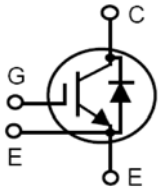
IXYS

1200V XPT™ IGBT GenX3™ w/ Diode

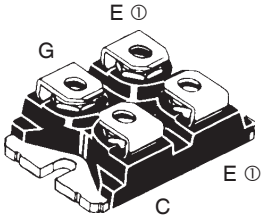
IXYN82N120C3H1

V_{CES} = 1200V
I_{C110} = 46A
$V_{CE(sat)}$ ≤ 3.2V
$t_{fi(typ)}$ = 93ns

High-Speed IGBT
for 20-50 kHz Switching



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°C to 150°C	1200	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	1200	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C (Chip Capability)	105	A
I_{C110}	T_C = 110°C	46	A
I_{F110}	T_C = 110°C	42	A
I_{CM}	T_C = 25°C, 1ms	320	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 2Ω Clamped Inductive Load	I_{CM} = 164 @ $V_{CE} \leq V_{CES}$	A
P_C	T_C = 25°C	500	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
V_{ISOL}	50/60Hz t = 1min $I_{ISOL} \leq$ 1mA t = 1s	2500 3000	V~ V~
M_d	Mounting Torque Terminal Connection Torque	1.5/13 1.3/11.5	Nm/lb.in. Nm/lb.in.
Weight		30	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250μA, V_{GE} = 0V	1200			V
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			50	μA
	T_J = 125°C			3	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 82A, V_{GE} = 15V, Note 1		2.75	3.20	V
	T_J = 125°C		3.50		V

Features

- Optimized for Low Switching Losses
- Square RBSOA
- Isolation Voltage 2500V~
- Anti-Parallel Ultra Fast Diode
- Positive Thermal Coefficient of Vce(sat)
- High Current Handling Capability
- International Standard Package

Advantages

- High Power Density
- Low Gate Drive Requirement

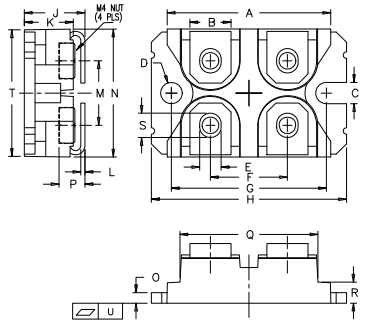
Applications

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

© 2018 IXYS CORPORATION, All Rights Reserved

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	30	50		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		4060		pF
C_{oes}			285		pF
C_{res}			110		pF
$Q_{g(on)}$	I_C = 75A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		215		nC
Q_{ge}			26		nC
Q_{gc}			84		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		29		ns
t_{ri}	I_C = 80A, V_{GE} = 15V		78		ns
E_{on}	V_{CE} = 0.5 • V_{CES}, R_G = 2Ω		4.95		mJ
$t_{d(off)}$	Note 2		192	280	ns
t_{fi}			93		ns
E_{off}			2.78	5.00	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		29		ns
t_{ri}	I_C = 80A, V_{GE} = 15V		90		ns
E_{on}	V_{CE} = 0.5 • V_{CES}, R_G = 2Ω		7.45		mJ
$t_{d(off)}$	Note 2		200		ns
t_{fi}			95		ns
E_{off}			3.70		mJ
R_{thJC}				0.25	°C/W
R_{thCS}			0.05		°C/W

SOT-227B miniBLOC (IXYN)



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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°C, Unless Otherwise Specified)		Characteristic Values Min.	Typ.	Max.	
V_F	I_F = 60A, V_{GE} = 0V, Note 1				2.7	V
		T_J = 125°C		1.9		V
I_{RM}	I_F = 60A, V_{GE} = 0V,	T_J = 125°C		41		A
t_{rr}	$-di_F/dt$ = 700A/μs, V_R = 600V			420		ns
R_{thJC}					0.42	°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.

