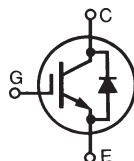


GenX3™ 1200V IGBT w/ Diode

IXGN82N120B3H1

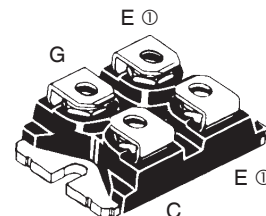
High-Speed Low-V_{sat} PT IGBT
for 3-20 kHz Switching



$$\begin{aligned} V_{CES} &= 1200V \\ I_{C110} &= 64A \\ V_{CE(sat)} &\leq 3.2V \end{aligned}$$

SOT-227B, miniBLOC

E153432



G = Gate, C = Collector, E = Emitter
① either emitter terminal can be used as Main or Kelvin Emitter

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	1200	V
V_{CGR}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}, R_{GE} = 1M\Omega$	1200	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$ (Chip Capability)	145	A
I_{C110}	$T_C = 110^\circ\text{C}$	64	A
I_{F110}	$T_C = 110^\circ\text{C}$	42	A
I_{CM}	$T_C = 25^\circ\text{C}, 1\text{ms}$	550	A
I_A	$T_C = 25^\circ\text{C}$	41	A
E_{AS}	$T_C = 25^\circ\text{C}$	750	mJ
SSOA (RBSOA)	$V_{GE} = 15V, T_{VJ} = 125^\circ\text{C}, R_G = 2\Omega$ Clamped Inductive Load	$I_{CM} = 164$ @ $V_{CE} \leq V_{CES}$	A
P_C	$T_C = 25^\circ\text{C}$	595	W
T_J		-55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
V_{ISOL}	50/60Hz	$t = 1\text{min}$	2500 V~
	$I_{ISOL} \leq 1\text{mA}$	$t = 1\text{s}$	3000 V~
M_d	Mounting Torque	1.5/13	Nm/lb.in.
	Terminal Connection Torque	1.3/11.5	Nm/lb.in.
Weight		30	g

Features

- Optimized for Low Conduction and Switching Losses
- Square RBSOA
- High Current Capability
- Isolation Voltage 2500V~
- Anti-Parallel Ultra Fast Diode
- International Standard Package

Advantages

- High Power Density
- Low Gate Drive Requirement

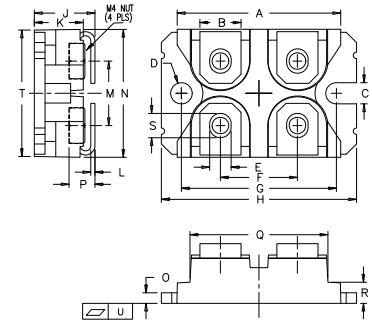
Applications

- Power Inverters
- UPS
- SMPS
- PFC Circuits
- Welding Machines
- Lamp Ballasts

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$V_{GE(th)}$	$I_C = 1\text{mA}, V_{CE} = V_{GE}$	3.0		5.0 V
I_{CES}	$V_{CE} = V_{CES}, V_{GE} = 0V$ Note 1, $T_J = 125^\circ\text{C}$			50 μA 6 mA
I_{GES}	$V_{CE} = 0V, V_{GE} = \pm 20V$			± 200 nA
$V_{CE(sat)}$	$I_C = 82A, V_{GE} = 15V$, Note 2		2.7	3.2 V

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$I_C = 60\text{A}$, $V_{CE} = 10\text{V}$, Note 2	35	60	S
C_{ies}	$V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$		7900	pF
C_{oes}			640	pF
C_{res}			170	pF
$Q_{g(on)}$	$I_C = 82\text{A}$, $V_{GE} = 15\text{V}$, $V_{CE} = 0.5 \cdot V_{CES}$		350	nC
Q_{ge}			50	nC
Q_{gc}			150	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 80\text{A}$, $V_{GE} = 15\text{V}$ $V_{CE} = 600\text{V}$, $R_G = 2\Omega$ Note 3		30	ns
t_{ri}			77	ns
E_{on}			5.0	mJ
$t_{d(off)}$			210	ns
t_{fi}			100	ns
E_{off}			3.3	6.2 mJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = 80\text{A}$, $V_{GE} = 15\text{V}$ $V_{CE} = 600\text{V}$, $R_G = 2\Omega$ Note 3		32	ns
t_{ri}			80	ns
E_{on}			6.8	mJ
$t_{d(off)}$			240	ns
t_{fi}			520	ns
E_{off}			7.1	mJ
R_{thJC}				0.21 $^\circ\text{C/W}$
R_{thCK}			0.05	$^\circ\text{C/W}$

