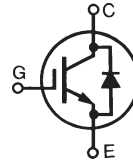


GenX3™ 1400V IGBTs w/ Diode

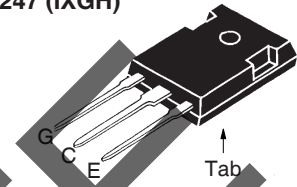
IXGH28N140B3H1
IXGX28N140B3H1
IXGK28N140B3H1

V_{CES} = 1400V
I_{C110} = 28A
V_{CE(sat)} ≤ 3.60V

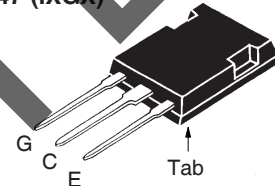
Avalanche Rated



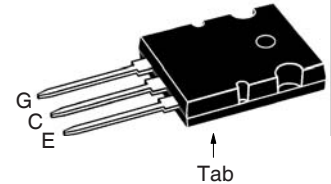
TO-247 (IXGH)



PLUS247 (IXGX)



TO-264 (IXGK)



G = Gate
C = Collector

E = Emitter
Tab = Collector

Symbol	Test Conditions	Maximum Ratings	
V _{CES}	T _J = 25°C to 150°C	1400	V
V _{CGR}	T _J = 25°C to 150°C, R _{GE} = 1MΩ	1400	V
V _{GES}	Continuous	±20	V
V _{GEM}	Transient	±30	V
I _{C25}	T _C = 25°C	60	A
I _{C110}	T _C = 110°C	28	A
I _{F110}	T _C = 110°C	15	A
I _{CM}	T _C = 25°C, 1ms	150	A
I _A	T _C = 25°C	28	A
E _{AS}	T _C = 25°C	360	mJ
SSOA (RBSOA)	V _{GE} = 15V, T _{VJ} = 125°C, R _G = 5Ω Clamped Inductive Load	I _{CM} = 120 @ V _{CES} < V _{CE}	A
P _C	T _C = 25°C	300	W
T _J		-55 ... +150	°C
T _{JM}		150	°C
T _{stg}		-55 ... +150	°C
T _L	Maximum Lead Temperature for Soldering	300	°C
T _{SOLD}	1.6 mm (0.062 in.) from Case for 10	260	°C
M _d	Mounting Torque (IXGH & IXGK)	1.13/10	Nm/lb.in.
F _C	Mounting Force (IXGX)	20..120/4.5..27	N/lb.
Weight	TO-247 & PLUS247	6	g
	TO-264	10	g

Symbol	Test Conditions (T _J = 25°C, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
V _{GE(th)}	I _C = 250μA, V _{CE} = V _{GE}	3.0		5.0 V
I _{CES}	V _{CE} = V _{CES} , V _{GE} = 0V Note 2, T _J = 125°C			50 μA 1 mA
I _{GES}	V _{CE} = 0V, V _{GE} = ±20V			±100 nA
V _{CE(sat)}	I _C = I _{C110} , V _{GE} = 15V, Note 1 T _J = 125°C		3.00 3.05	3.60 V

Features

- Optimized for Low Conduction and Switching Losses
- Square RBSOA
- Avalanche Rated
- Anti-Parallel Ultra Fast Diode
- High Current Handling Capability

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

- Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Battery Chargers
- Welding Machines

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$I_C = I_{C110}, V_{CE} = 10\text{V}$, Note 1	12	19	S
C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		1830	pF
C_{oes}			163	pF
C_{res}			46	pF
$Q_{g(on)}$	$I_C = I_{C110}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$		88	nC
Q_{ge}			12	nC
Q_{gc}			38	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = I_{C110}, V_{GE} = 15\text{V}$ $V_{CE} = 960\text{V}, R_G = 5\Omega$ Note 3		16	ns
t_{ri}			36	ns
E_{on}			3.6	mJ
$t_{d(off)}$			190	400 ns
t_{fi}			360	ns
E_{off}			3.9	6.5 J
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = I_{C110}, V_{GE} = 15\text{V}$ $V_{CE} = 960\text{V}, R_G = 5\Omega$ Note 3		16	ns
t_{ri}			50	ns
E_{on}			7.3	mJ
$t_{d(off)}$			215	ns
t_{fi}			700	ns
E_{off}			6.5	mJ
R_{thJC}				0.42 °C/W
R_{thCs}		0.21		°C/W
		0.15		°C/W