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 4,860,072 4,881,106 4,931,844 5,017,508 5,034,796 5,049,961 5,063,307 5,187,117 5,237,481 5,381,025 5,486,715 6,162,665 6,259,123 B1 6,306,728 B1 6,404,065 B1 6,534,343 6,583,505 6,683,344 6,710,405 B2 6,710,463 6,727,585 6,759,692 6,771,478 B2 7,005,734 B2 7,063,975 B2 7,071,537 7,157,338B2

Fig. 1. Output Characteristics @ T_J = 25°C

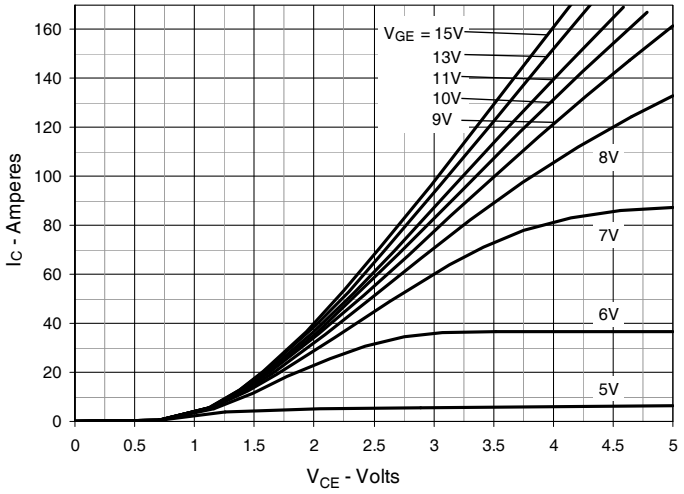


