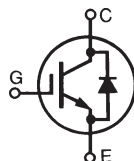


High Voltage, High Frequency, BiMOSFET™ Monolithic Bipolar MOS Transistor

MMIX1B15N300C



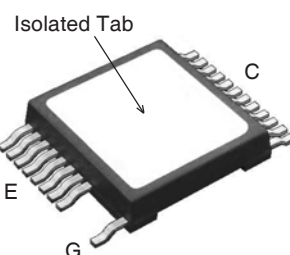
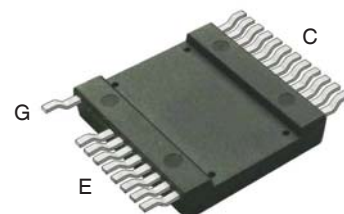
$$V_{CES} = 3000V$$

$$I_{C110} = 15A$$

$$V_{CE(sat)} \leq 6.0V$$

(Electrically Isolated Tab)

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ C$ to $150^\circ C$	3000	V
V_{CGR}	$T_J = 25^\circ C$ to $150^\circ C$, $R_{GE} = 1M\Omega$	3000	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ C$	37	A
I_{C110}	$T_C = 110^\circ C$	15	A
I_{CM}	$T_C = 25^\circ C$, 1ms	300	A
SSOA (RBSOA)	$V_{GE} = 15V$, $T_{VJ} = 125^\circ C$, $R_G = 10\Omega$ Clamped Inductive Load	$I_{CM} = 120$ $V_{CES} \leq 1500$	A V
T_{SC} (SCSOA)	$V_{GE} = 15V$, $T_J = 125^\circ C$, $R_G = 52\Omega$, $V_{CE} = 1500V$, Non-Repetitive	10	μs
P_C	$T_C = 25^\circ C$	300	W
T_J		-55 ... +150	$^\circ C$
T_{JM}		150	$^\circ C$
T_{stg}		-55 ... +150	$^\circ C$
T_L T_{SOLD}	Maximum Lead Temperature for Soldering Plastic Body for 10s	300 260	$^\circ C$ $^\circ C$
F_C	Mounting Force	50..200/11..45	N/lb
V_{ISOL}	50/60Hz, 5 Seconds	4000	V~
Weight		8	g



G = Gate E = Emitter
C = Collector

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 4000V~ Electrical Isolation
- High Blocking Voltage
- High Frequency Operation

Advantages

- Low Gate Drive Requirement
- High Power Density

Applications

- Switch-Mode and Resonant-Mode Power Supplies

Symbol	Test Conditions ($T_J = 25^\circ C$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu A$, $V_{GE} = 0V$	3000		V
$V_{GE(th)}$	$I_C = 250\mu A$, $V_{CE} = V_{GE}$	3.0		5.0 V
I_{CES}	$V_{CE} = V_{CES}$, $V_{GE} = 0V$ Note 2, $T_J = 125^\circ C$			25 μA 5 mA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 200 nA
$V_{CE(sat)}$	$I_C = 15A$, $V_{GE} = 15V$, Note 1 $T_J = 125^\circ C$		4.7 5.0	V V

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$I_C = 15\text{A}, V_{CE} = 10\text{V}$, Note 1	18	30	S
C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		6230	pF
C_{oes}			260	pF
C_{res}			93	pF
$Q_{g(on)}$	$I_C = 15\text{A}, V_{GE} = 15\text{V}, V_{CE} = 1000\text{V}$		267	nC
Q_{ge}			33	nC
Q_{gc}			99	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 15\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 1500\text{V}, R_G = 10\Omega$ Note 3		40	ns
t_{ri}			23	ns
E_{on}			9.15	mJ
$t_{d(off)}$			455	ns
t_{fi}			90	ns
E_{off}			1.40	mJ
$t_{d(on)}$			Inductive load, $T_J = 125^\circ\text{C}$ $I_C = 15\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 1500\text{V}, R_G = 10\Omega$ Note 3	
t_{ri}	20	ns		
E_{on}	9.15	mJ		
$t_{d(off)}$	515	ns		
t_{fi}	150	ns		
E_{off}	2.75	mJ		
R_{thJC}				
R_{thCS}		0.05		$^\circ\text{C/W}$

Reverse Diode

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max
V_F	$I_F = 15\text{A}, V_{GE} = 0\text{V}$, Note 1			5.0 V
t_{rr}	$I_F = 15\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}, V_{GE} = 0\text{V}$		706	ns
I_{RM}			26	A
Q_{RM}			9.2	μC

Notes:

1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.
2. Device must be heatsunk for high-temperature leakage current measurements to avoid thermal runaway.
3. Switching times & energy losses may increase for higher V_{CE} (clamp), T_J or R_G .