SOT-227B miniBLOC (IXGN)



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.240	1.255	31.50	31.88
B	.307	.323	7.80	8.20
C	.161	.169	4.09	4.29
D	.161	.169	4.09	4.29
E	.161	.169	4.09	4.29
F	.587	.595	14.91	15.11
G	1.186	1.193	30.12	30.30
H	1.496	1.505	38.00	38.23
J	.460	.481	11.68	12.22
K	.351	.378	8.92	9.60
L	.030	.033	0.76	0.84
M	.496	.506	12.60	12.85
N	.990	1.001	25.15	25.42
O	.078	.084	1.98	2.13
P	.195	.235	4.95	5.97
Q	1.045	1.059	26.54	26.90
R	.155	.174	3.94	4.42
S	.186	.191	4.72	4.85
T	.968	.987	24.59	25.07
U	-.002	.004	-0.05	0.1

Reverse Diode (FRED)

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
V_F	$I_F = 60\text{A}$, $V_{GE} = 0\text{V}$, Note 2 $T_J = 150^\circ\text{C}$	1.85	2.5	V
t_{rr}	$I_F = 60\text{A}$, $V_{GE} = 0\text{V}$, $-di_F/dt = 350\text{A}/\mu\text{s}$, $V_R = 600\text{V}$, $T_J = 100^\circ\text{C}$		200	ns
I_{RM}			24.6	A
R_{thJC}				0.42 $^\circ\text{C/W}$

Notes:

1. Part must be heatsunk for high-temp I_{ces} measurement.
2. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.
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 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 @ $T_J = 25^\circ\text{C}$

