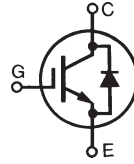


XPT™ 650V IGBT GenX3™ w/ Sonic Diode

IXYH75N65C3H1

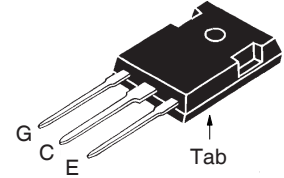
$$\begin{aligned} V_{CES} &= 650V \\ I_{C110} &= 75A \\ V_{CE(sat)} &\leq 2.3V \\ t_{fi(typ)} &= 50ns \end{aligned}$$



Extreme Light Punch through
IGBT for 20-60kHz Switching

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C to } 175^\circ\text{C}$	650	V
V_{CGR}	$T_J = 25^\circ\text{C to } 175^\circ\text{C}, R_{GE} = 1M\Omega$	650	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$ (Chip Capability)	170	A
I_{LRMS}	Terminal Current Limit	160	A
I_{C110}	$T_C = 110^\circ\text{C}$	75	A
I_{F110}	$T_C = 110^\circ\text{C}$	62	A
I_{CM}	$T_C = 25^\circ\text{C}, 1\text{ms}$	360	A
I_A	$T_C = 25^\circ\text{C}$	30	A
E_{AS}	$T_C = 25^\circ\text{C}$	300	mJ
SSOA (RBSOA)	$V_{GE} = 15V, T_{VJ} = 150^\circ\text{C}, R_G = 3\Omega$ Clamped Inductive Load	$I_{CM} = 150$ $V_{CE} \leq V_{CES}$	A
t_{sc} (SCSOA)	$V_{GE} = 15V, V_{CE} = 360V, T_J = 150^\circ\text{C}$ $R_G = 82\Omega$, Non Repetitive	8	μs
P_C	$T_C = 25^\circ\text{C}$	750	W
T_J		-55 ... +175	$^\circ\text{C}$
T_{JM}		175	$^\circ\text{C}$
T_{stg}		-55 ... +175	$^\circ\text{C}$
T_L	Maximum Lead Temperature for Soldering	300	$^\circ\text{C}$
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	$^\circ\text{C}$
M_d	Mounting Torque	1.13/10	Nm/lb.in
Weight		6	g

TO-247 AD



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

Features

- International Standard Package
- Optimized for 20-60kHz Switching
- Square RBSOA
- Avalanche Rated
- Short Circuit Capability
- High Current Handling Capability
- Anti-Parallel Sonic Diode

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

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

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu\text{A}, V_{GE} = 0V$	650		V
$V_{GE(th)}$	$I_C = 250\mu\text{A}, V_{CE} = V_{GE}$	3.5		6.0 V
I_{CES}	$V_{CE} = V_{CES}, V_{GE} = 0V$ $T_J = 150^\circ\text{C}$			50 μA 4 mA
I_{GES}	$V_{CE} = 0V, V_{GE} = \pm 20V$			± 100 nA
$V_{CE(sat)}$	$I_C = 60A, V_{GE} = 15V$, Note 1 $T_J = 150^\circ\text{C}$		1.8 2.2	2.3 V V

Symbol Test Conditions

(T_J = 25°C Unless Otherwise Specified)

Characteristic Values

Min. Typ. Max.

g_{fs}	I _C = 60A, V _{CE} = 10V, Note 1	25	42	S
C_{ies}	V _{CE} = 25V, V _{GE} = 0V, f = 1MHz		3450	pF
C_{oes}			307	pF
C_{res}			70	pF
Q_{g(on)}	I _C = 75A, V _{GE} = 15V, V _{CE} = 0.5 • V _{CES}		123	nC
Q_{ge}			24	nC
Q_{gc}			60	nC
t_{d(on)}	Inductive load, T _J = 25°C I _C = 60A, V _{GE} = 15V V _{CE} = 400V, R _G = 3Ω Note 2		27	ns
t_{ri}			67	ns
E_{on}			2.8	mJ
t_{d(off)}			93	ns
t_{fi}			50	ns
E_{off}			1.0	mJ
t_{d(on)}	Inductive load, T _J = 150°C I _C = 60A, V _{GE} = 15V V _{CE} = 400V, R _G = 3 Note 2		26	ns
t_{ri}			57	ns
E_{on}			3.3	mJ
t_{d(off)}			108	ns
t_{fi}			58	ns
E_{off}			1.3	mJ
R_{thJC}			0.21	°C/W
R_{thCS}				°C/W

Reverse Sonic Diode (FRD)

Symbol Test Conditions

(T_J = 25°C Unless Otherwise Specified)

Characteristic Values

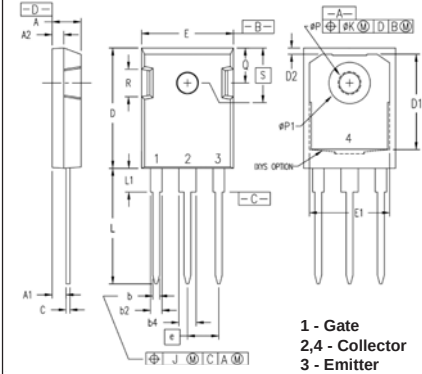
Min. Typ. Max.