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	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
by one or more of the following U.S. patents:	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	

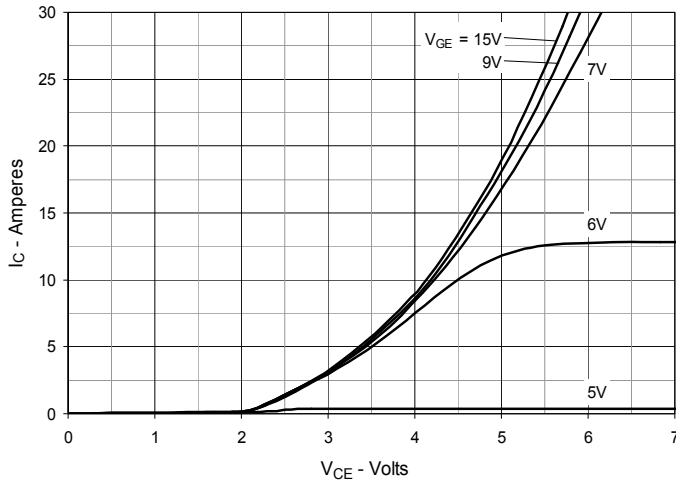
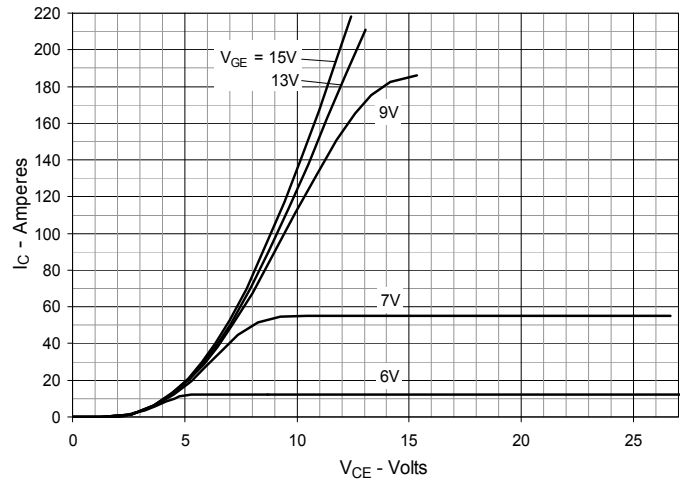
