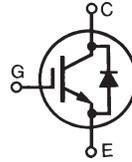


## BiMOSFET™ Monolithic Bipolar MOS Transistor

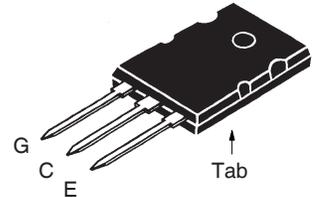
## IXBK75N170A IXBX75N170A



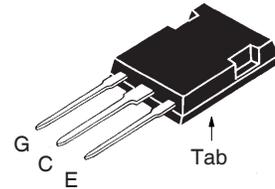
$V_{CES} = 1700V$   
 $I_{C90} = 65A$   
 $V_{CE(sat)} \leq 6.00V$   
 $t_{fi(typ)} = 60ns$

Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ C$ 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	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ C$	110	A
$I_{C90}$	$T_C = 90^\circ C$	65	A
$I_{CM}$	$T_C = 25^\circ C$ , 1ms	300	A
<b>SSOA</b>	$V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 1\Omega$	$I_{CM} = 100$	A
<b>(RBSOA)</b>	Clamped Inductive Load	$V_{CE} \leq 0.8 \cdot V_{CES}$	
$P_C$	$T_C = 25^\circ C$	1040	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 (0.062 in.) from Case for 10	260	$^\circ C$
$M_d$	Mounting Torque (TO-264 )	1.13/10	Nm/lb.in.
$F_c$	Mounting Force (PLUS247 )	20..120/4.5..27	N/lb.
<b>Weight</b>	TO-264	10	g
	PLUS247	6	g

### TO-264 (IXBK)



### PLUS247™ (IXBX)



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

### Features

- International Standard Packages
- High Blocking Voltage
- Fast Switching
- High Current Handling Capability
- Anti-Parallel Diode

### Advantages

- High Power Density
- Low Gate Drive Requirement
- Intergrated Diode Can Be Used for Protection

### Applications

- Switch-Mode and Resonant-Mode Power Supplies
- UPS
- AC Motor Drives
- Substitutes for High Voltage MOSFET

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
$V_{GE(th)}$	$I_C = 1.5mA$ , $V_{CE} = V_{GE}$	2.5		5.5 V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ , $V_{GE} = 0V$ $T_J = 125^\circ C$			50 $\mu A$ 3 mA
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 20V$			$\pm 100$ nA
$V_{CE(sat)}$	$I_C = 42A$ , $V_{GE} = 15V$ , Note 1 $T_J = 125^\circ C$	4.95 5.15		6.00 V V

**Symbol Test Conditions**

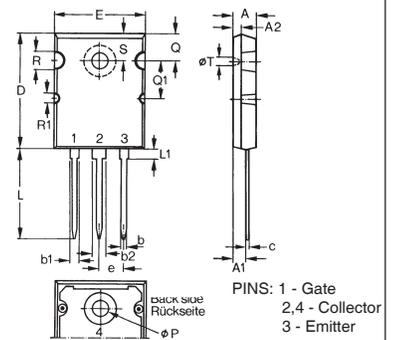
( $T_J = 25^\circ\text{C}$  Unless Otherwise Specified)

**Characteristic Values**

**Min.      Typ.      Max.**

$g_{fs}$	$I_C = 42\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$	28	48	S	
$C_{ies}$	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		7200	pF	
$C_{oes}$			450	pF	
$C_{res}$			150	pF	
$Q_g$	$I_C = 42\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$		358	nC	
$Q_{ge}$			46	nC	
$Q_{gc}$			148	nC	
$t_{d(on)}$	<b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b> $I_C = 42\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 0.8 \cdot V_{CES}, R_G = 1\Omega$ Note 2		26	ns	
$t_{ri}$			40	ns	
$t_{d(off)}$			418	ns	
$t_{fi}$			60	110	ns
$E_{off}$			3.80	7.00	mJ
$t_{d(on)}$	<b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b> $I_C = 42\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 0.8 \cdot V_{CES}, R_G = 1\Omega$ Note 2		27	ns	
$t_{ri}$			38	ns	
$t_{d(off)}$			420	ns	
$t_{fi}$			175	ns	
$E_{off}$			6.35	mJ	
$R_{thJC}$			0.12	$^\circ\text{C/W}$	
$R_{thCS}$		0.15		$^\circ\text{C/W}$	