V_F	I _F = 50A, V _{GE} = 0V, Note 1	T _J = 150°C	1.8	2.5 V
I_{RM}	I _F = 50A, V _{GE} = 0V, -di _F /dt = 900A/μs,		45	A
t_{rr}	V _R = 300V	T _J = 150°C	150	ns
R_{thJC}				0.45 °C/W

Notes:

1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.
2. Switching times & energy losses may increase for higher V_{CE}(clamp), T_J or R_G.

TO-247 (IXYH) Outline



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.70	5.30	0.185	0.209
A1	2.21	2.59	0.087	0.102
A2	1.50	2.49	0.059	0.098
b	0.99	1.40	0.039	0.055
b2	1.65	2.39	0.065	0.094
b4	2.59	3.43	0.102	0.135
c	0.38	0.89	0.015	0.035
D	20.79	21.45	0.819	0.845
D1	13.07	-	0.515	-
D2	0.51	1.35	0.020	0.053
E	15.48	16.24	0.610	0.640
E1	13.45	-	0.53	-
E2	4.31	5.48	0.170	0.216
e	5.45 BSC		0.215 BSC	
L	19.80	20.30	0.078	0.800
L1	-	4.49	-	0.177
Ø P	3.55	3.65	0.140	0.144
Ø P1	-	7.39	-	0.290
Q	5.38	6.19	0.212	0.244
S	6.14 BSC		0.242 BSC	

PRELIMINARY 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
	4,860,072	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	

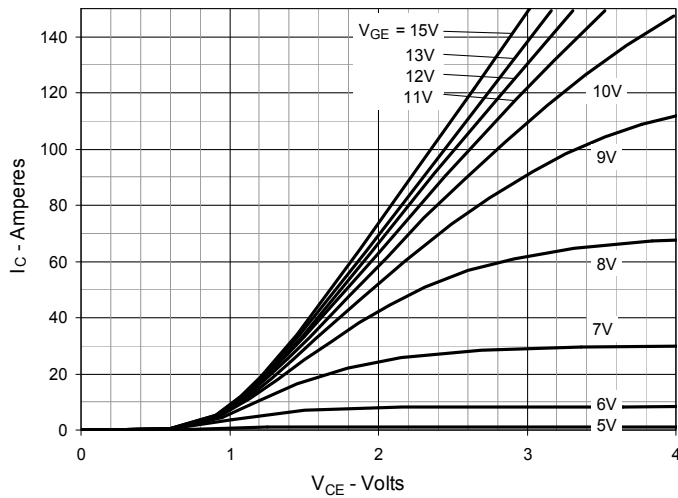
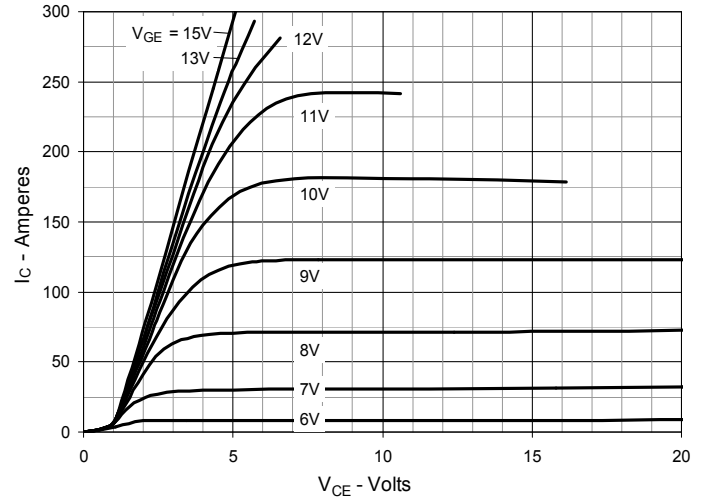
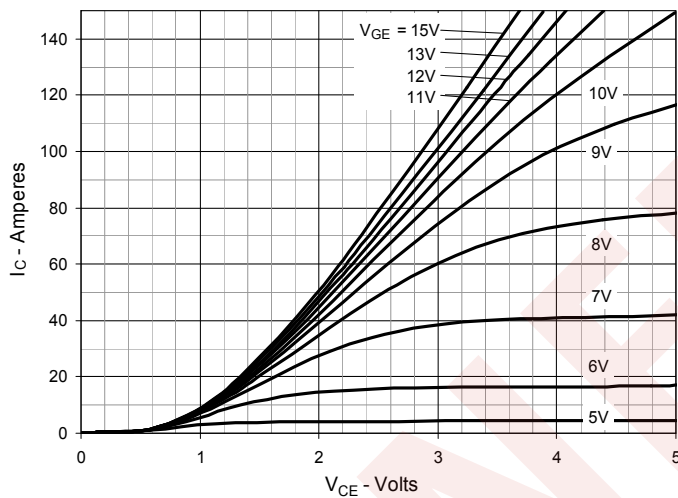
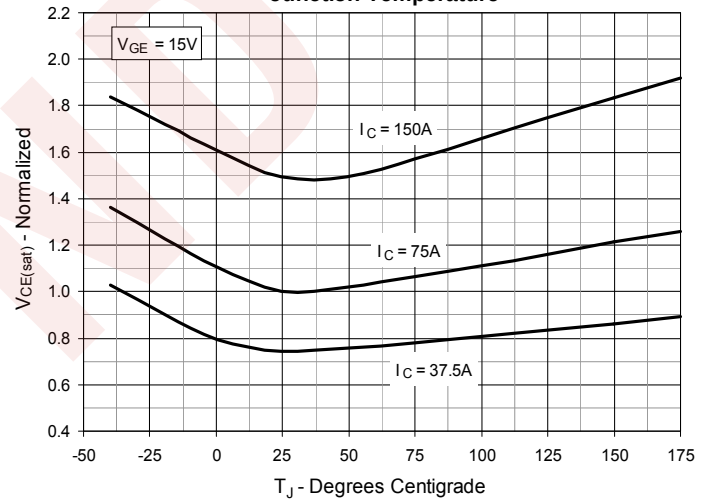
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$ Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$ Fig. 3. Output Characteristics @ $T_J = 150^\circ\text{C}$ Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