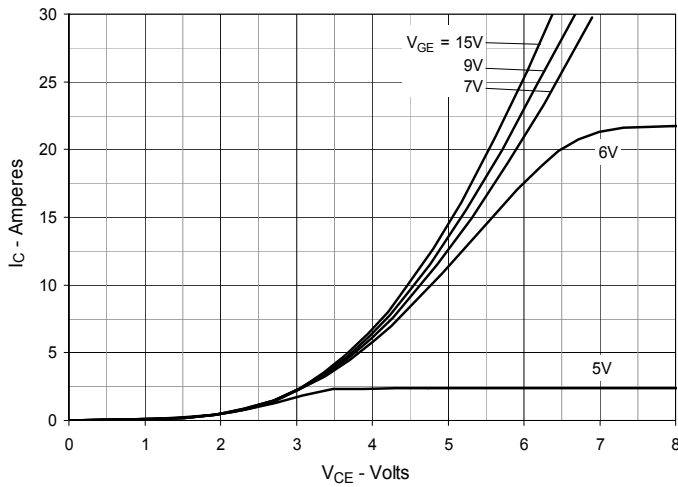
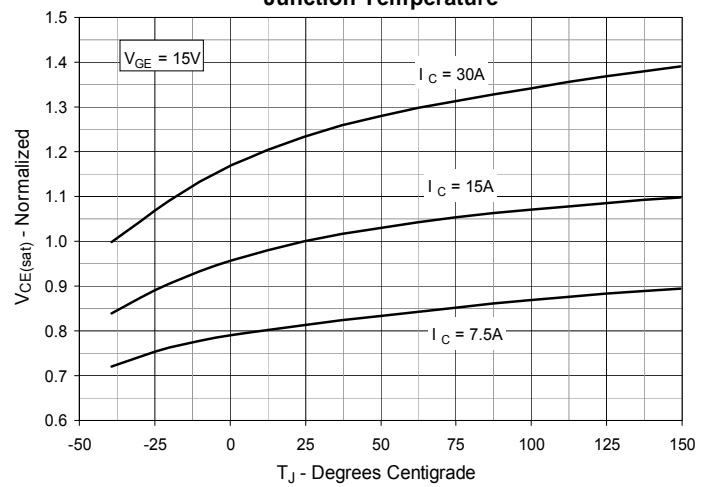
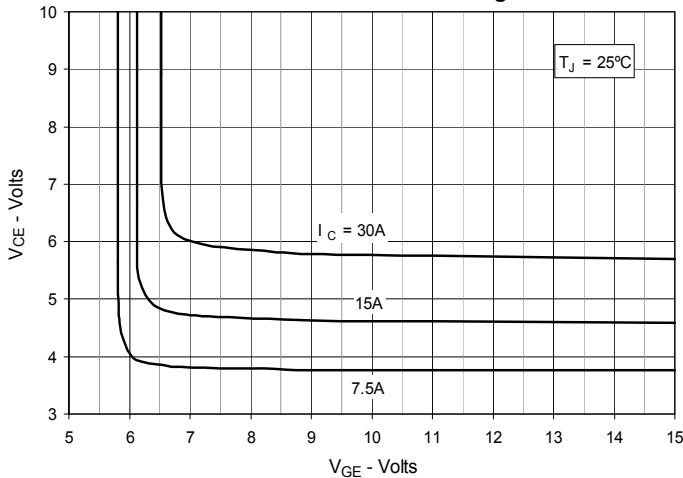
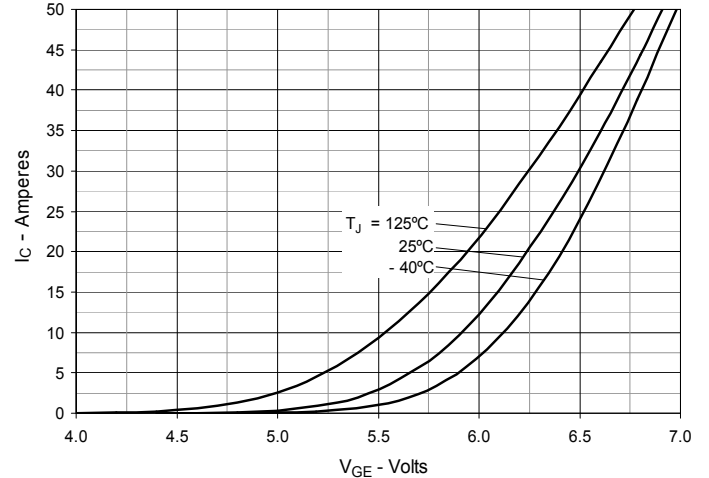
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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