**TO-264 AA ( IXBK) Outline**



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.82	5.13	.190	.202
A1	2.54	2.89	.100	.114
A2	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b1	2.39	2.69	.094	.106
b2	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e	5.46 BSC		.215 BSC	
J	0.00	0.25	.000	.010
K	0.00	0.25	.000	.010
L	20.32	20.83	.800	.820
L1	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q1	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R1	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248
T	1.57	1.83	.062	.072

**Reverse Diode**

**Symbol Test Conditions**

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

**Characteristic Values**

**Min.      Typ.      Max**

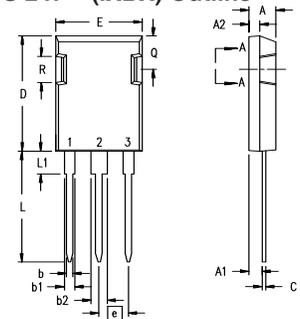
$V_F$	$I_F = 42\text{A}, V_{GE} = 0\text{V}, \text{Note 1}$		5.5	V
$t_{rr}$	$I_F = 42\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 100\text{A}/\mu\text{s}$		360	ns
$I_{RM}$			19	A
$Q_{RM}$	$V_R = 100\text{V}, V_{GE} = 0\text{V}$		3.5	$\mu\text{C}$

**Notes:**

1. Pulse test,  $t \leq 300\mu\text{s}$ ; duty cycle,  $d \leq 2\%$ .
2. Switching times & energy losses may increase for higher  $V_{CE}$  (Clamp),  $T_J$  or  $R_G$ .

Additional provisions for lead-to-lead isolation are required at  $V_{CE} > 1200\text{V}$ .

**PLUS 247™ (IXBX) Outline**



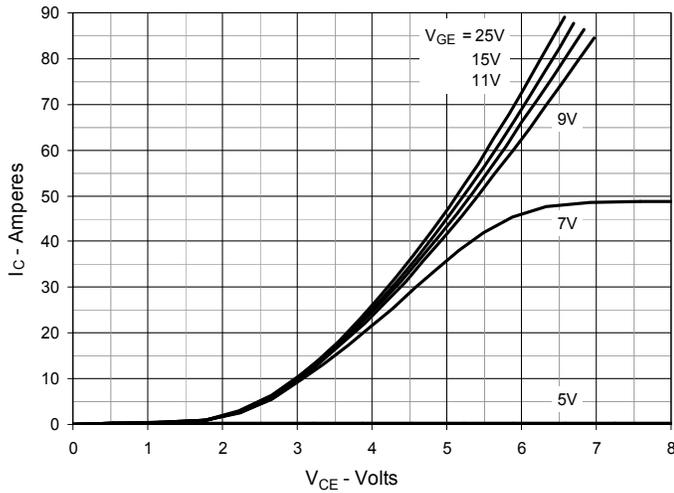
Terminals: 1 - Gate  
2 - Collector  
3 - Emitter

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	.190	.205
A <sub>1</sub>	2.29	2.54	.090	.100
A <sub>2</sub>	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b <sub>1</sub>	1.91	2.13	.075	.084
b <sub>2</sub>	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	0.244
R	4.32	4.83	.170	.190

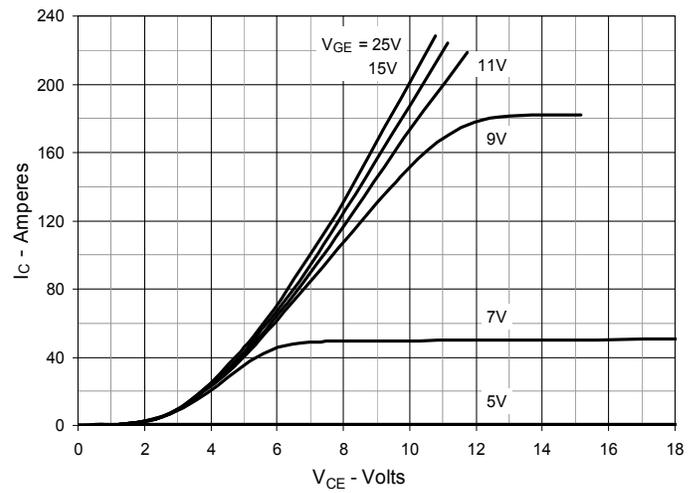
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