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

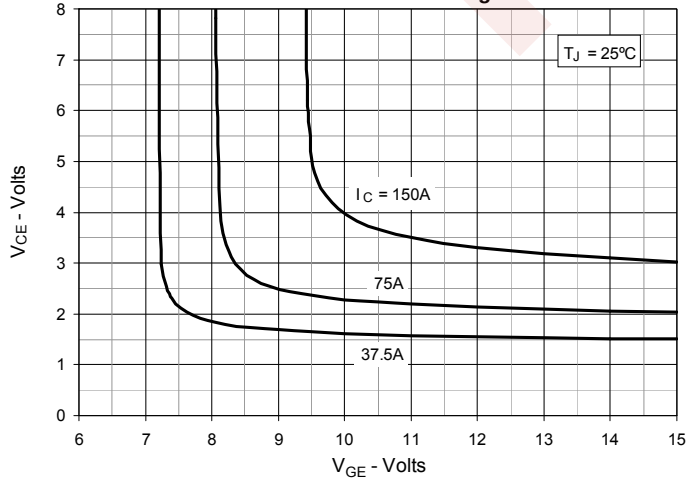


Fig. 6. Input Admittance

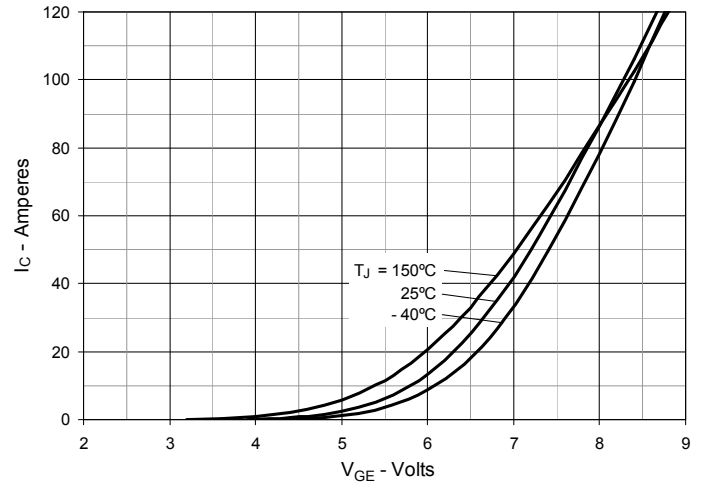


Fig. 7. Transconductance

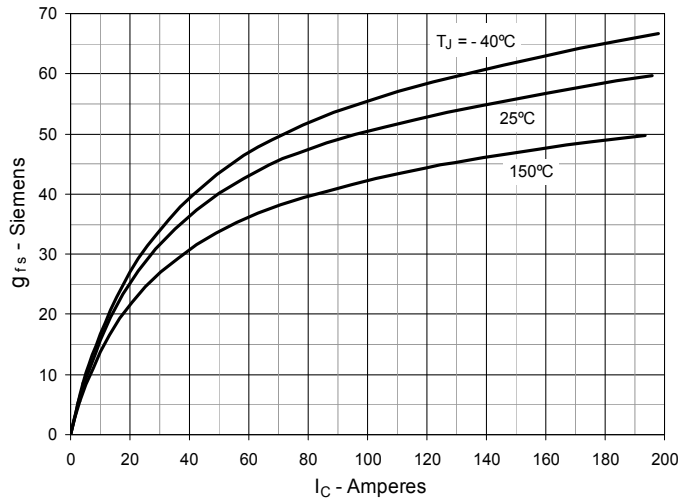


Fig. 8. Gate Charge

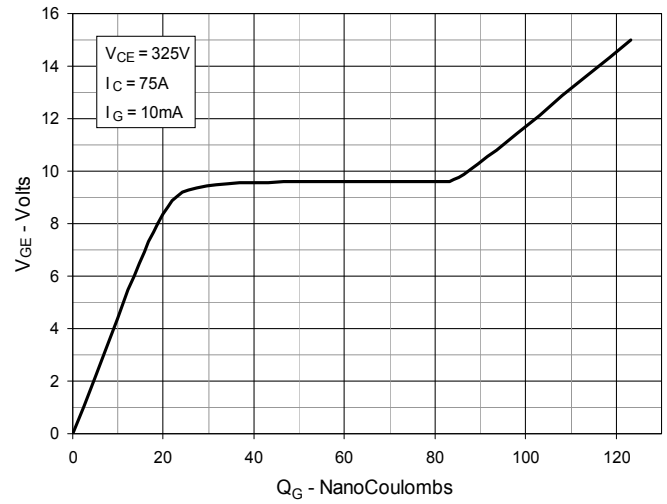


Fig. 9. Capacitance

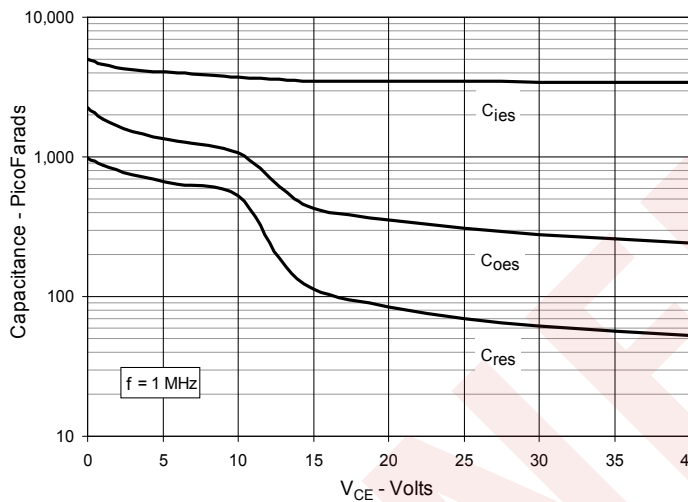