Fig. 2. Extended Output Characteristics @ T_J = 25°C

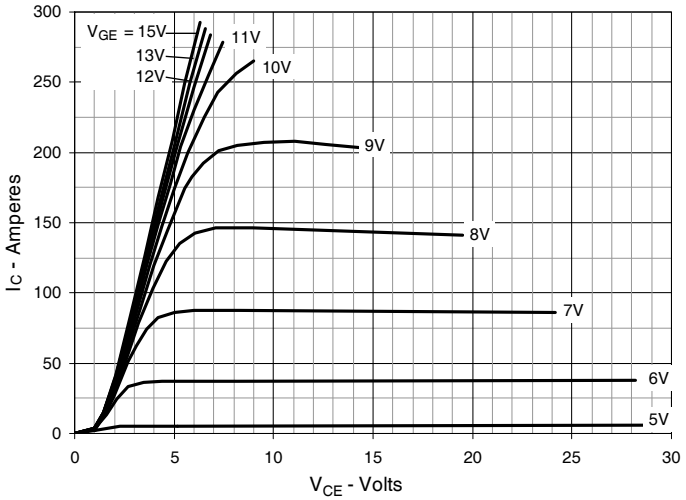


Fig. 3. Output Characteristics @ T_J = 125°C

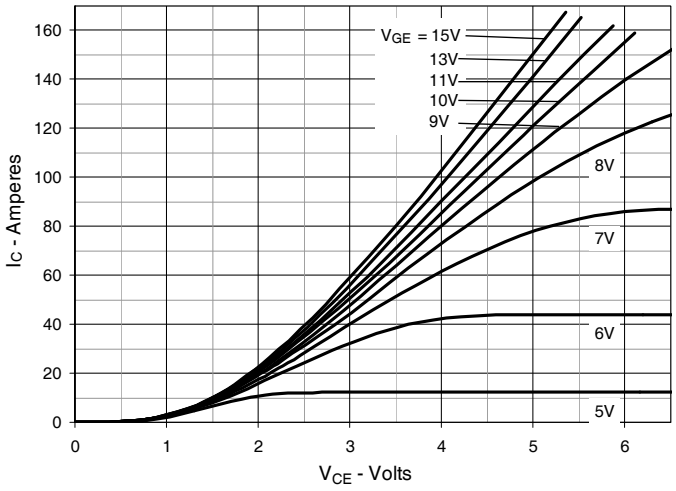


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

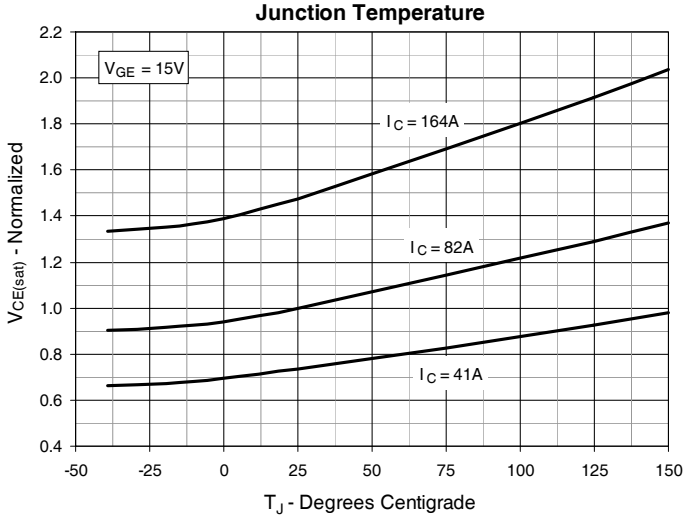


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

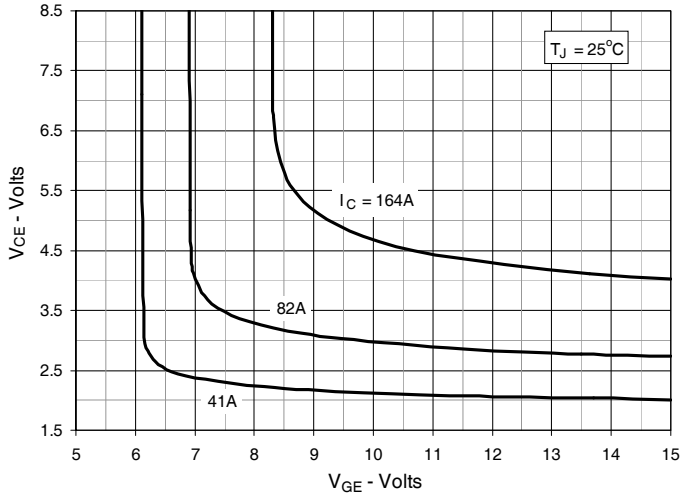
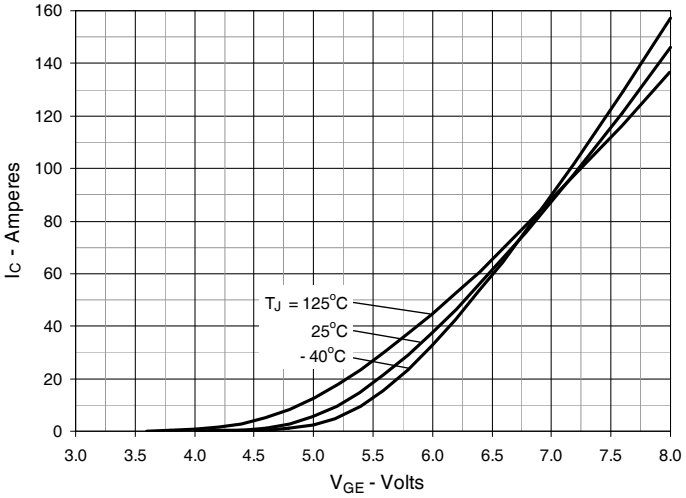