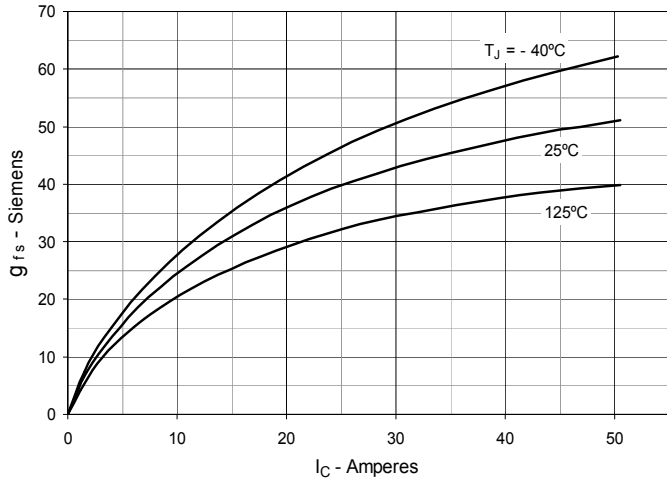


Fig. 8. Gate Charge

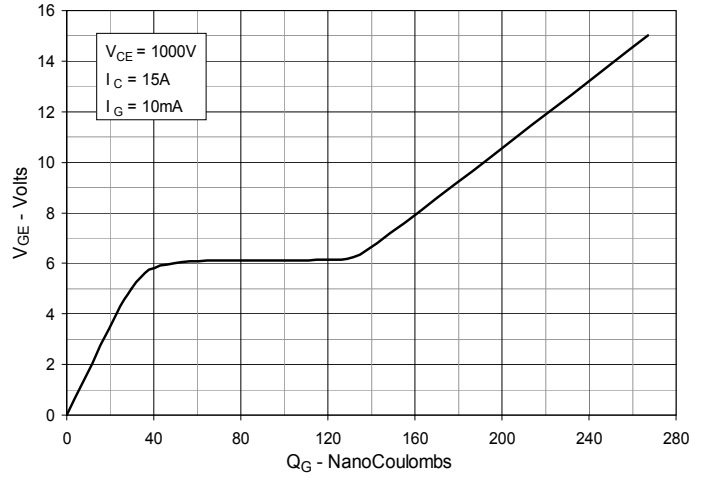


Fig. 9. Forward Voltage Drop of Intrinsic Diode

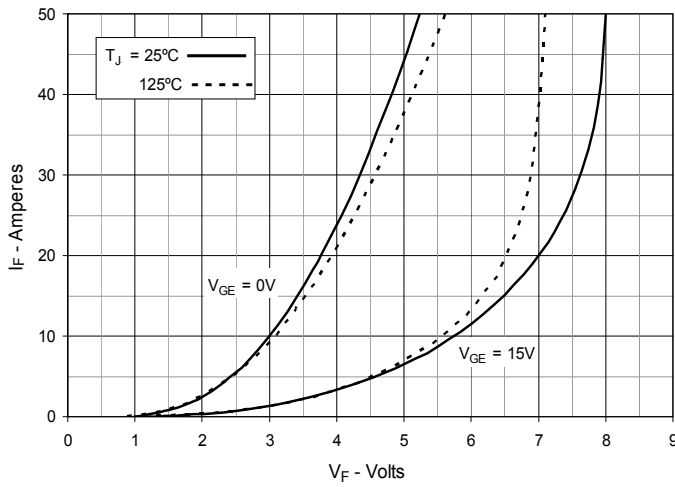


Fig. 10. Capacitance

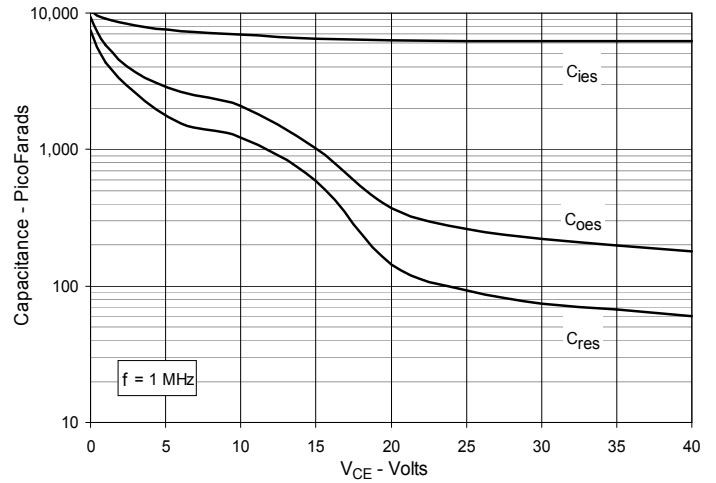


Fig. 11. Reverse-Bias Safe Operating Area

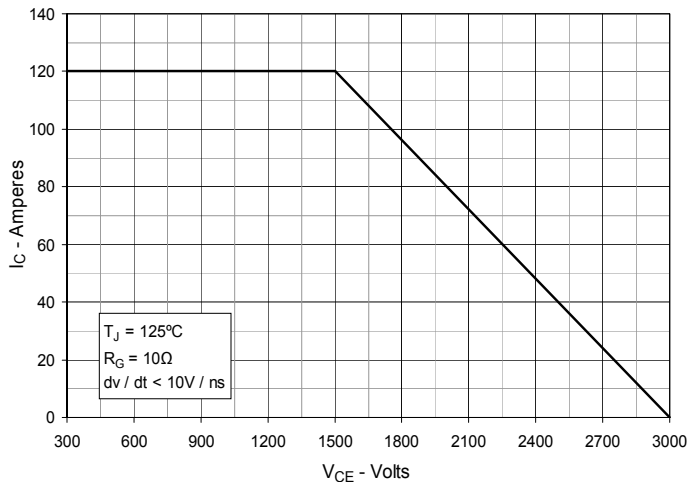


Fig. 12. Maximum Transient Thermal Impedance

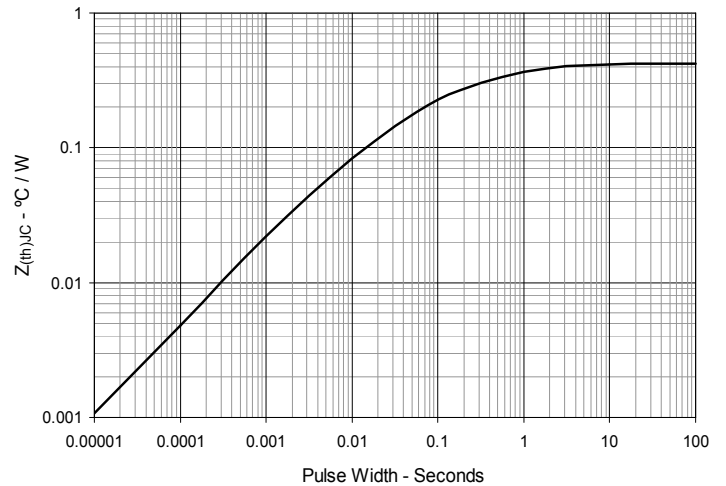


