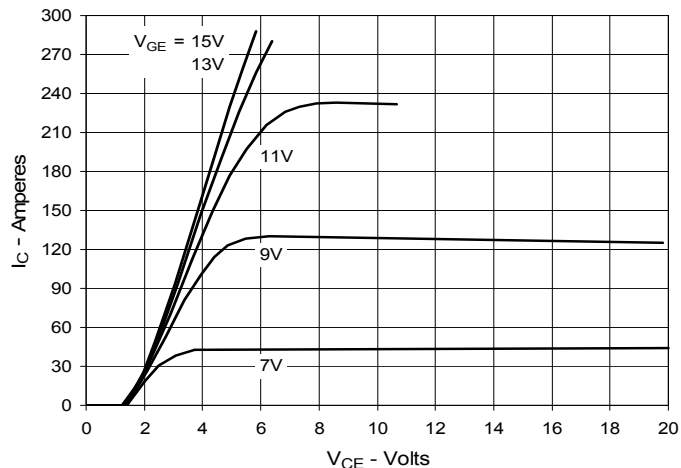
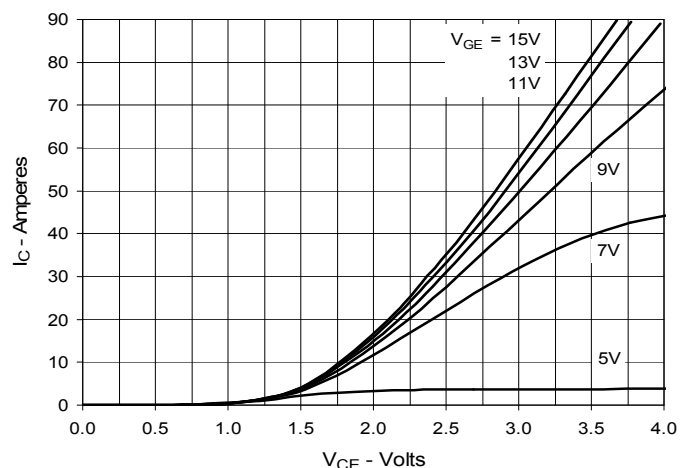
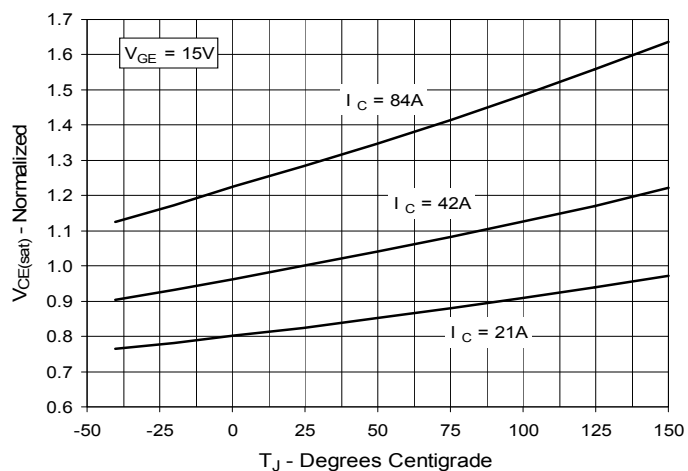
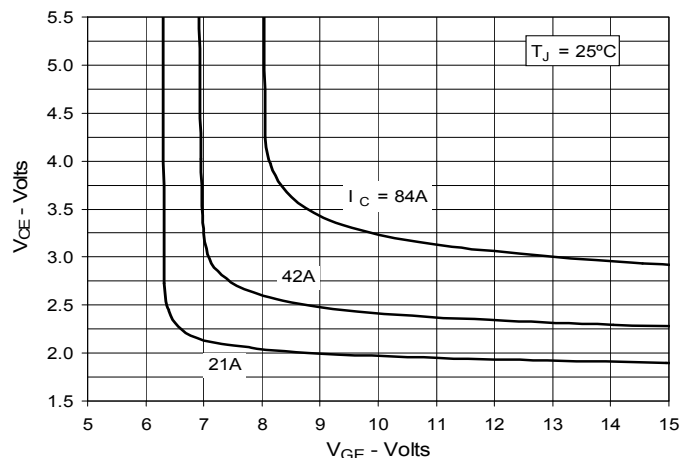
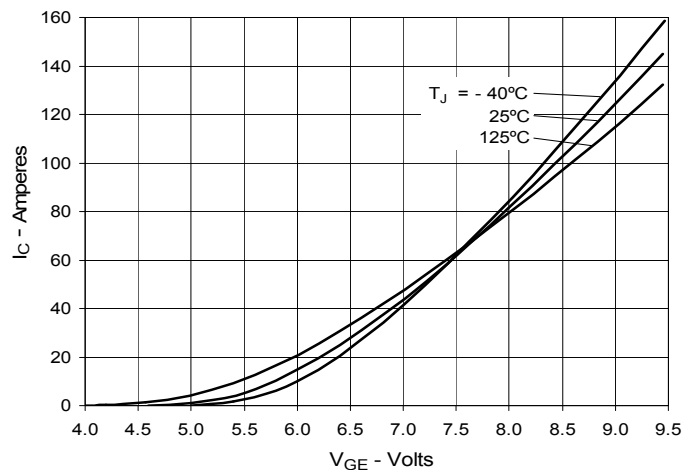
Fig. 1. Output Characteristics
@ 25°C