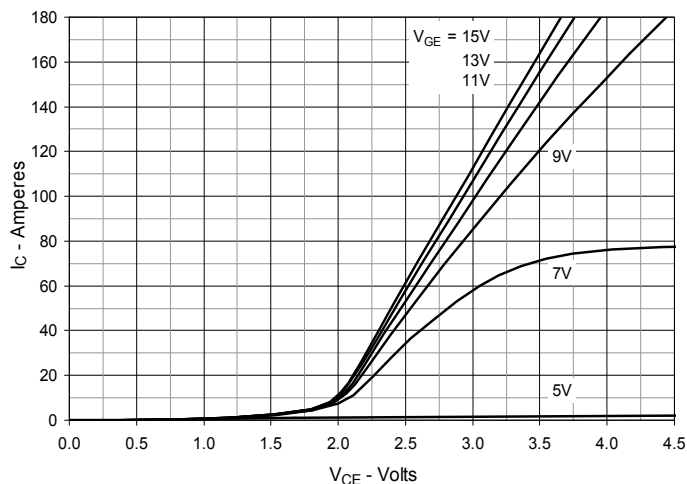


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

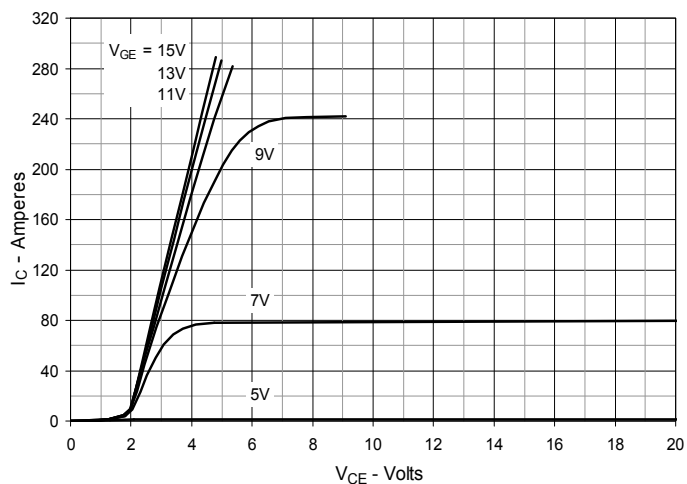


Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

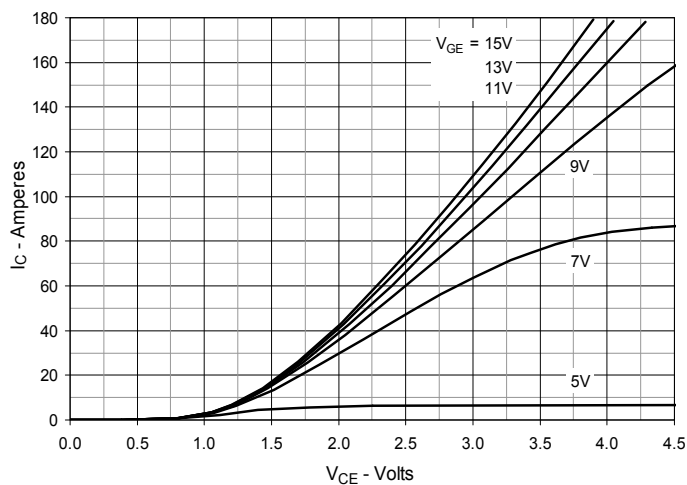