Reverse Diode (FRED)

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
V_F	$I_F = 20\text{A}, V_{GE} = 0\text{V}$, Note 1 $T_J = 150^\circ\text{C}$			3.0 V
			2.65	V
t_{rr}	$I_F = 20\text{A}, V_{GE} = 0\text{V}, -di_F/dt = -200\text{A}/\mu\text{s}$		350	ns
I_{RM}		$V_R = 1200\text{V}, T_J = 125^\circ\text{C}$		18.5
R_{thJC}				0.90 °C/W

Notes:

1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.
2. Part must be heatsunk for high-temp I_{ces} measurement.
3. Switching times & energy losses may increase for higher V_{CE} (Clamp), T_J or R_G .

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

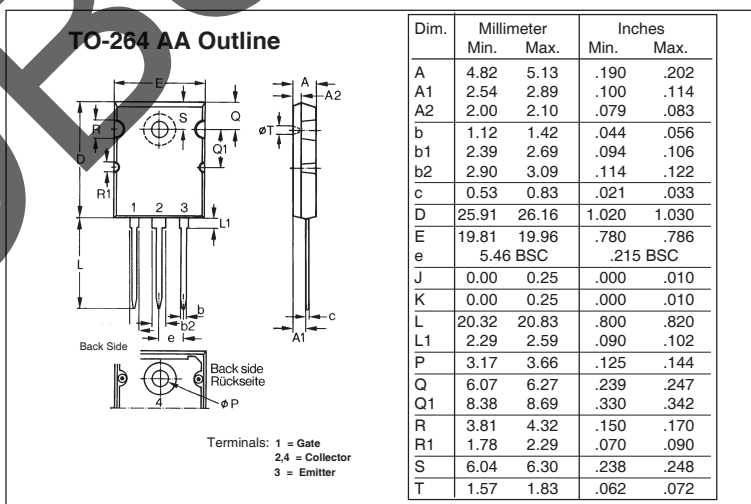
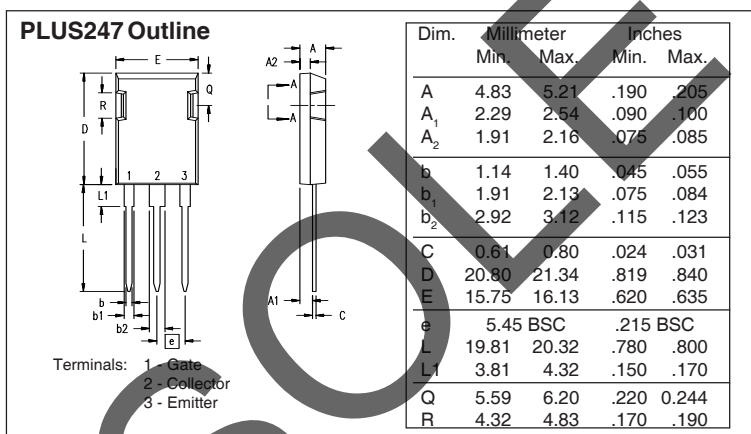
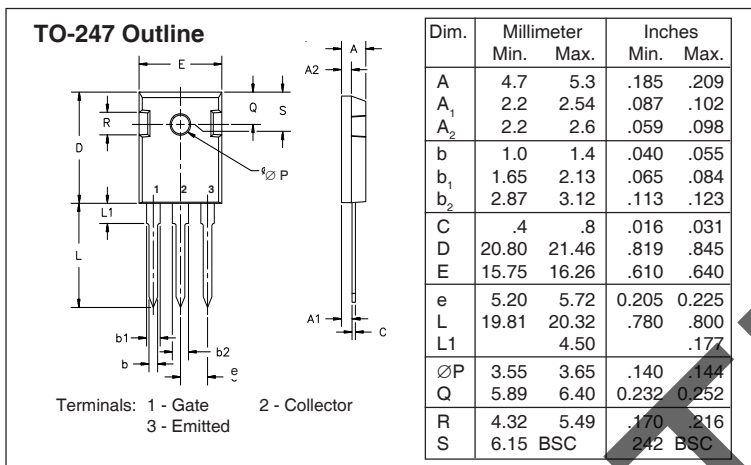


Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

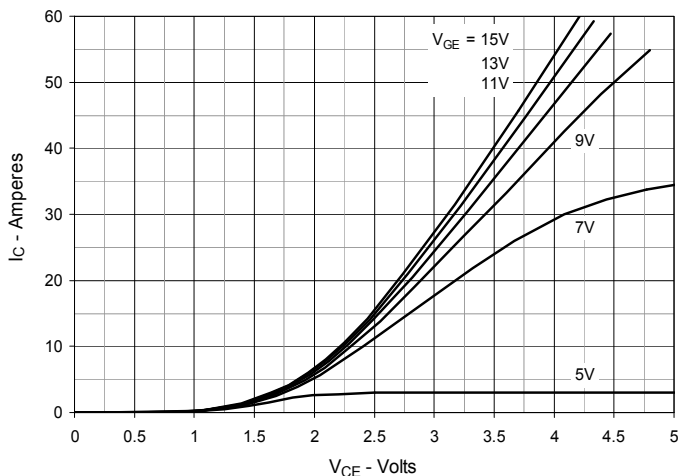


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

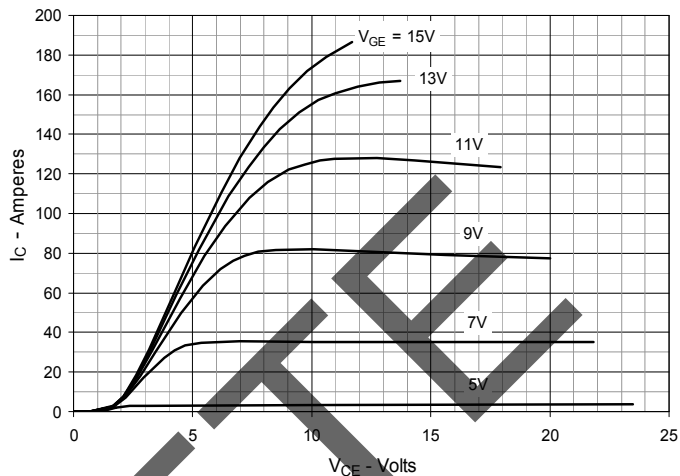


Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

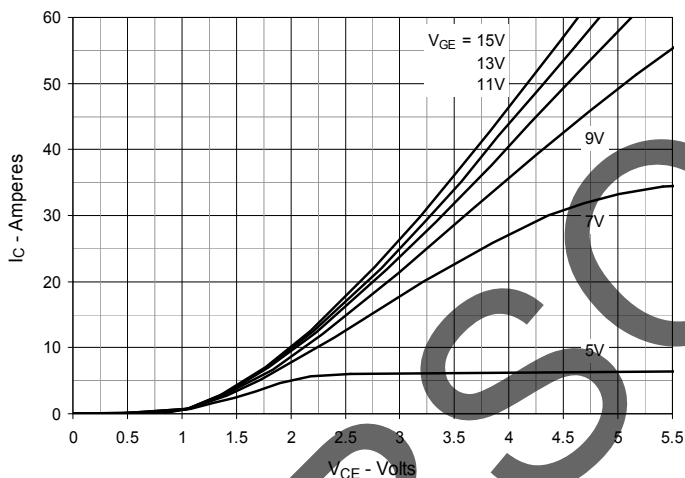