Fig. 10. Reverse-Bias Safe Operating Area

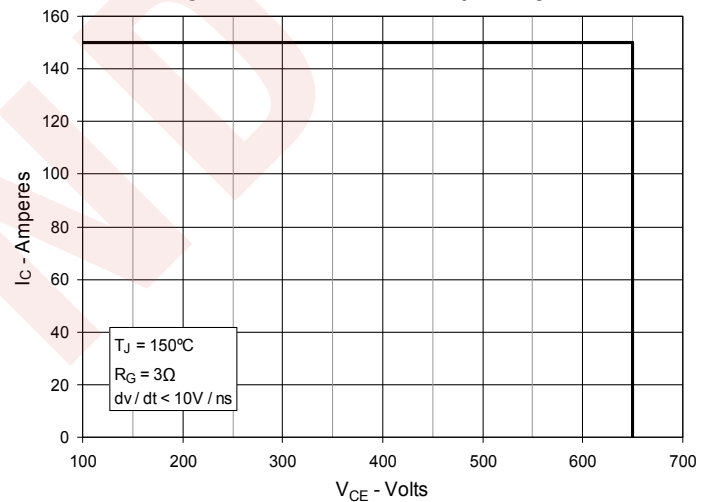


Fig. 11. Maximum Transient Thermal Impedance

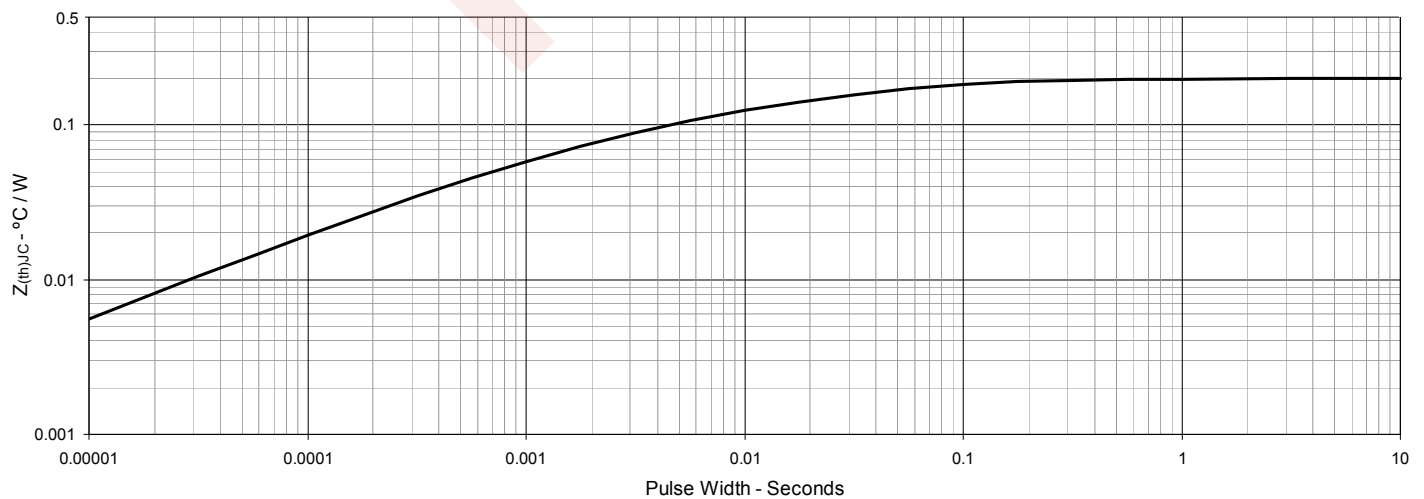


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

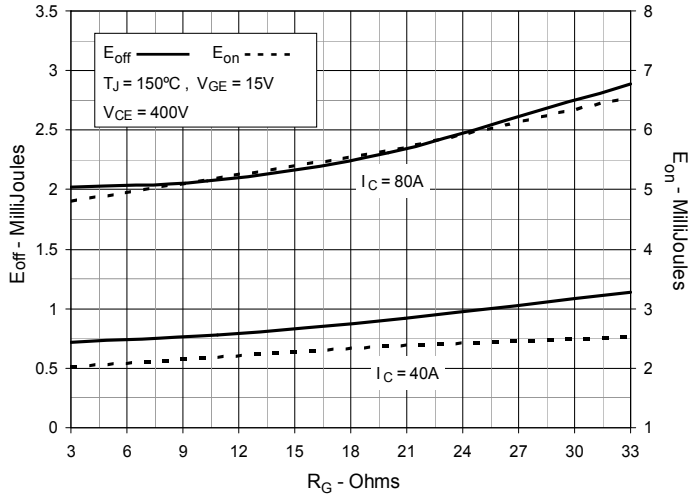


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

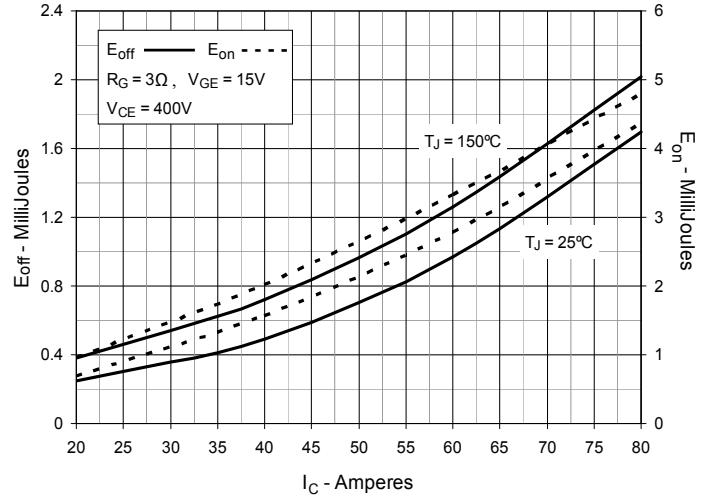