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

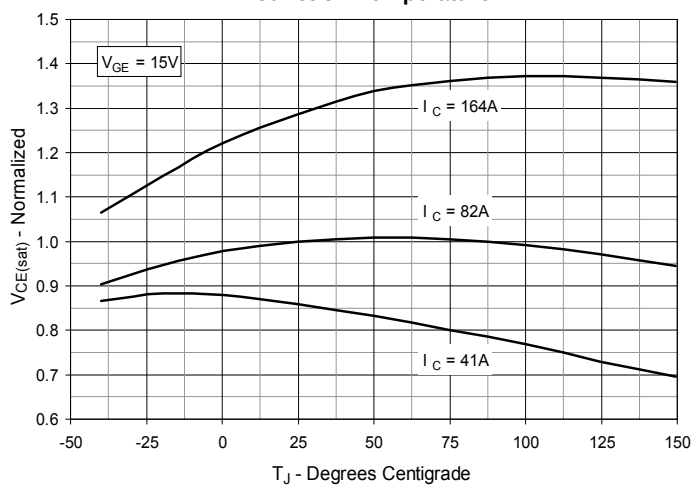


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

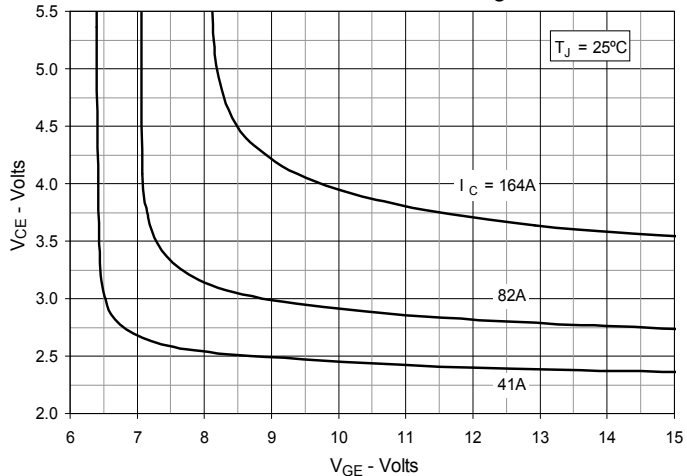


Fig. 6. Input Admittance

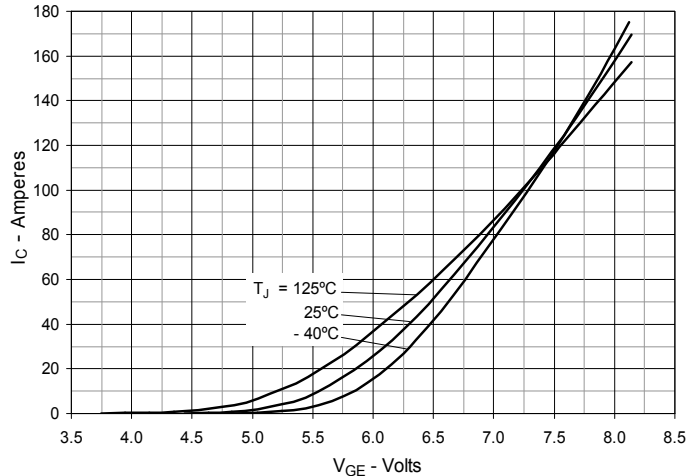
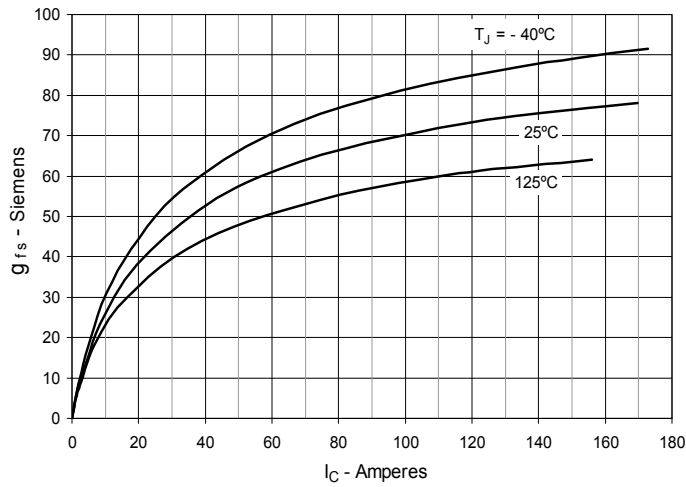