Fig. 6. Input Admittance



© 2018 IXYS CORPORATION, All Rights Reserved

Fig. 7. Transconductance

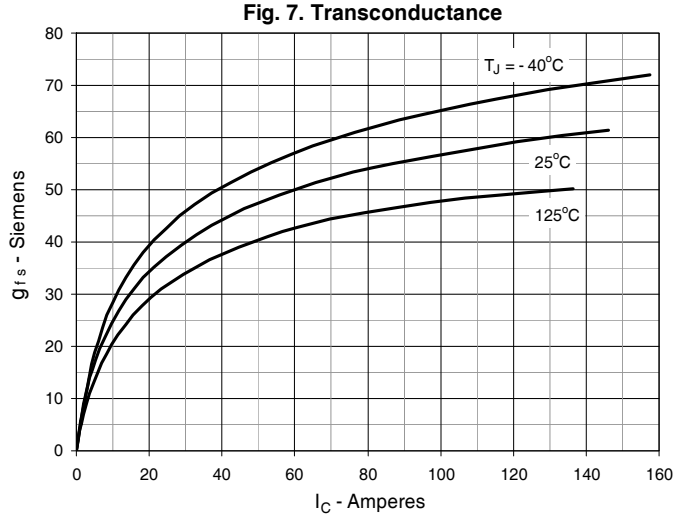


Fig. 8. Gate Charge

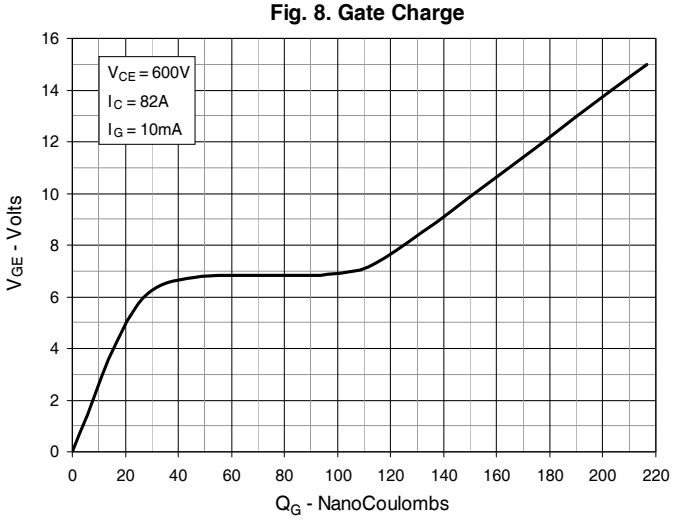