Fig. 2. Extended Output Characteristics
@ 25°C

Fig. 3. Output Characteristics
@ 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


Fig. 7. Transconductance

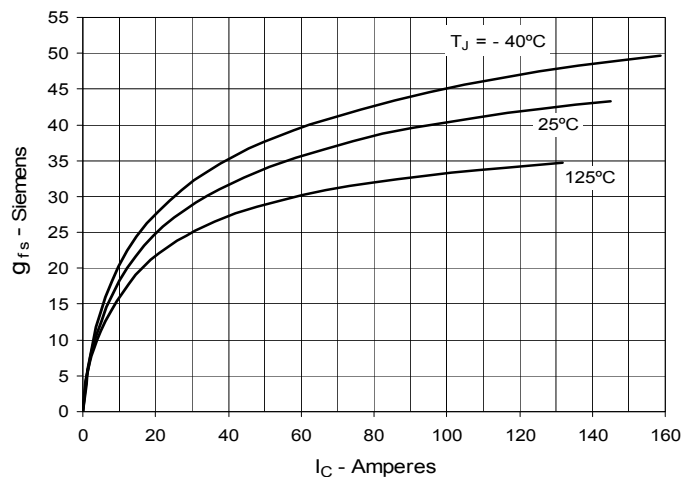


Fig. 8. Forward Voltage Drop of Intrinsic Diode

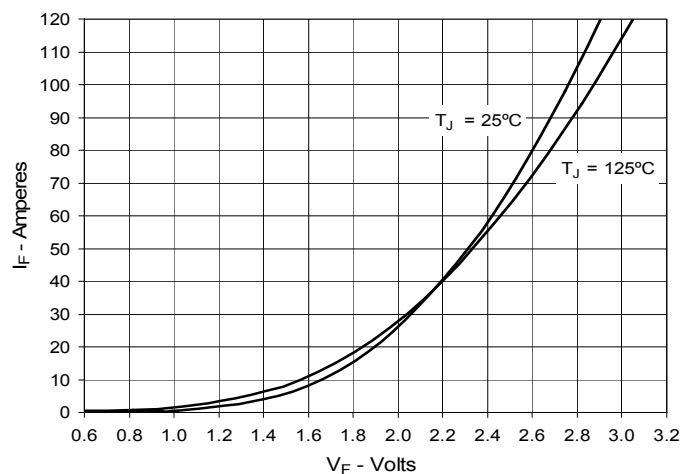