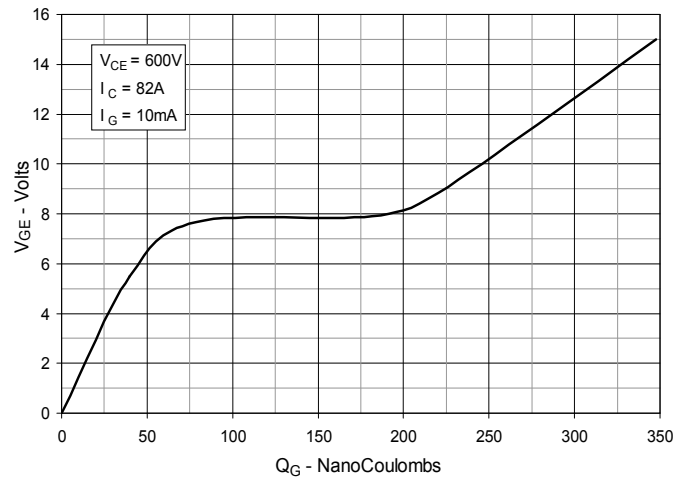
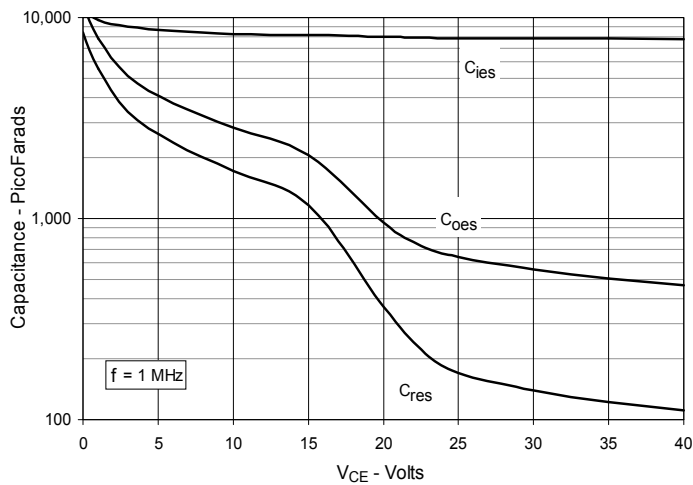
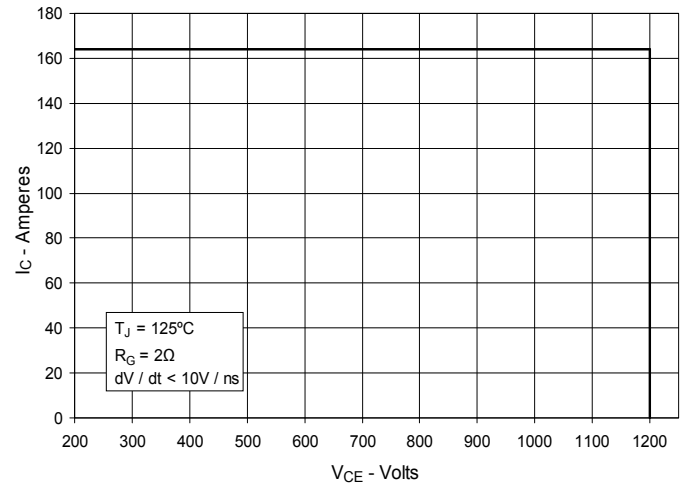
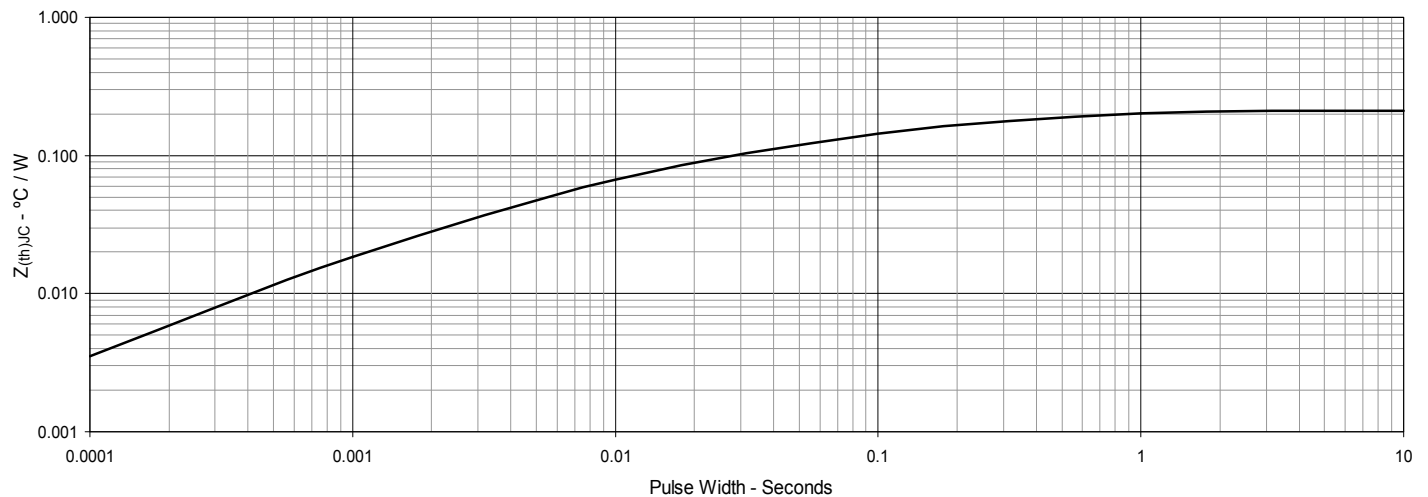
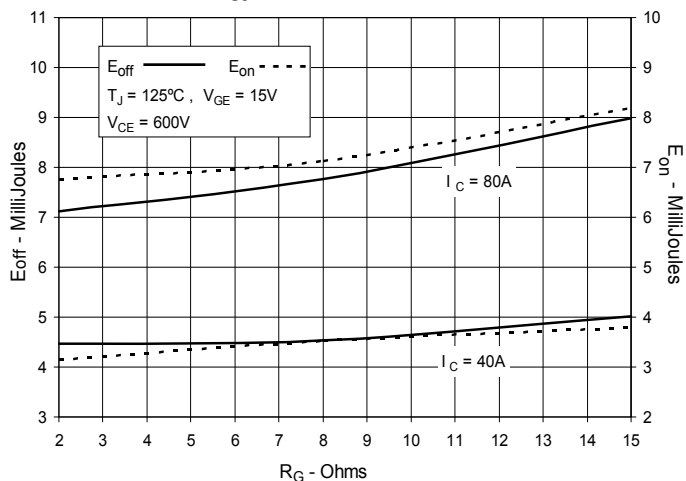
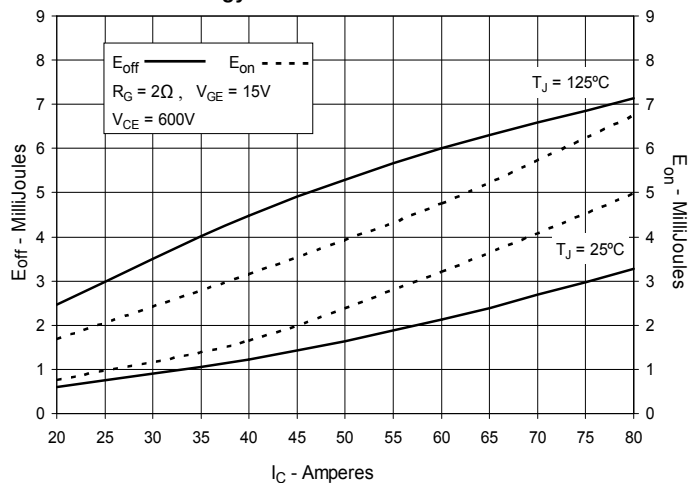