Fig. 13. Forward-Bias Safe Operating Area @ $T_C = 25^\circ\text{C}$

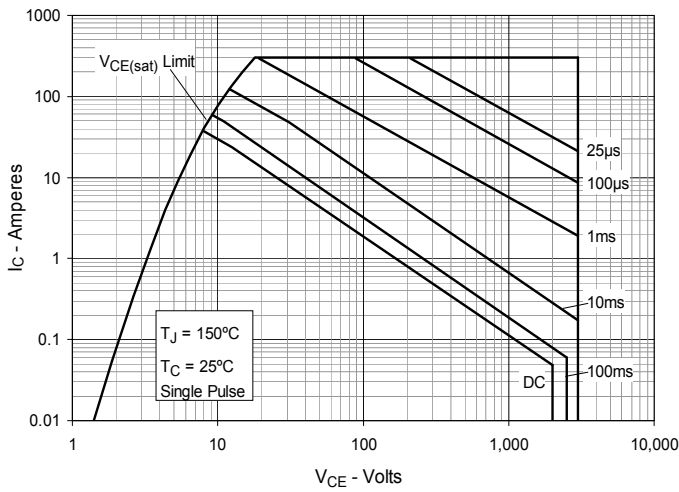


Fig. 14. Forward-Bias Safe Operating Area @ $T_C = 75^\circ\text{C}$

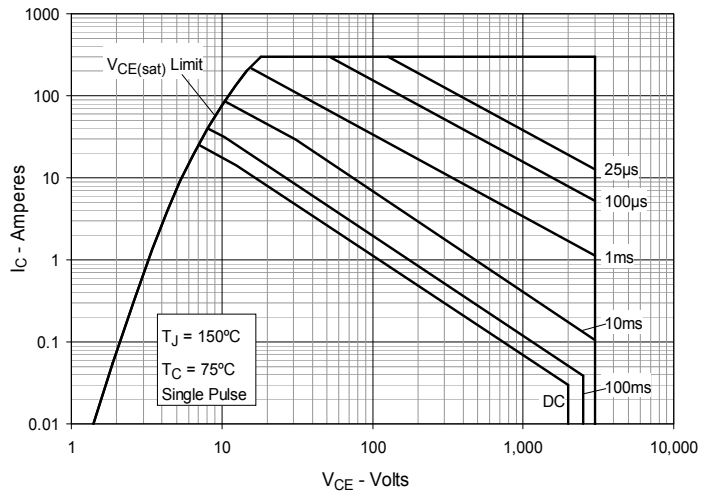


Fig. 15. Inductive Switching Energy Loss vs. Gate Resistance

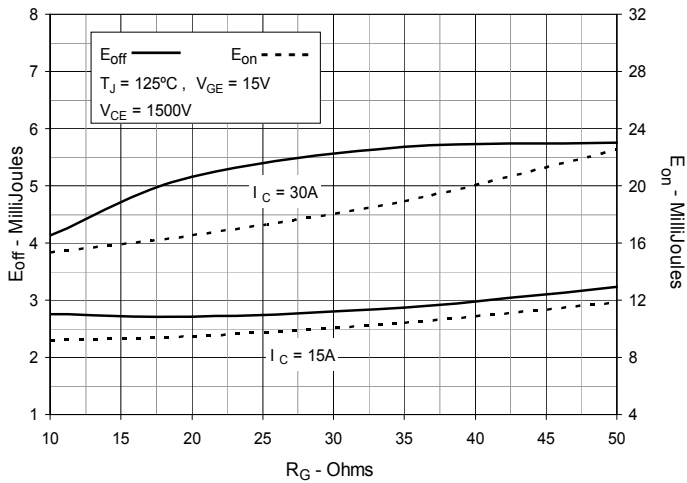


Fig. 16. Inductive Switching Energy Loss vs. Collector Current

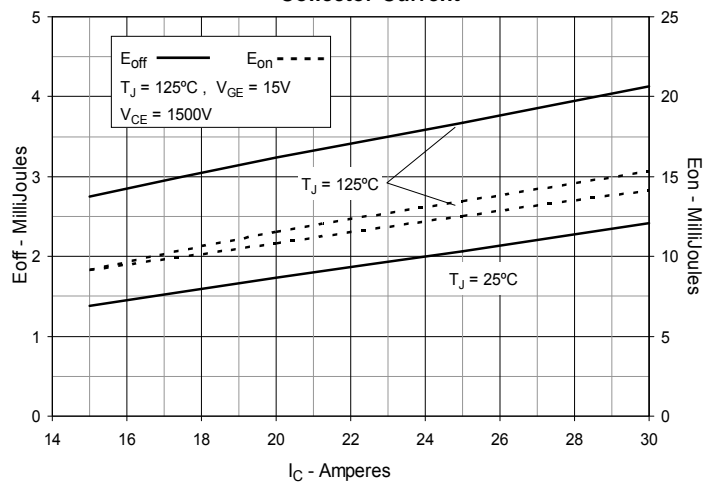