Fig. 9. Gate Charge

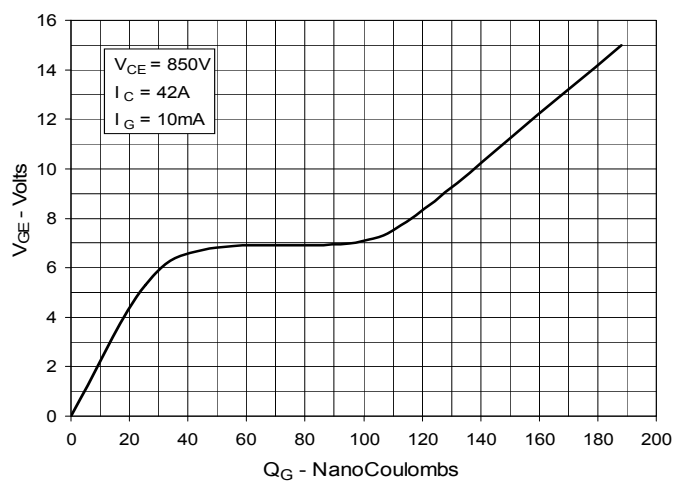


Fig. 10. Capacitance

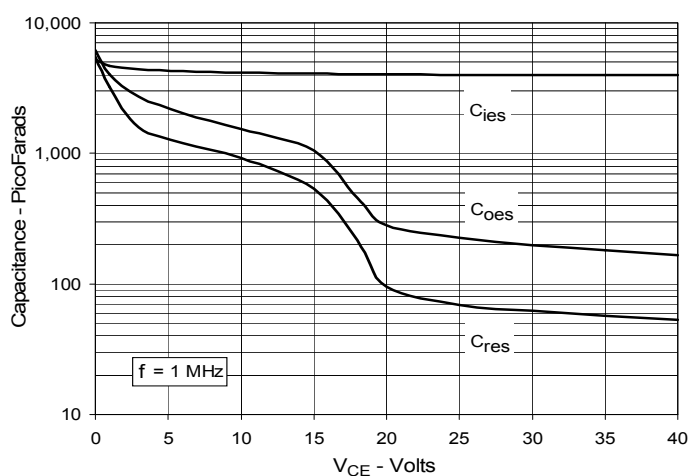


Fig. 11. Reverse-Bias Safe Operating Area

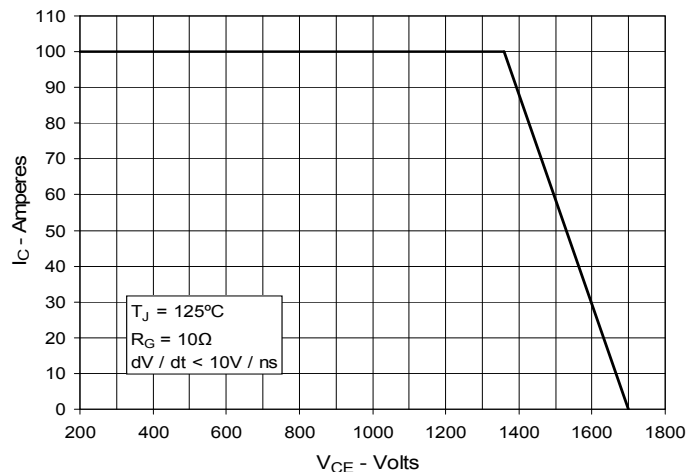
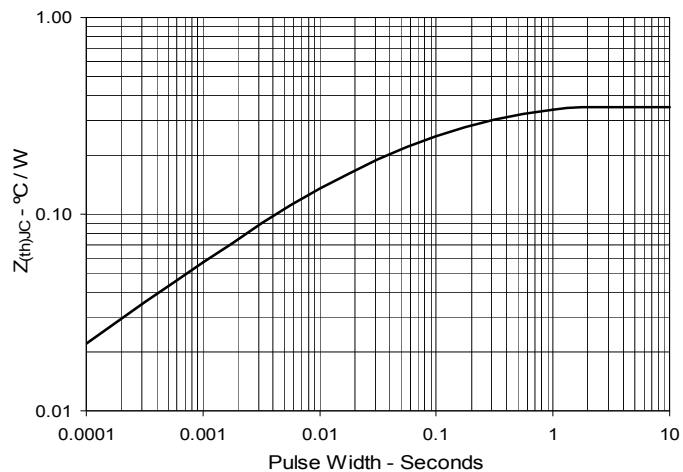
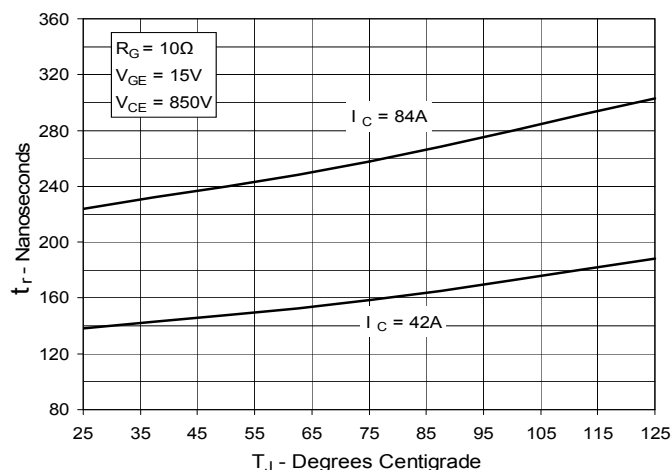