Fig. 7. Transconductance

Fig. 8. Gate Charge

Fig. 9. Capacitance

Fig. 10. Reverse-Bias Safe Operating Area

Fig. 11. Maximum Transient Thermal Impedance


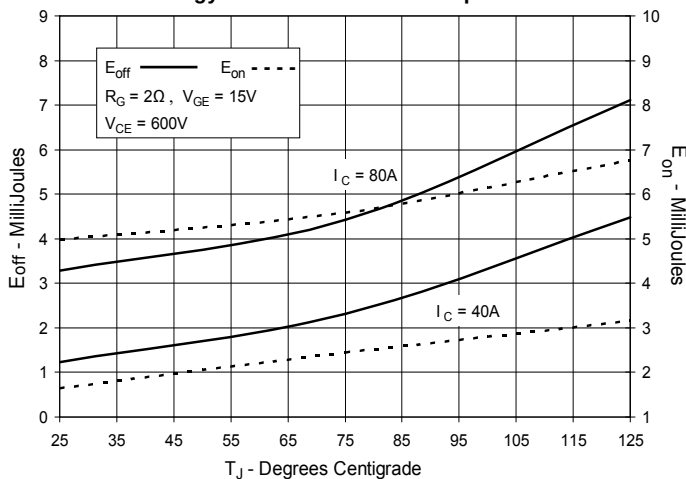
**Fig. 12. Inductive Switching
Energy Loss vs. Gate Resistance**



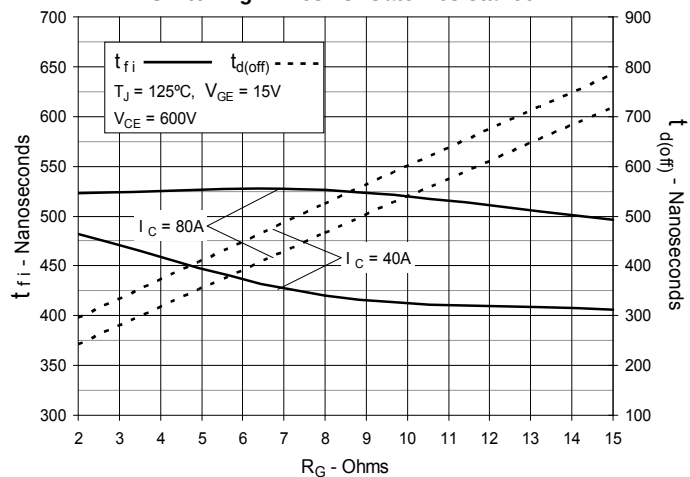
**Fig. 13. Inductive Switching
Energy Loss vs. Collector Current**