Fig. 9. Capacitance

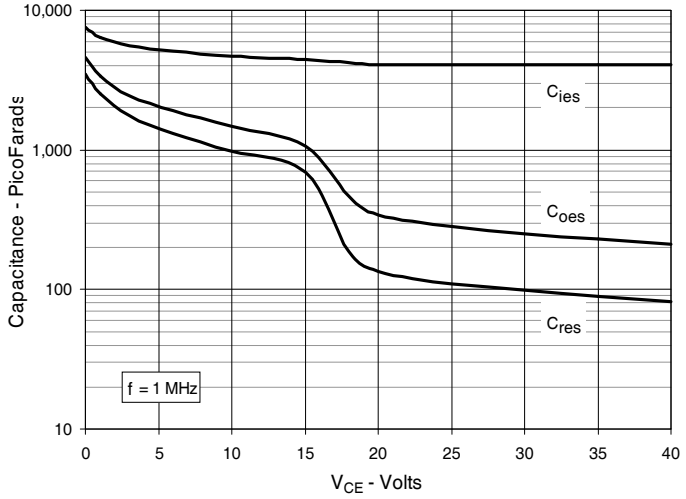


Fig. 10. Reverse-Bias Safe Operating Area

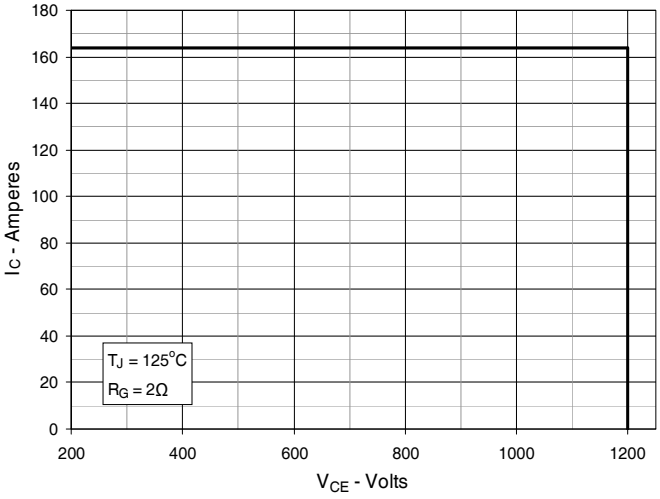
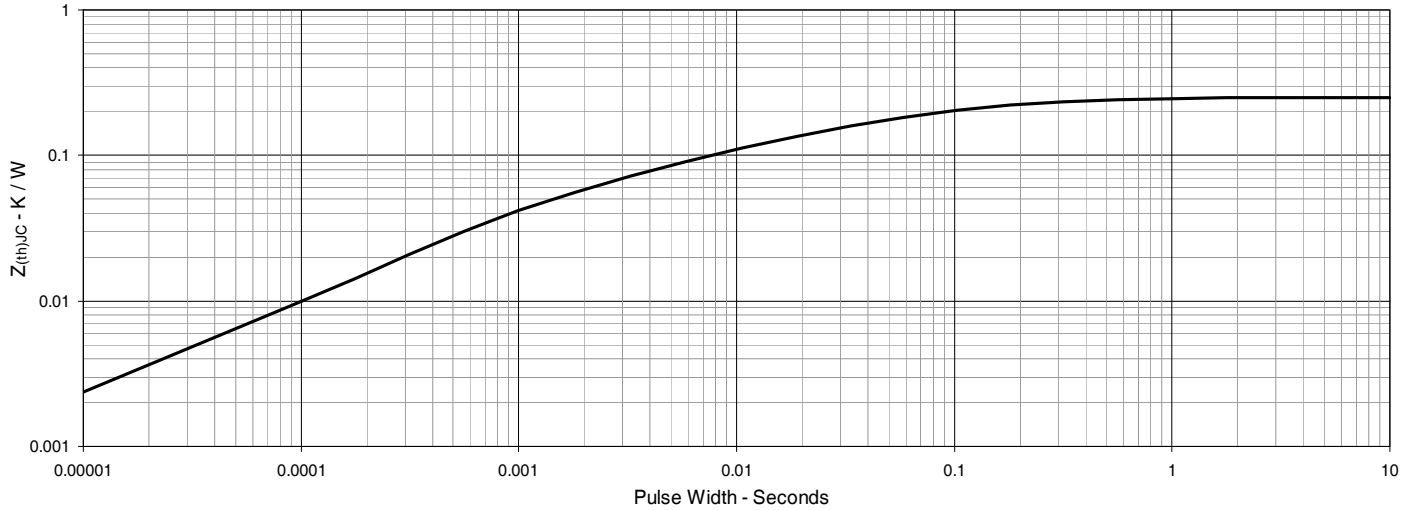