Fig. 17. Inductive Switching Energy Loss vs. Junction Temperature

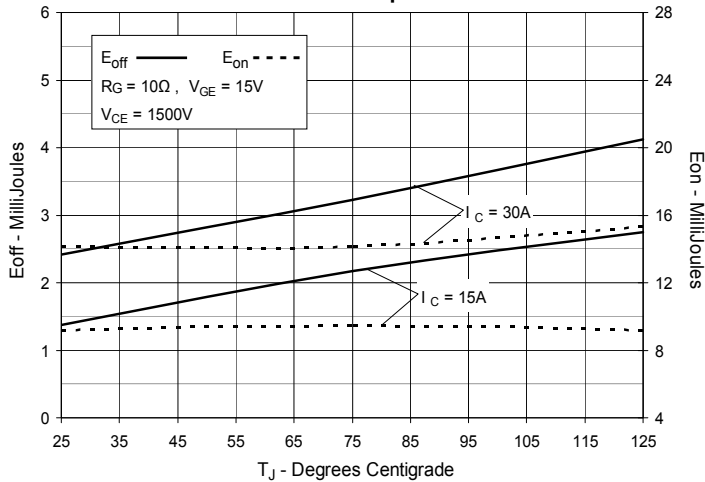


Fig. 18. Inductive Turn-off Switching Times vs. Gate Resistance

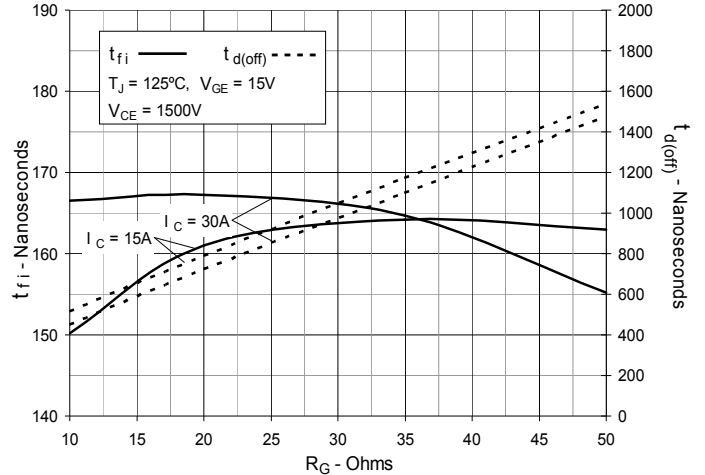


Fig. 19. Inductive Turn-off Switching Times vs. Collector Current

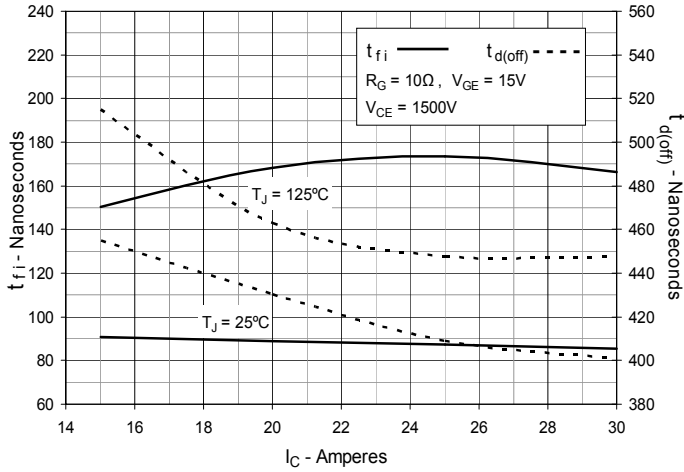


Fig. 20. Inductive Turn-off Switching Times vs. Junction Temperature

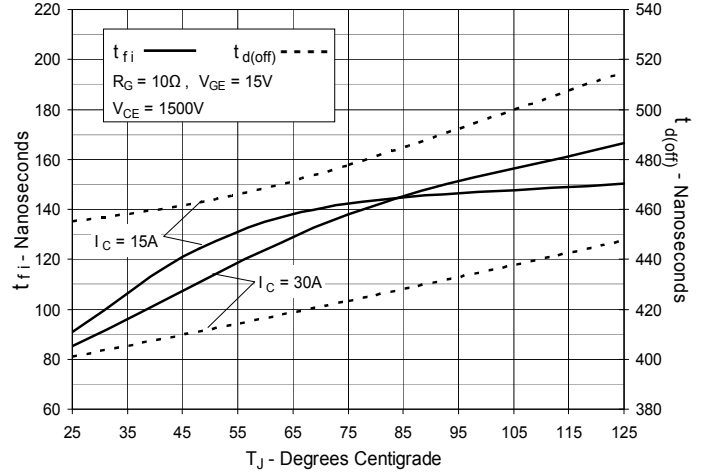