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

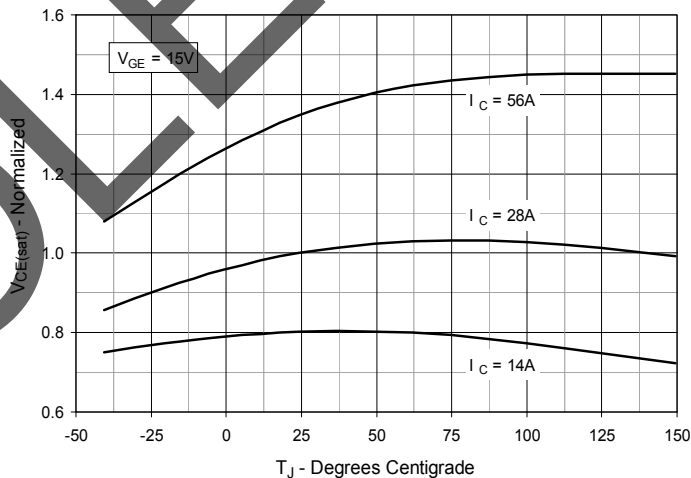


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

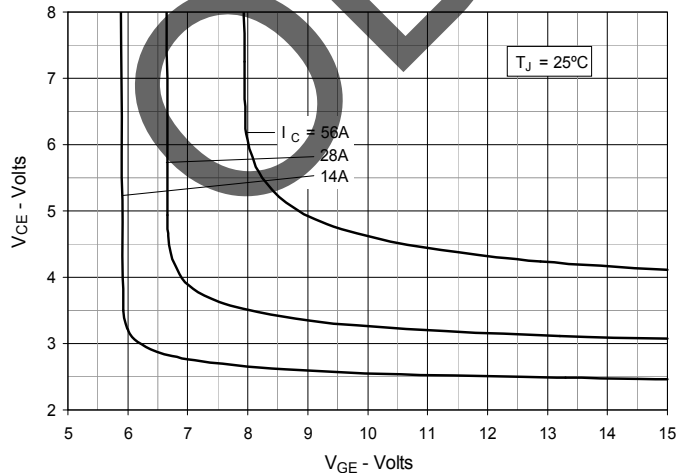


Fig. 6. Input Admittance

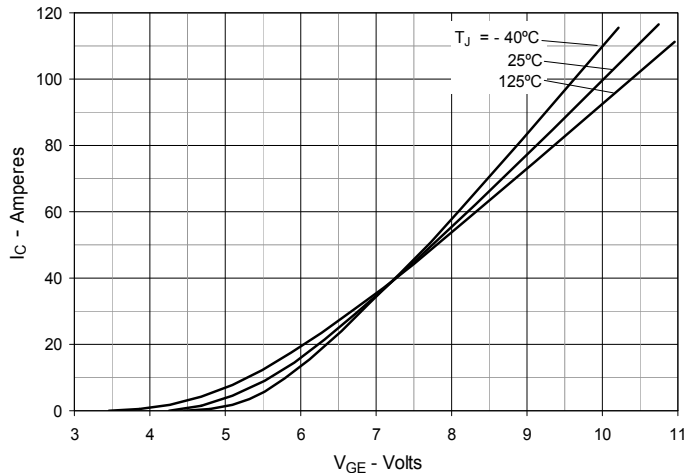


Fig. 7. Transconductance

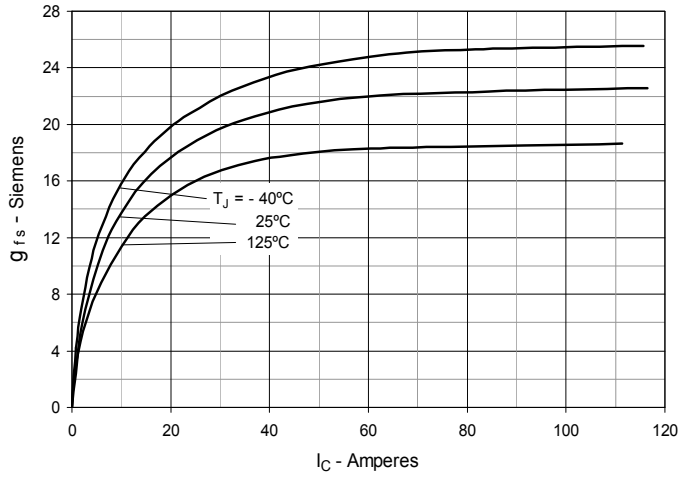