Fig. 11. Maximum Transient Thermal Impedance



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

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

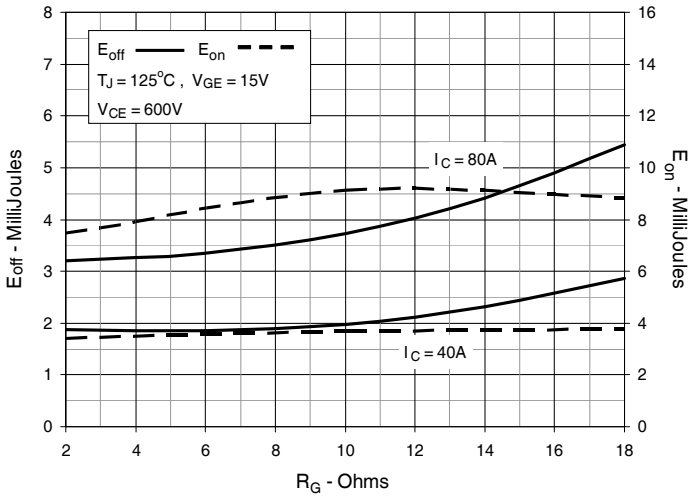


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

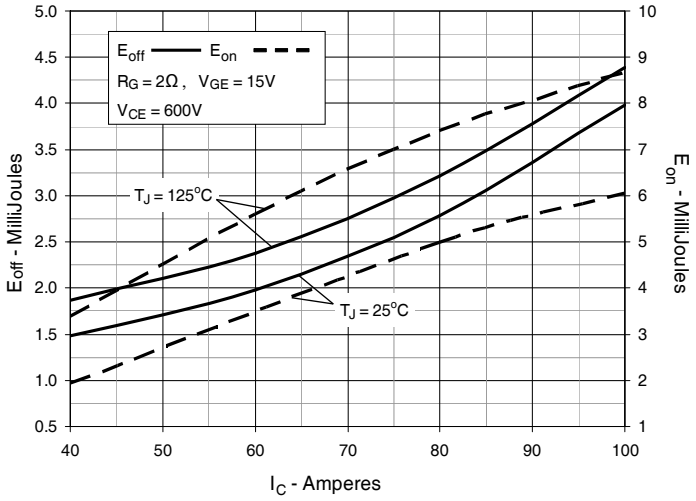


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

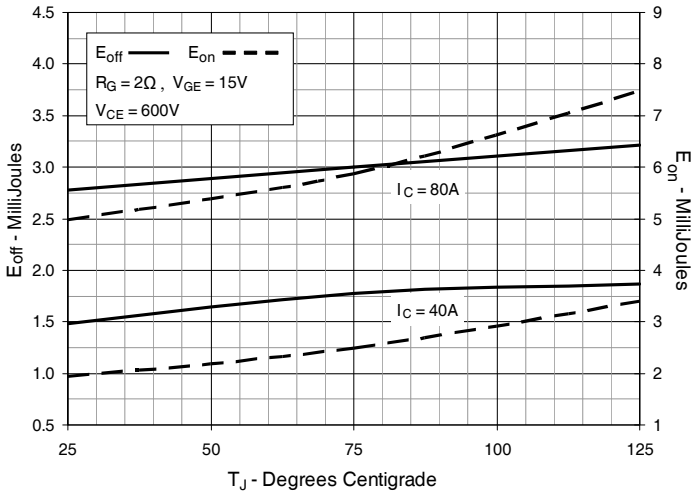


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

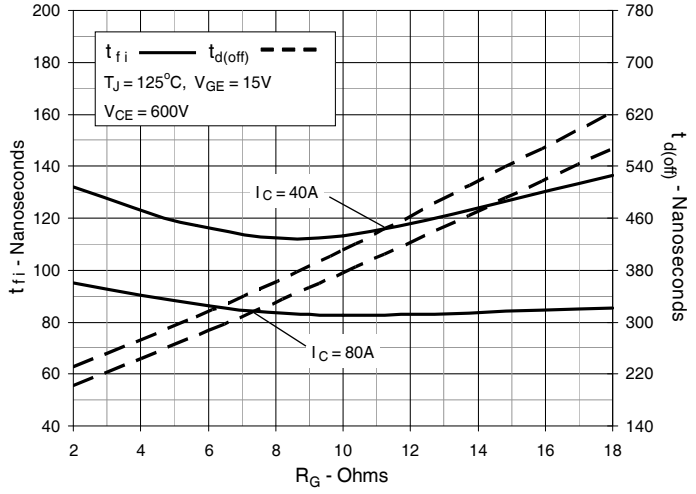


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

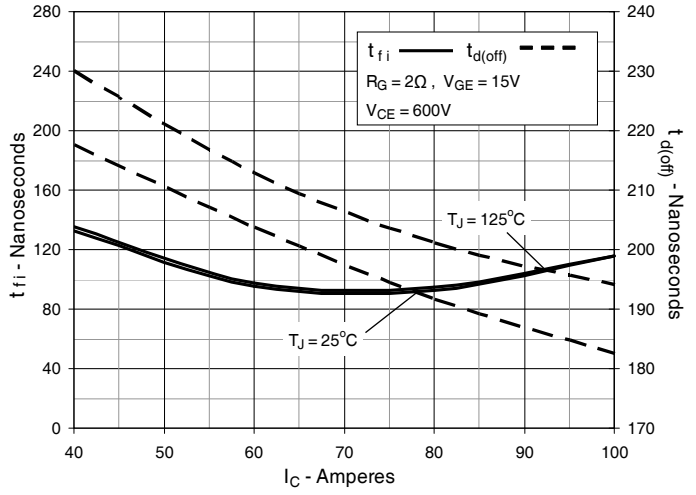
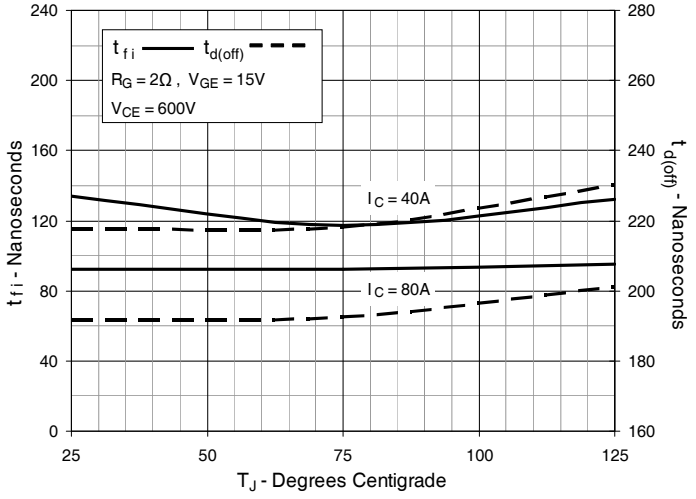