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

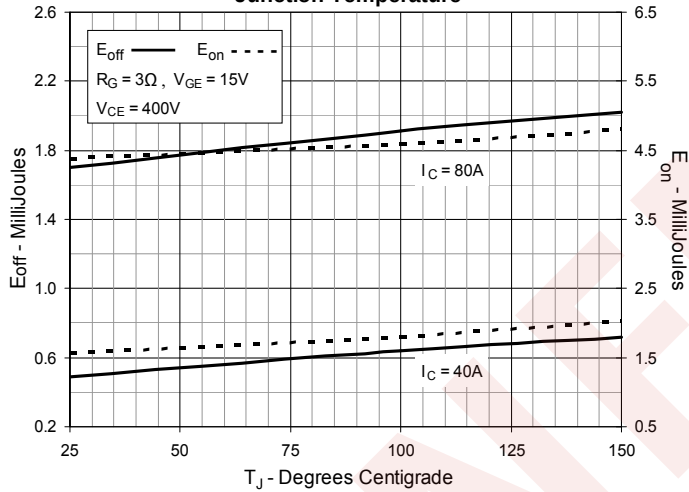


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

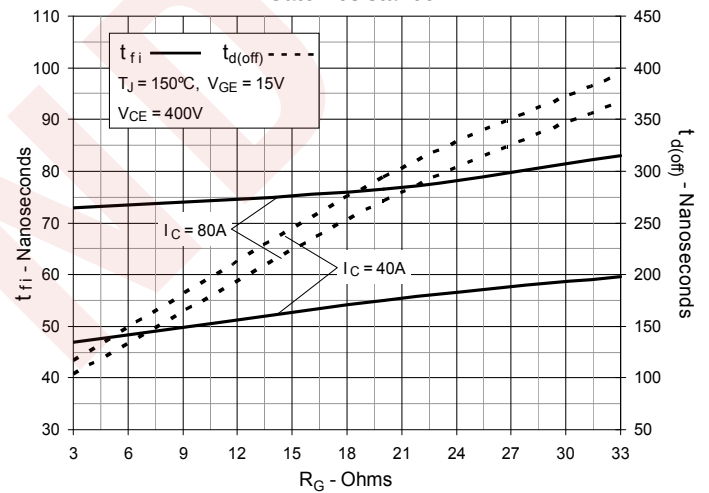


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

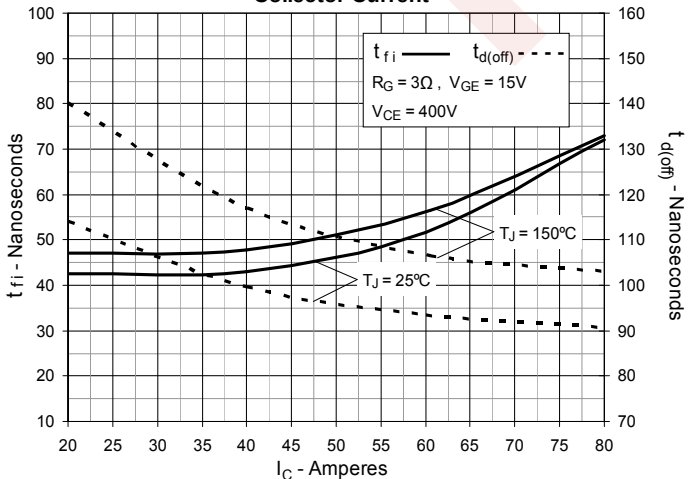


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