Fig. 8. Gate Charge

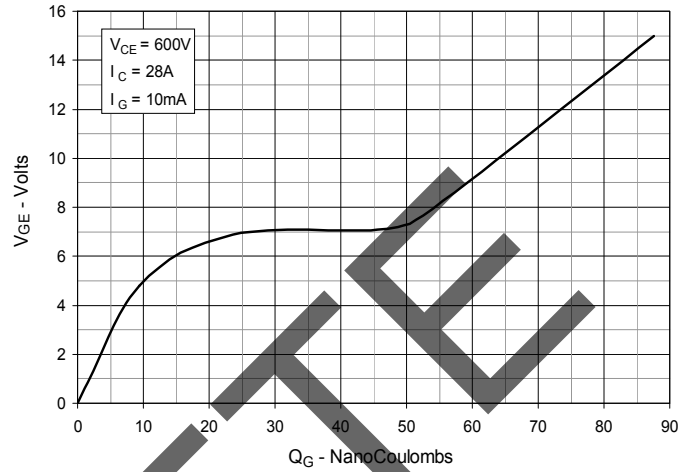


Fig. 9. Capacitance

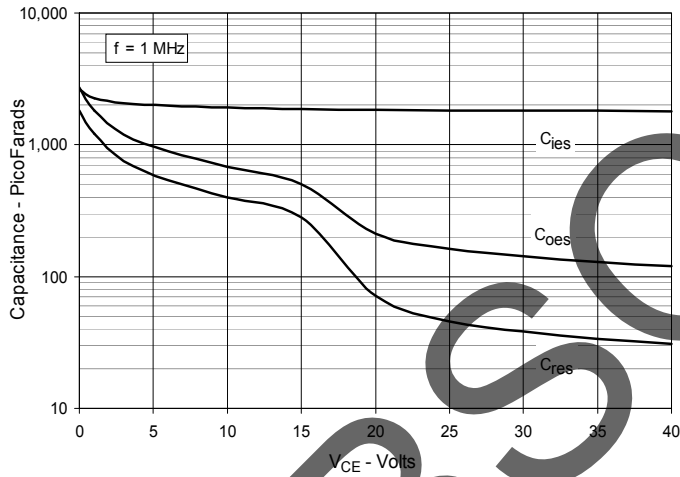


Fig. 10. Reverse-Bias Safe Operating Area

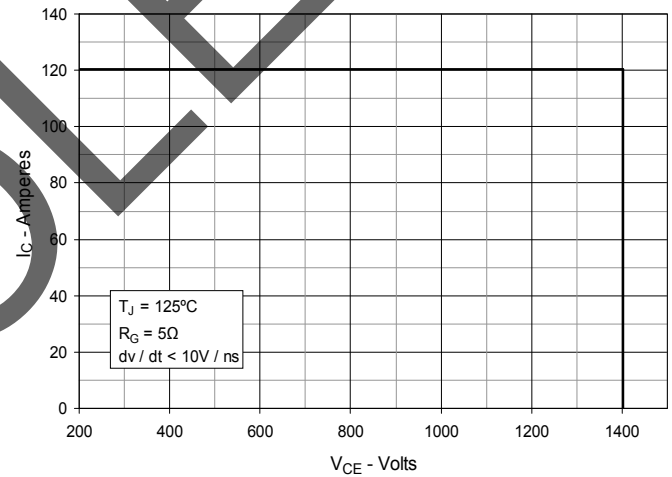


Fig. 11. Maximum Transient Thermal Impedance

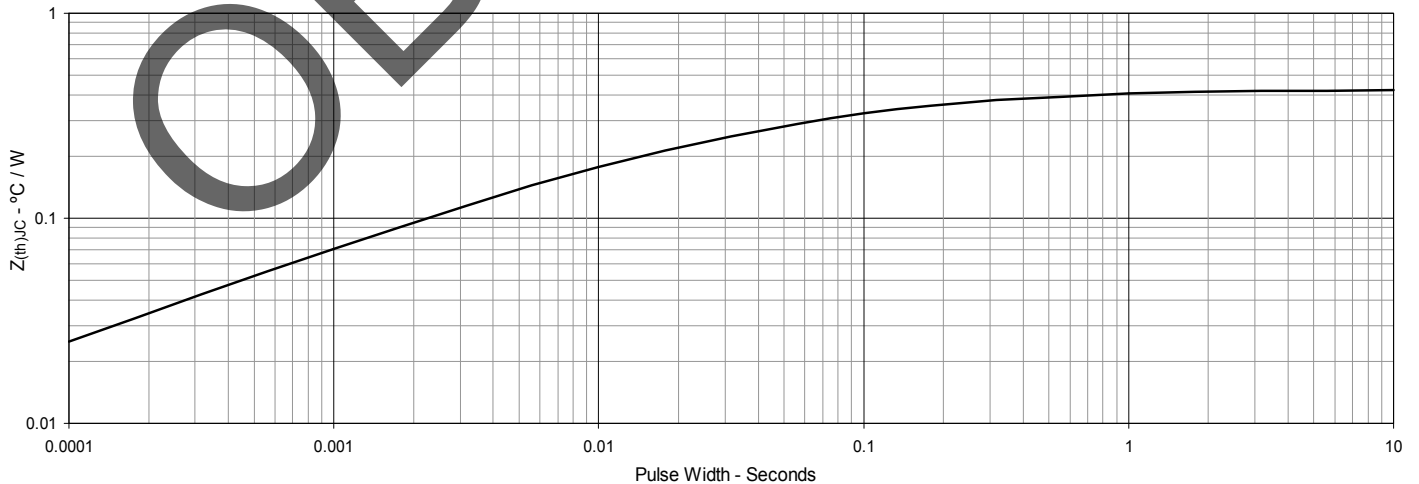