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature



© 2018 IXYS CORPORATION, All Rights Reserved

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

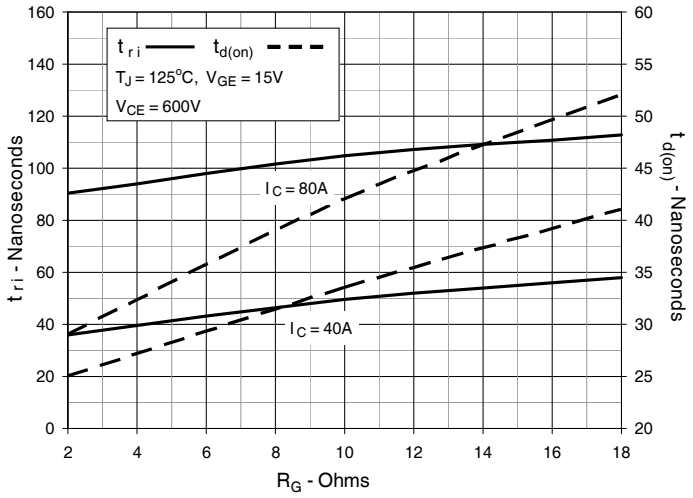


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

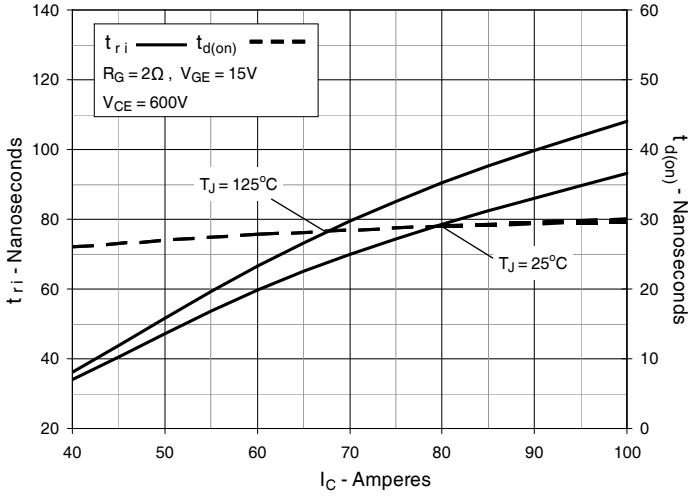
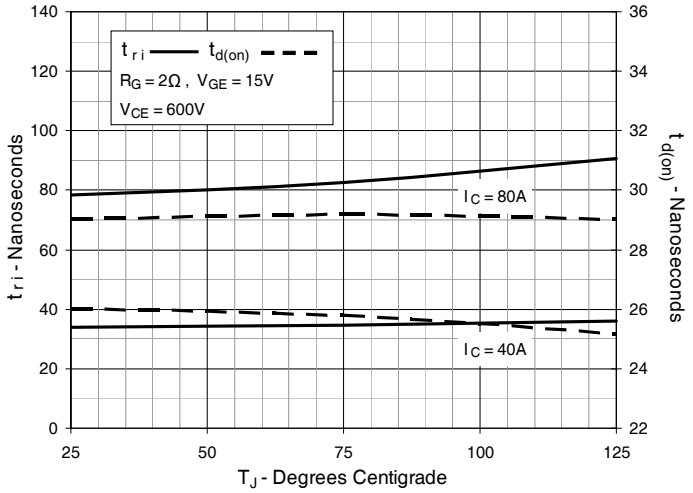