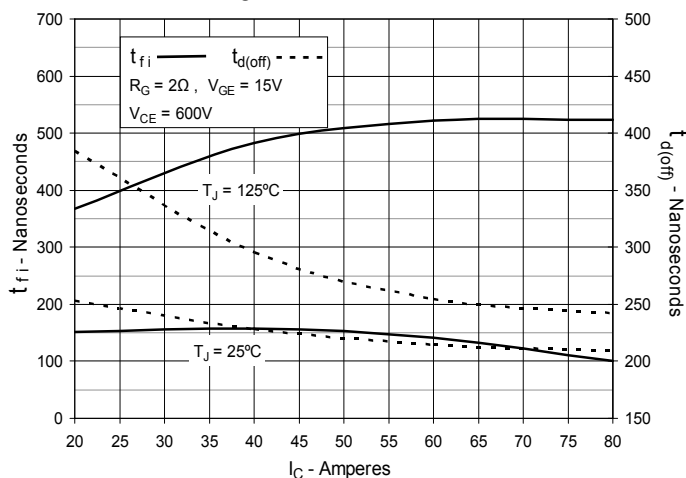
**Fig. 14. Inductive Switching
Energy Loss vs. Junction Temperature**



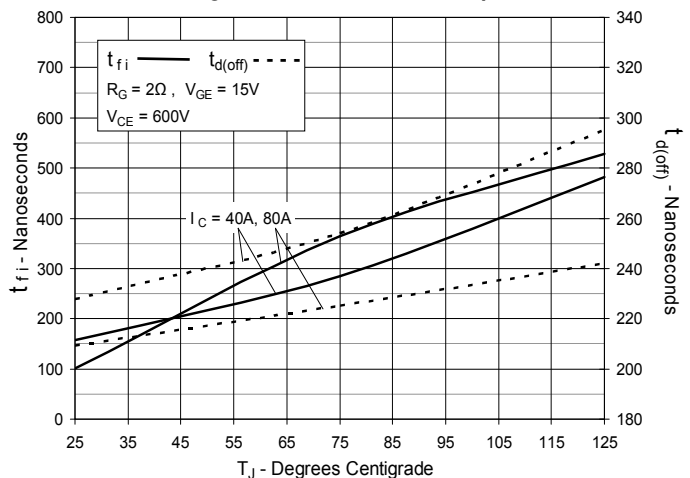
**Fig. 15. Inductive Turn-off
Switching Times vs. Gate Resistance**



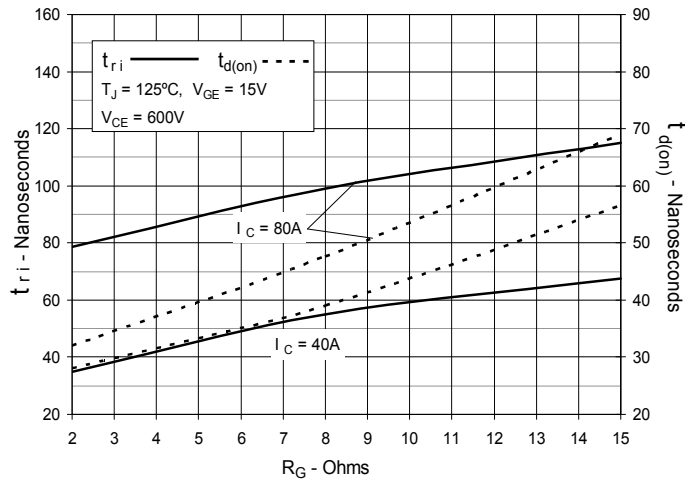
**Fig. 16. Inductive Turn-off
Switching Times vs. Collector Current**



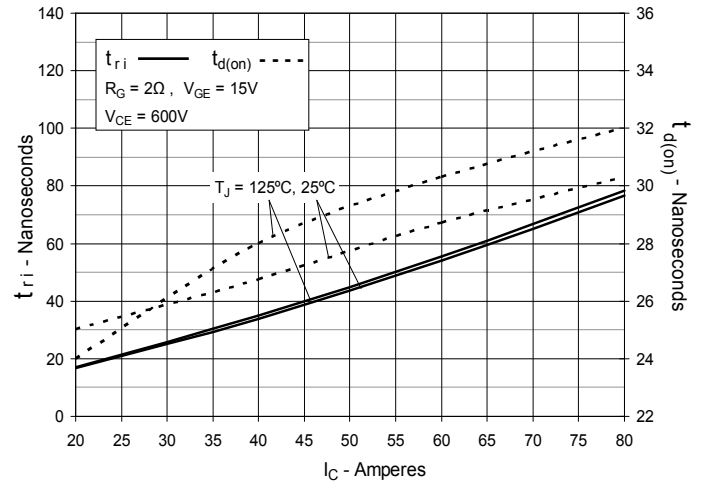
**Fig. 17. Inductive Turn-off
Switching Times vs. Junction Temperature**