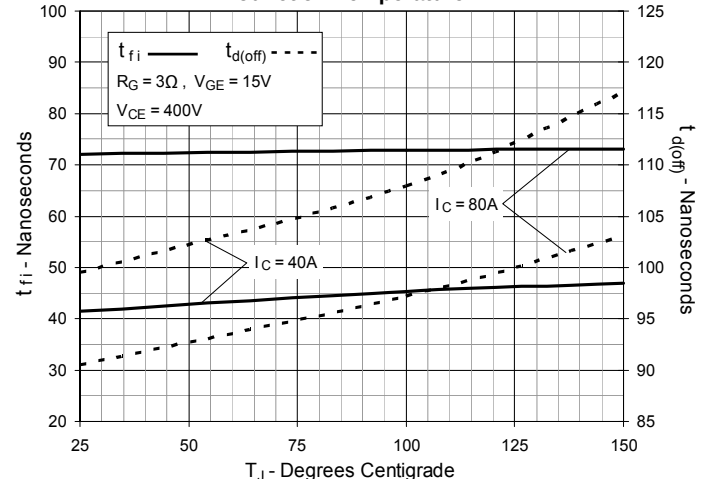


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

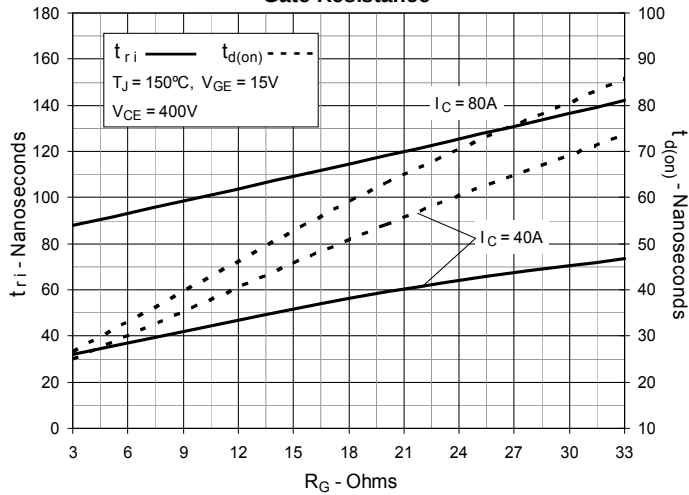


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

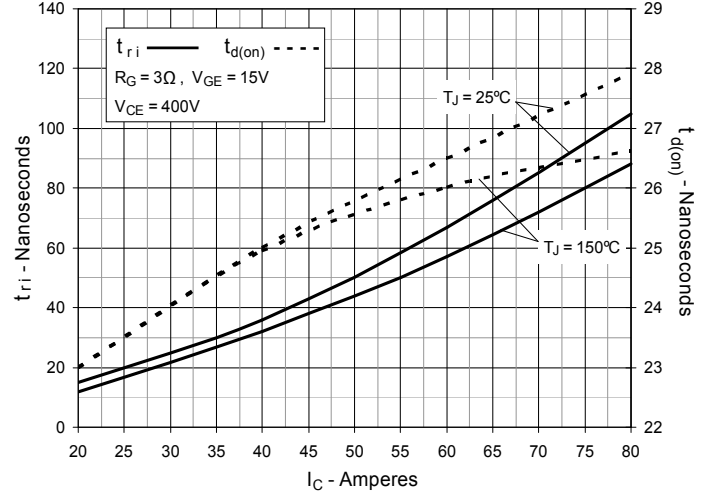


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature

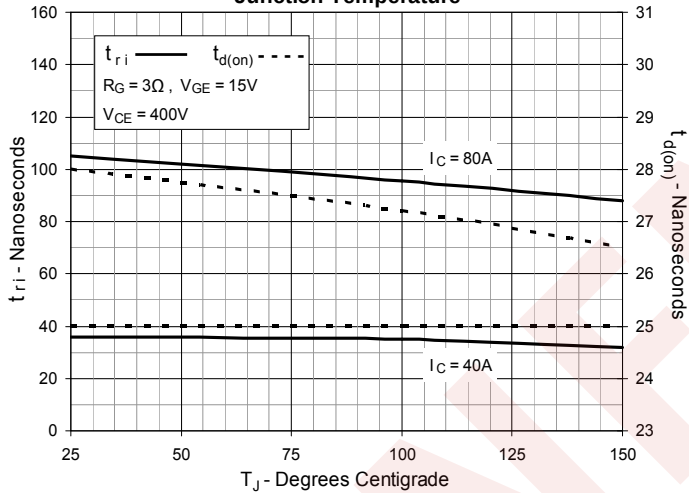