Fig. 21. Inductive Turn-on Switching Times vs. Gate Resistance

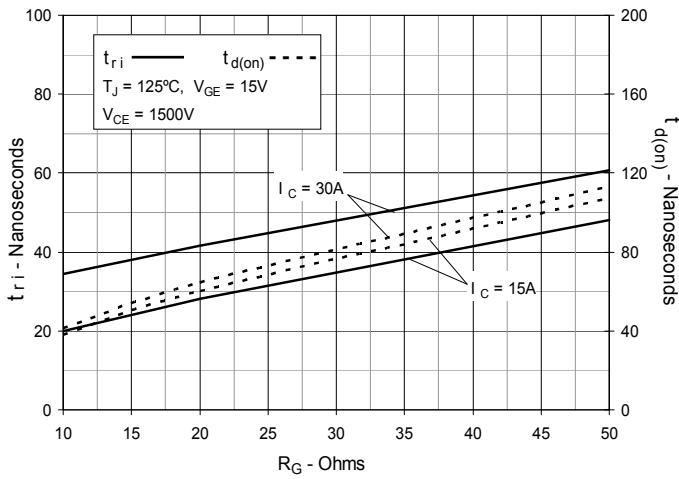


Fig. 22. Inductive Turn-on Switching Times vs. Collector Current

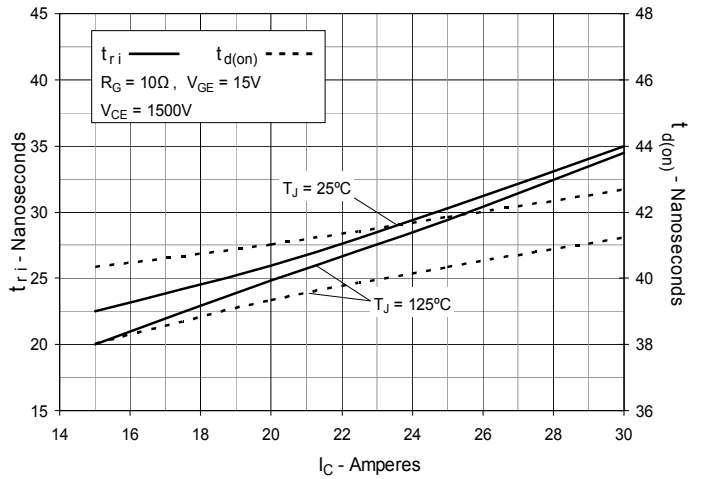
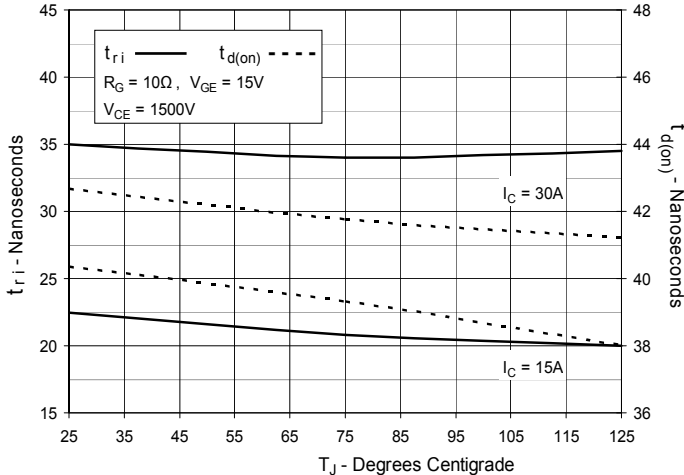
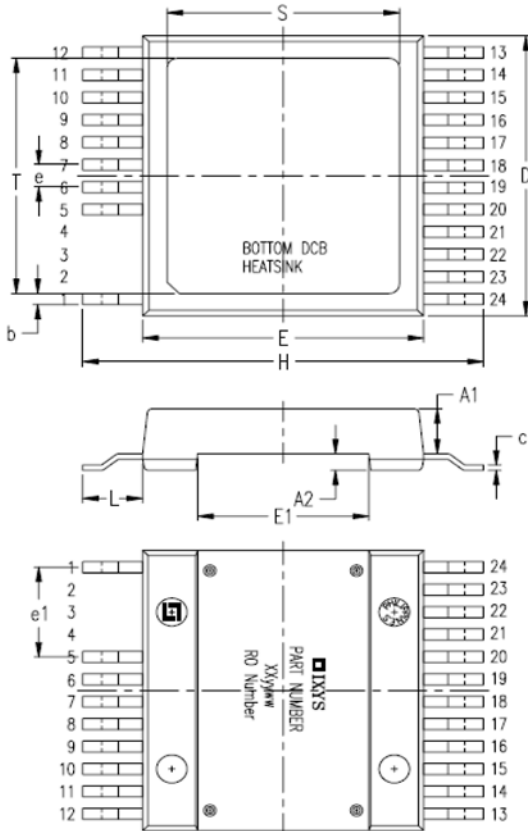


Fig. 23. Inductive Turn-on Switching Times vs. Junction Temperature





SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.209	.224	5.30	5.70
A1	.154	.161	3.90	4.10
A2	.055	.063	1.40	1.60
b	.035	.045	0.90	1.15
c	.018	.026	0.45	0.65
D	.976	.994	24.80	25.25
E	.898	.915	22.80	23.25
E1	.543	.559	13.80	14.20
e	.079 BSC		2.00 BSC	
e1	.315 BSC		8.00 BSC	
H	1.272	1.311	32.30	33.30
L	.181	.209	4.60	5.30
L1	.051	.067	1.30	1.70
L2	.000	.006	0.00	0.15
S	.736	.760	18.70	19.30
T	.815	.839	20.70	21.30
∞	0	4'	0	4'

PIN: 1 = Gate
5-12 = Emitter
13-24 = Collector