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	7,157,338 B2
	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	

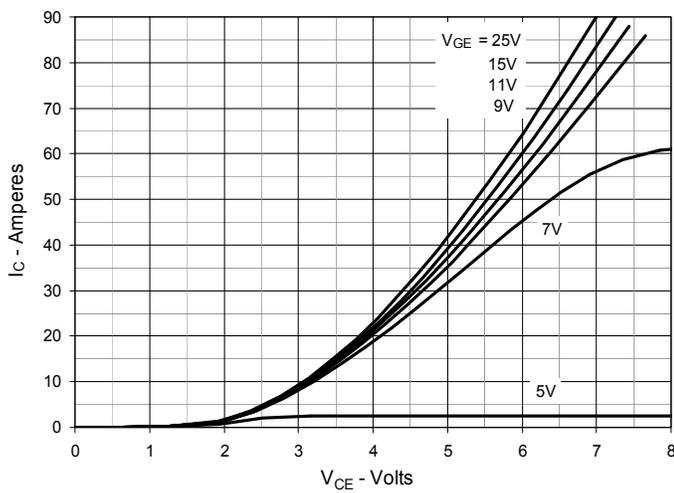
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



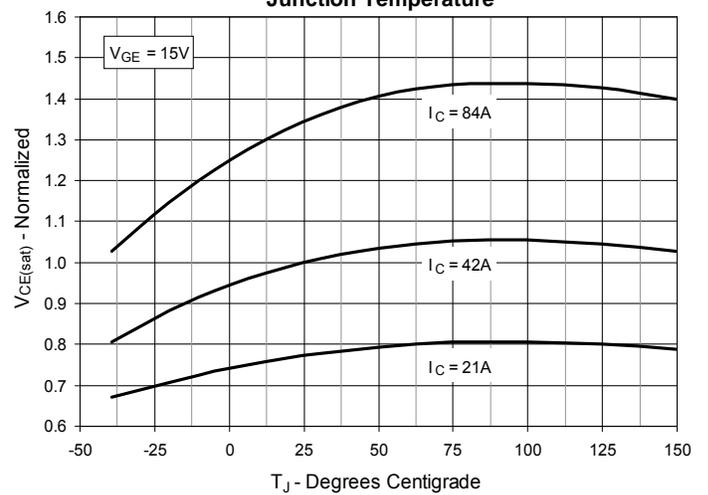
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



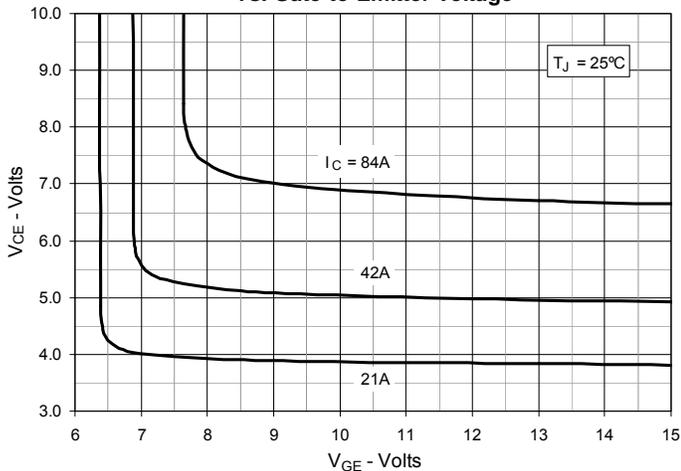
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



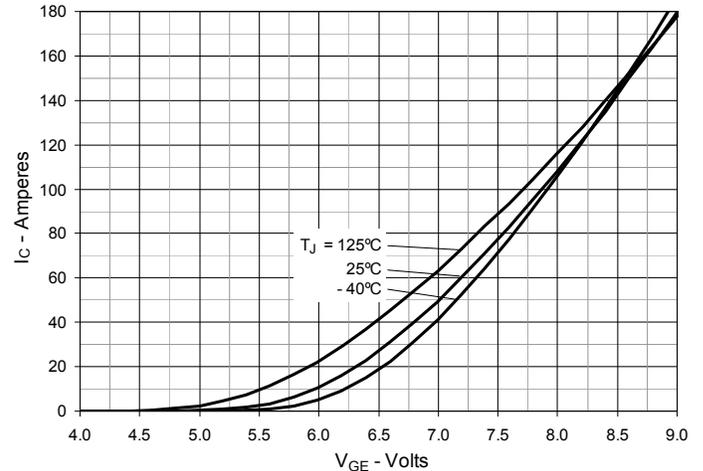
**Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature**