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

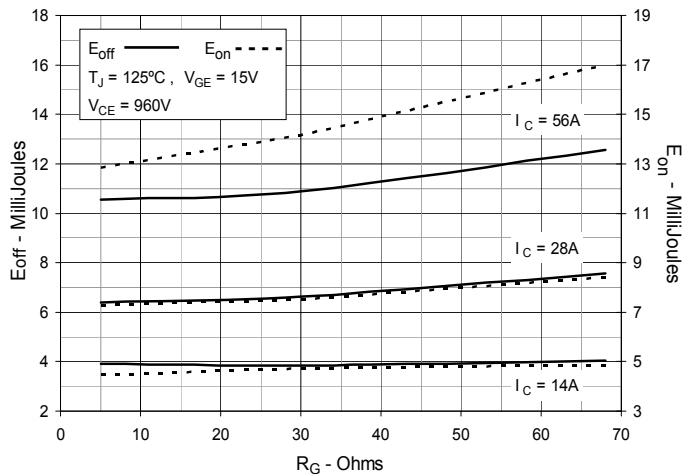


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

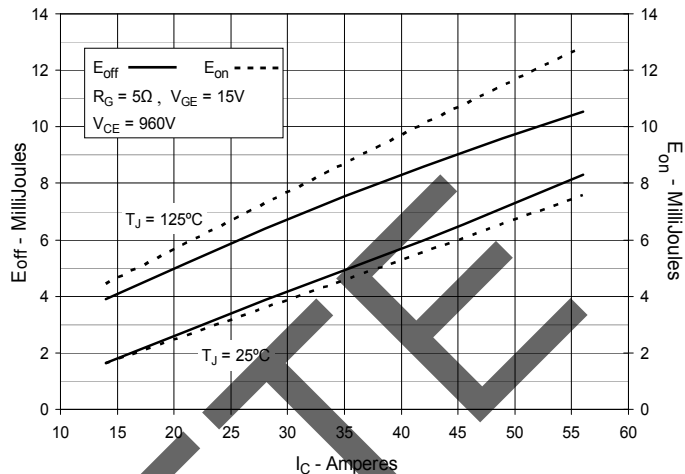


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

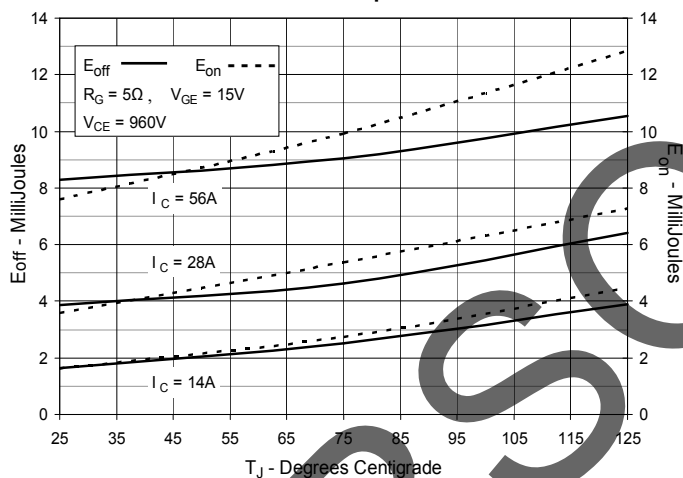