**Fig. 18. Inductive Turn-on
Switching Times vs. Gate Resistance**



**Fig. 19. Inductive Turn-on
Switching Times vs. Collector Current**



**Fig. 20. Inductive Turn-on
Switching Times vs. Junction Temperature**

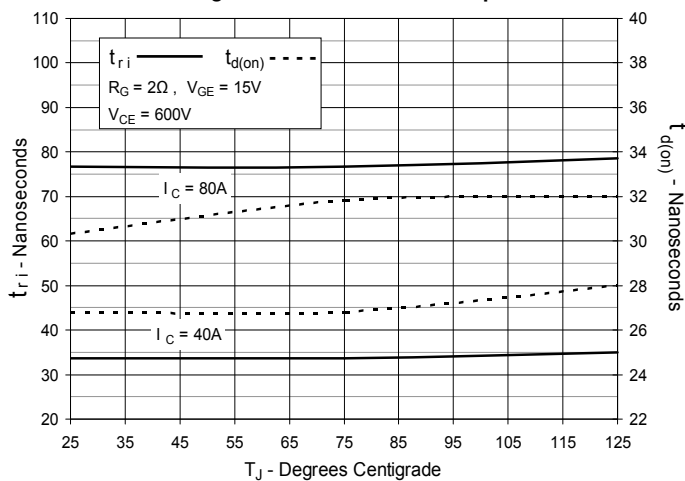
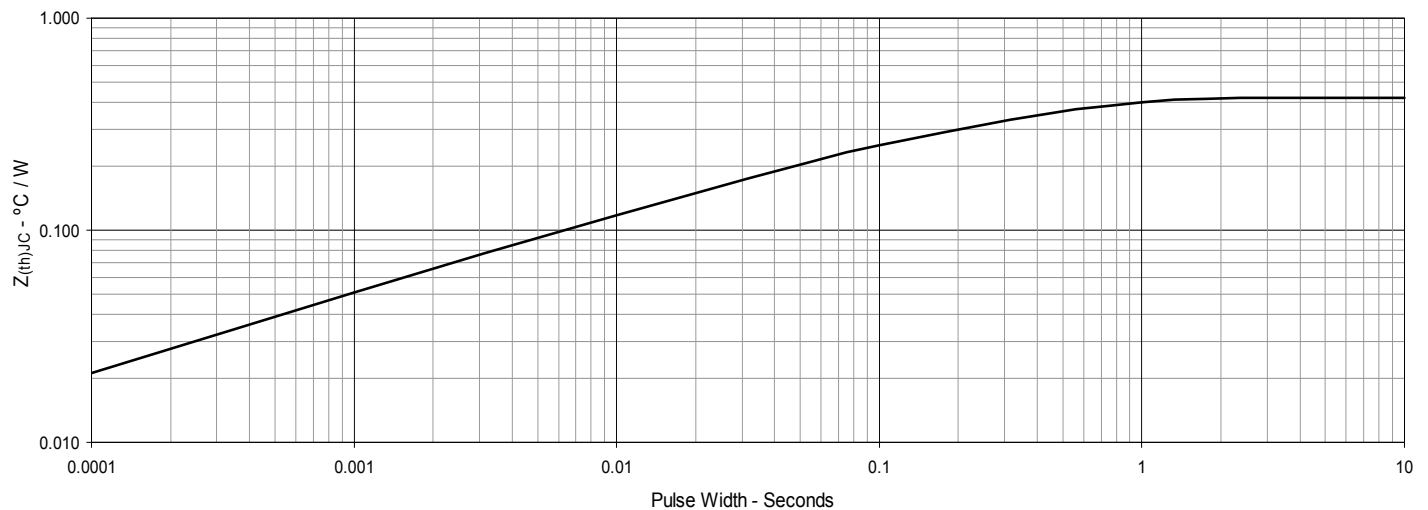


Fig. 21. Maximum Transient Thermal Impedance





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