Fig. 21. Maximum Peak Load Current vs. Frequency

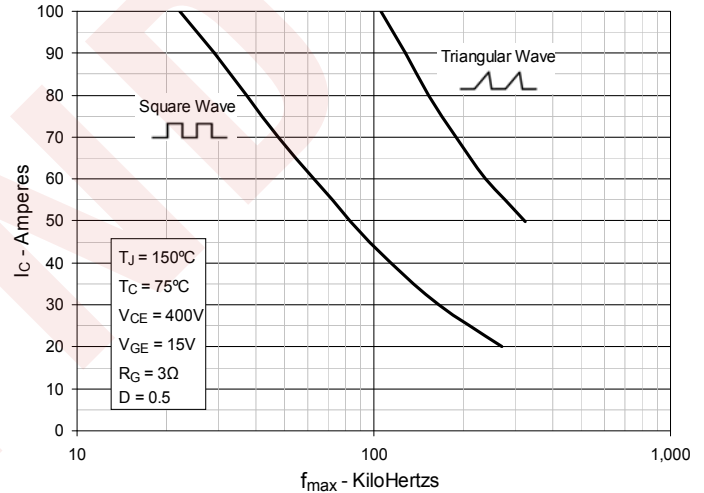


Fig. 22. Typ. Forward characteristics

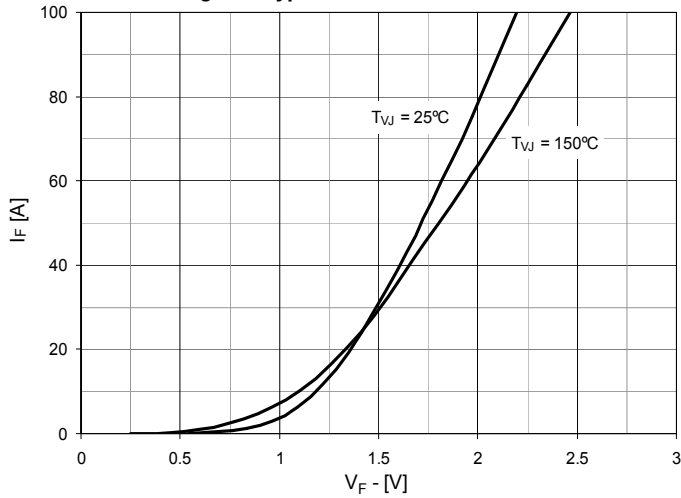
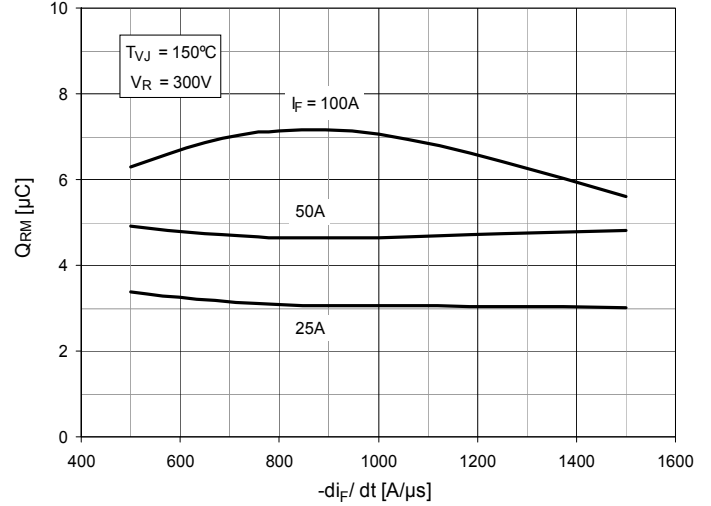
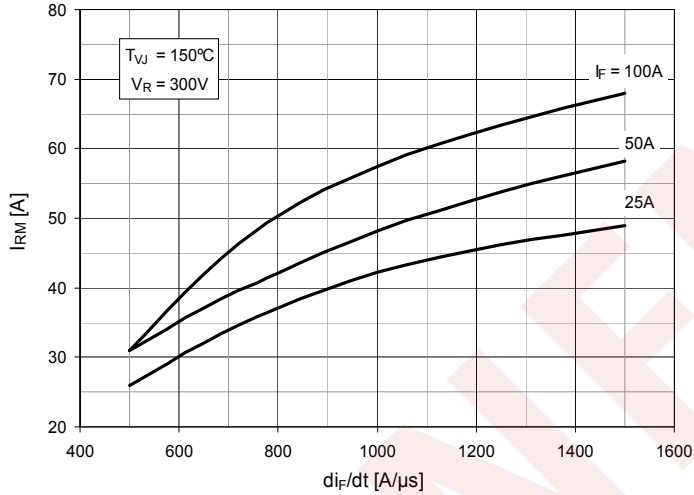
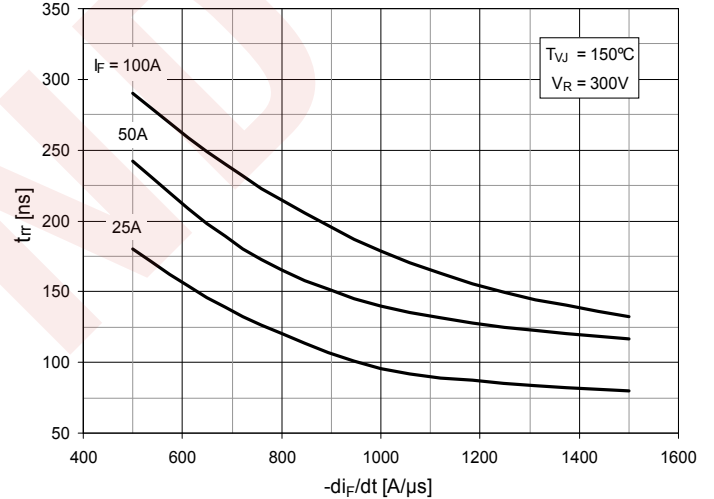
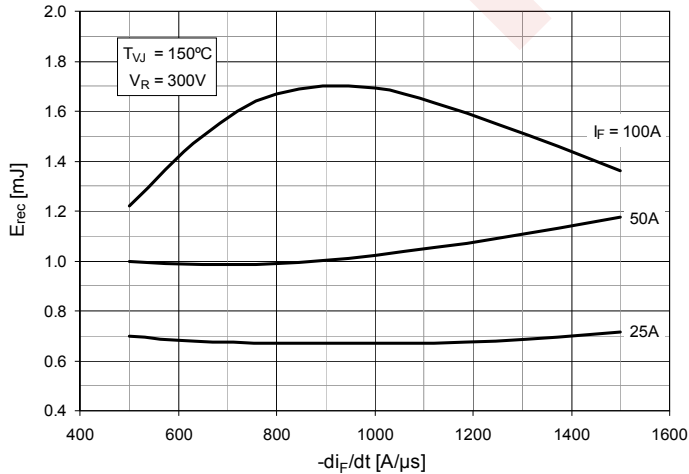
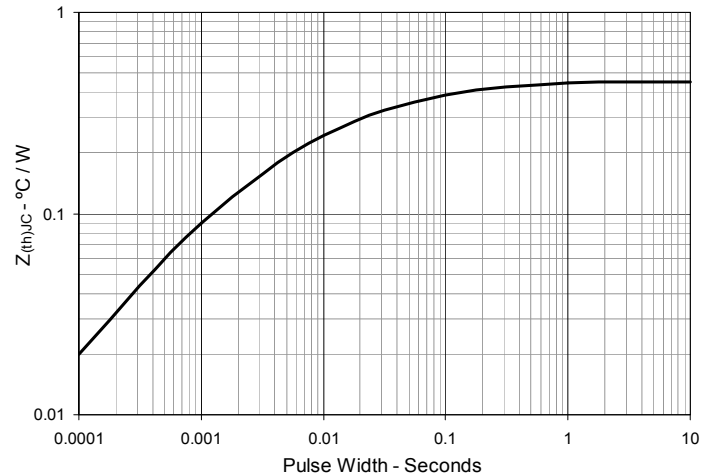
Fig. 23. Typ. Reverse Recovery Charge Q_{rr} vs. $-di_F/dt$ Fig. 24. Typ. Peak Reverse Current I_{RM} vs. $-di_F/dt$ Fig. 25. Typ. Recovery Time t_{rr} vs. $-di_F/dt$ Fig. 26. Typ. Recovery Energy E_{rec} vs. $-di_F/dt$ 

Fig. 27. Maximum Transient Thermal Impedance



NOT FOR NEW DESIGN

NEW



Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.