Fig. 12. Maximum Transient Thermal Impedance

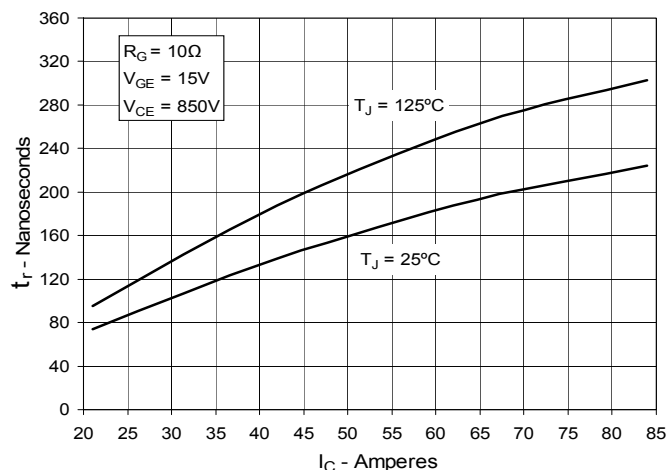


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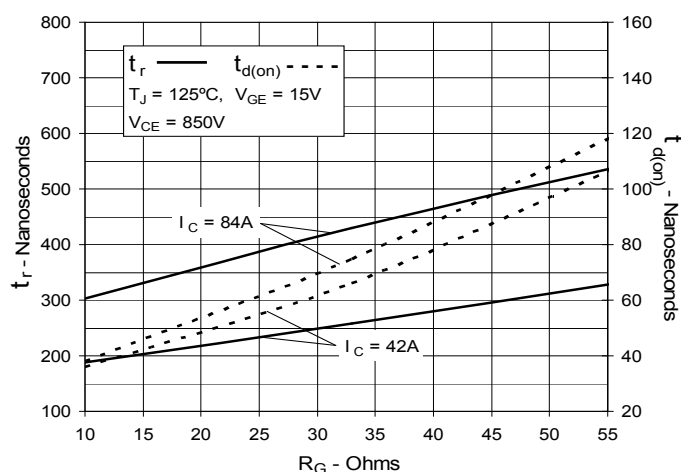
**Fig. 13. Resistive Turn-on
Rise Time vs. Junction Temperature**



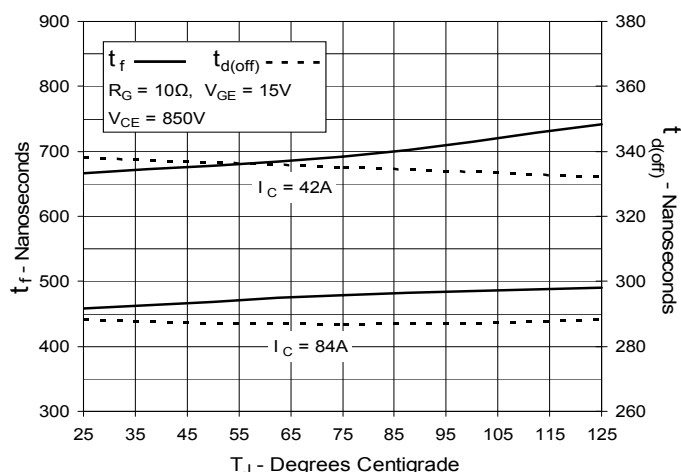
**Fig. 14. Resistive Turn-on
Rise Time vs. Drain Current**



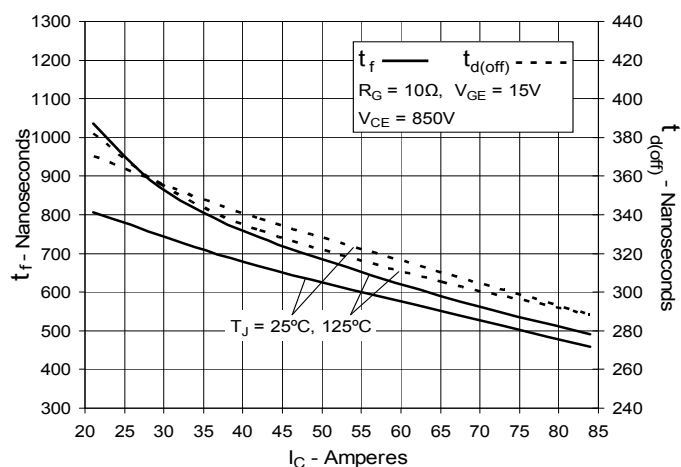
**Fig. 15. Resistive Turn-on
Switching Times vs. Gate Resistance**



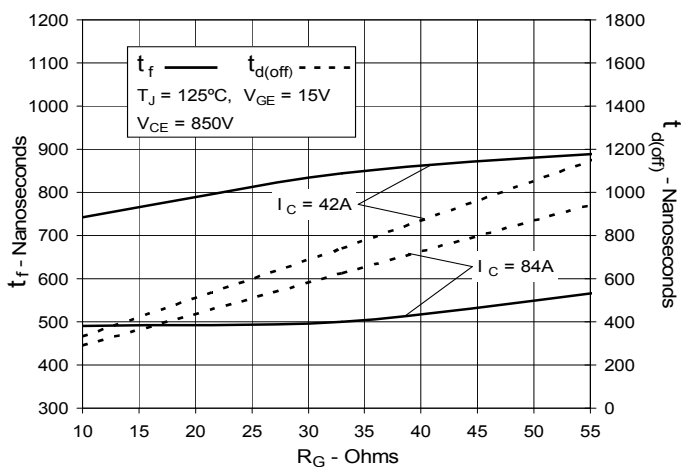
**Fig. 16. Resistive Turn-off
Switching Times vs. Junction Temperature**



**Fig. 17. Resistive Turn-off
Switching Times vs. Drain Current**



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





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