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

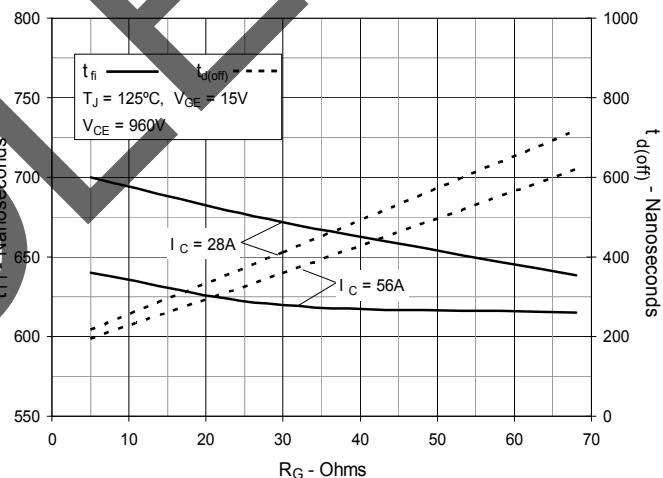


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

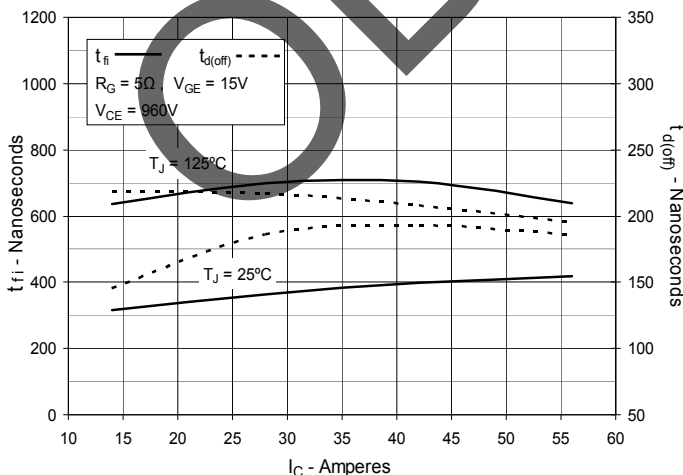


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

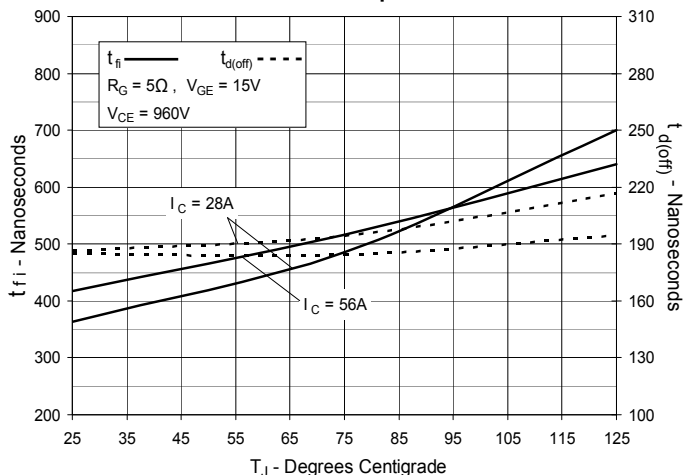


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