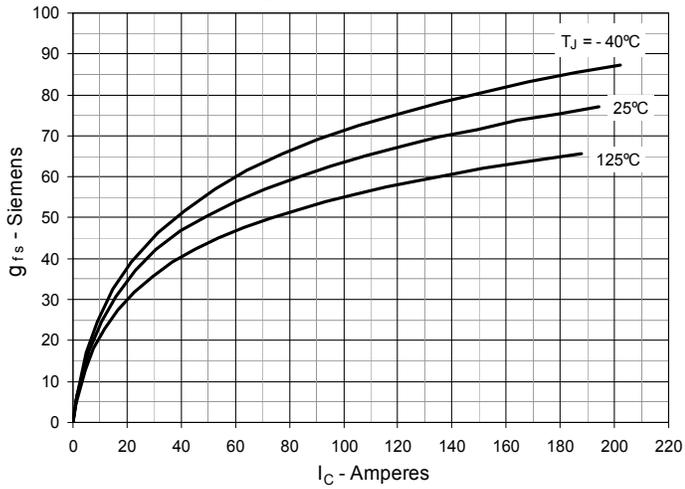
**Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage**



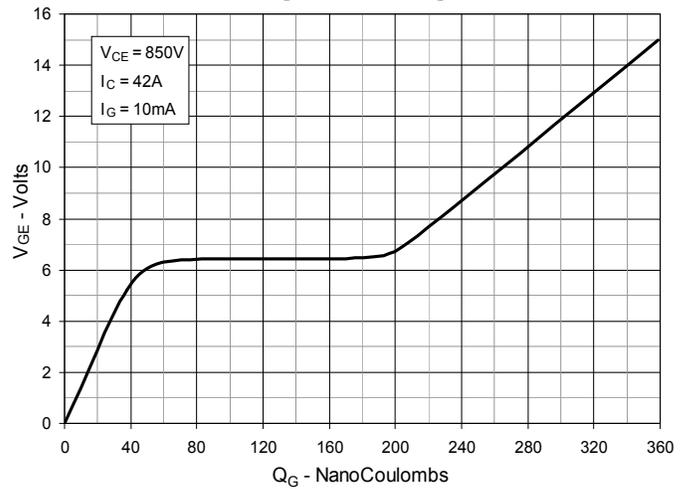
**Fig. 6. Input Admittance**



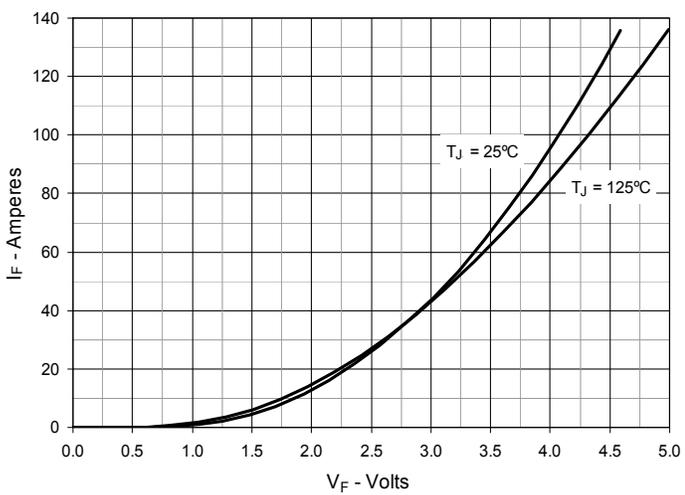
**Fig. 7. Transconductance**



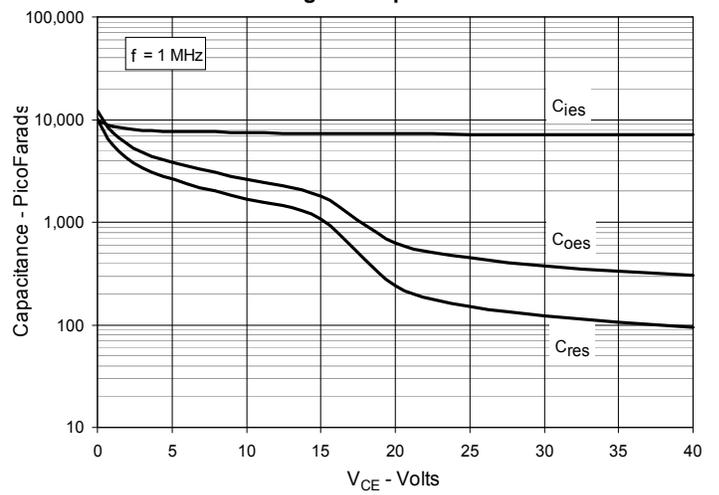
**Fig. 8. Gate Charge**



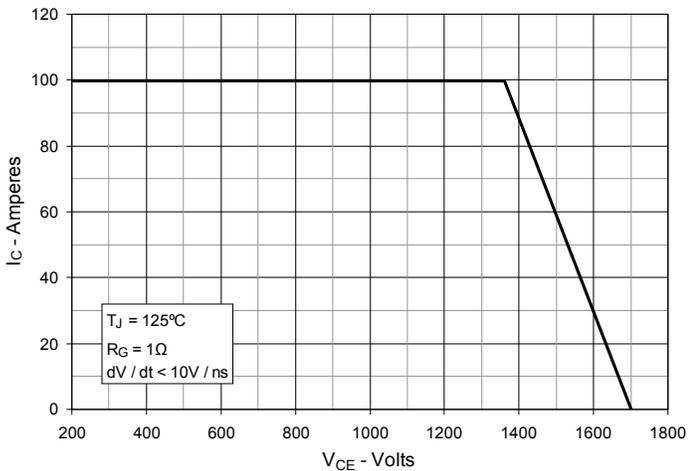
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



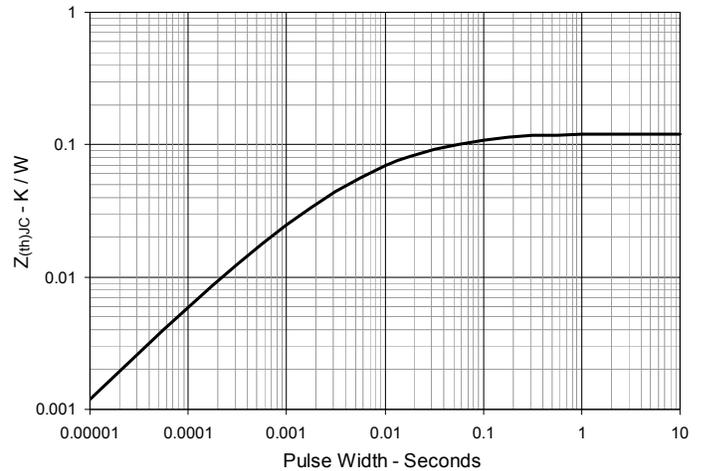
**Fig. 10. Capacitance**



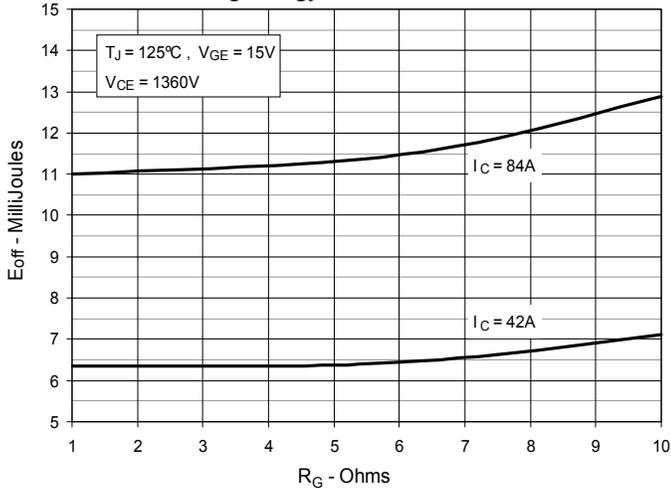
**Fig. 11. Reverse-Bias Safe Operating Area**