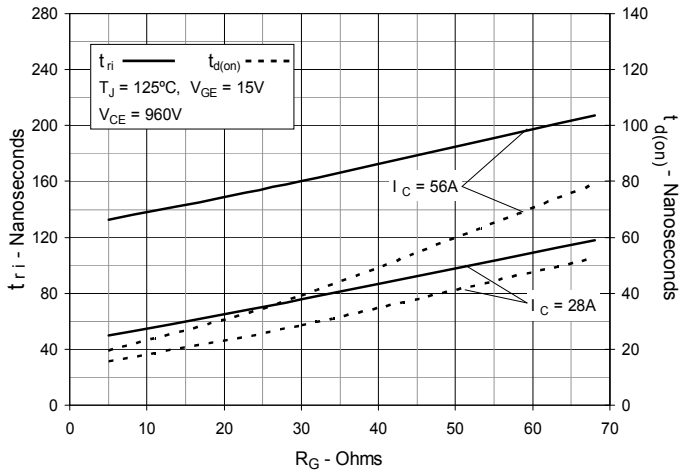


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

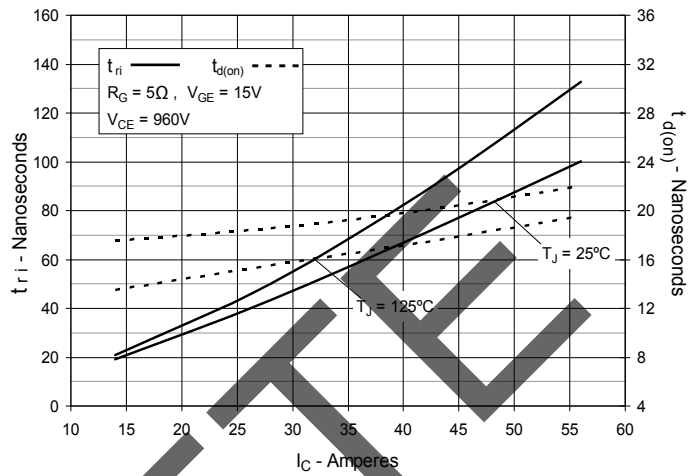
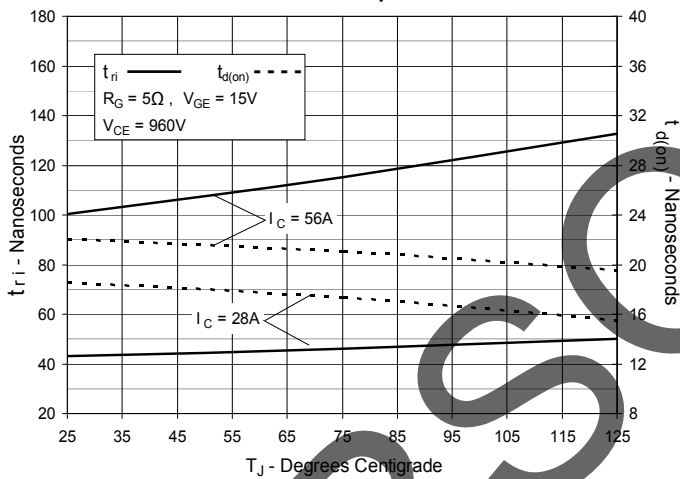


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature



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