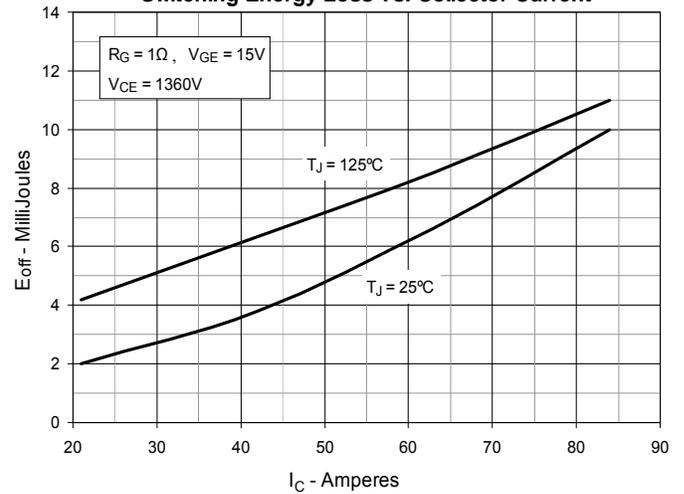
**Fig. 12. Maximum Transient Thermal Impedance**



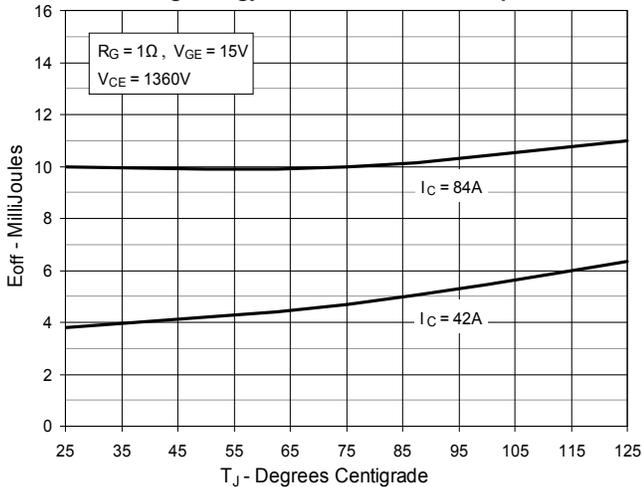
**Fig. 13. Inductive Turn-off**  
**Switching Energy Loss vs. Gate Resistance**



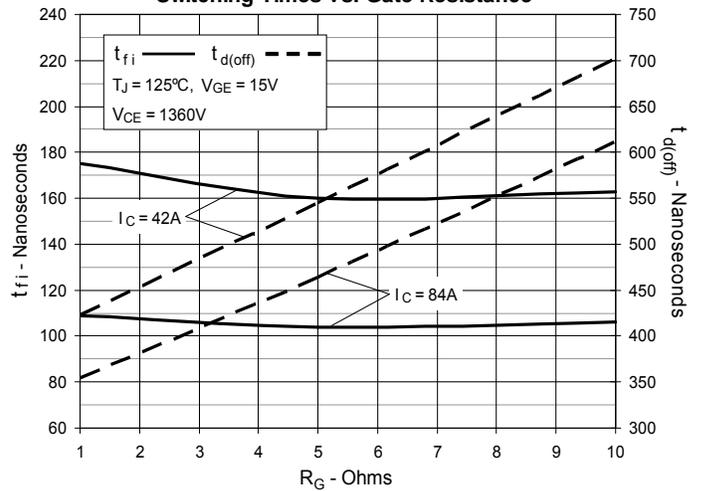
**Fig. 14. Inductive Turn-off**  
**Switching Energy Loss vs. Collector Current**



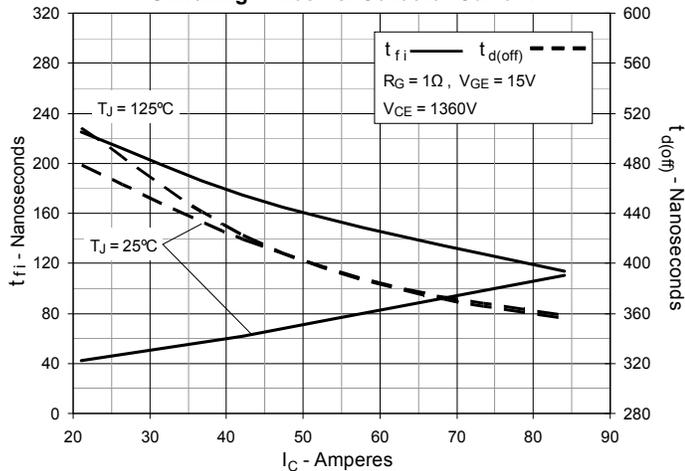
**Fig. 15. Inductive Turn-off**  
**Switching Energy Loss vs. Junction Temperature**



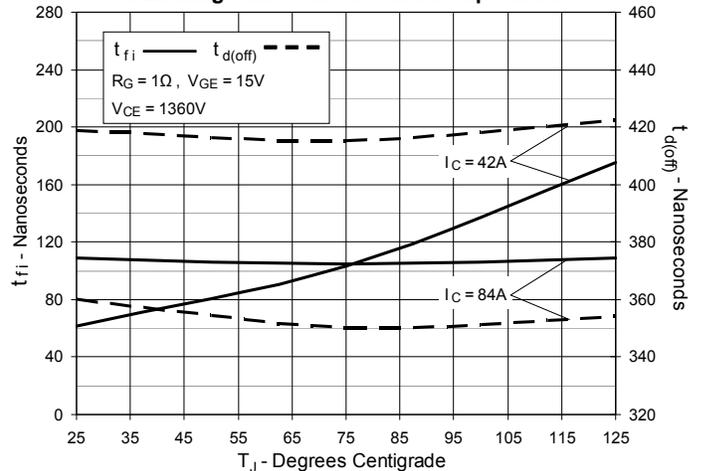
**Fig. 16. Inductive Turn-off**  
**Switching Times vs. Gate Resistance**



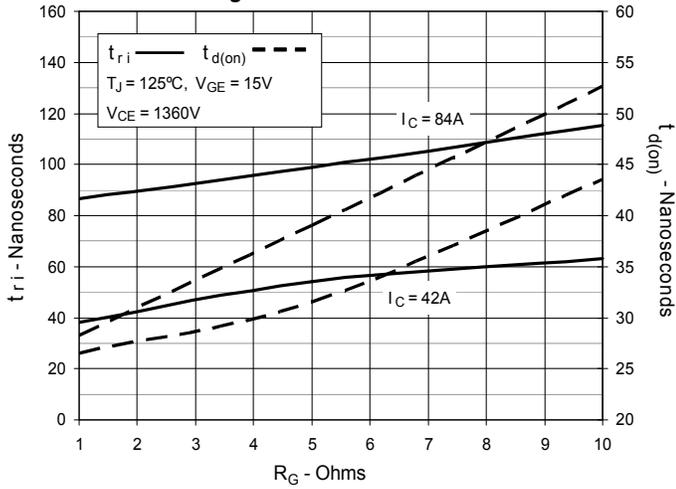
**Fig. 17. Inductive Turn-off**  
**Switching Times vs. Collector Current**



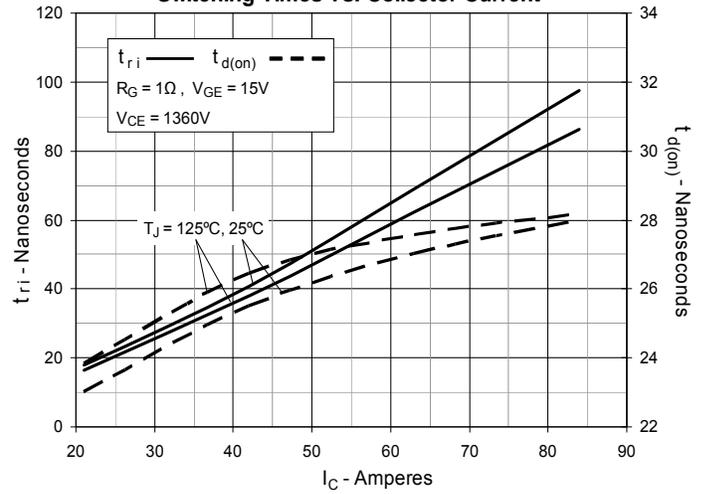
**Fig. 18. Inductive Turn-off**  
**Switching Times vs. Junction Temperature**



**Fig. 19. Inductive Turn-on  
Switching Times vs. Gate Resistance**



**Fig. 20. Inductive Turn-on  
Switching Times vs. Collector Current**



**Fig. 21. Inductive Turn-on  
Switching Times vs. Junction Temperature**