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature



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

Fig. 21. Forward Characteristics

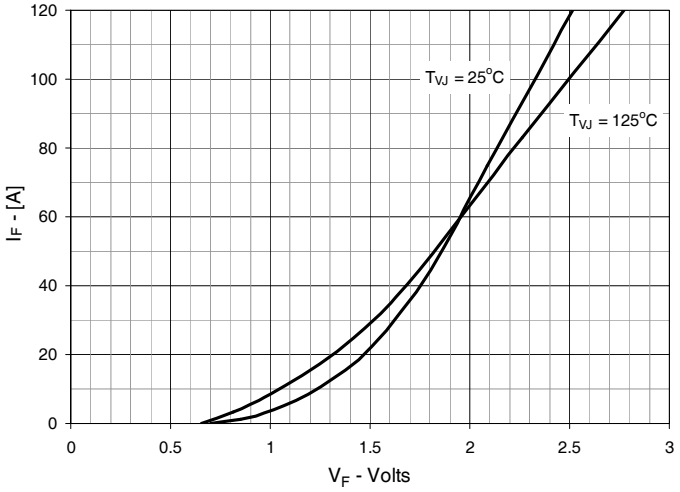


Fig. 22. Reverse Recovery Charge Q_{rr} vs. -di_F/dt

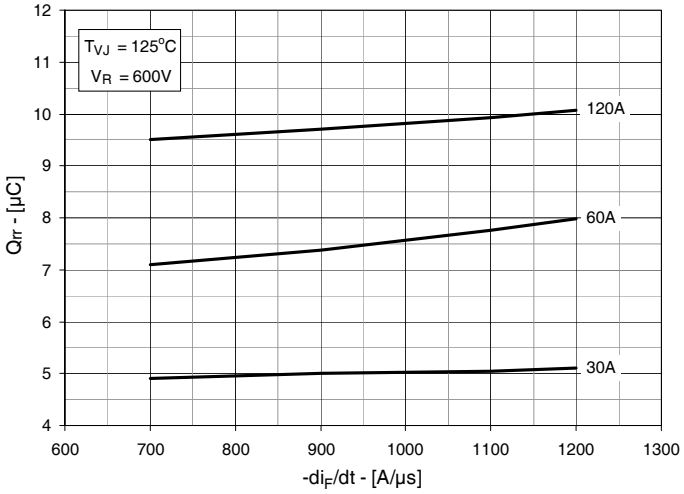


Fig. 23. PeakReverse Current I_{RM} vs. -di_F/dt

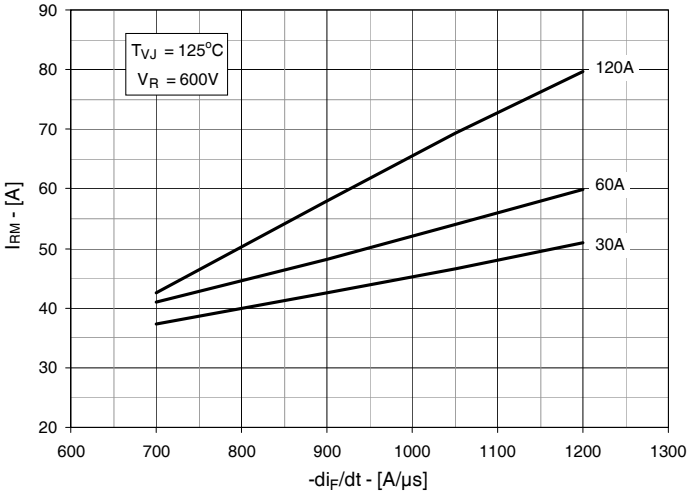


Fig. 24. Recovery Time t_{rr} vs. -di_F/dt

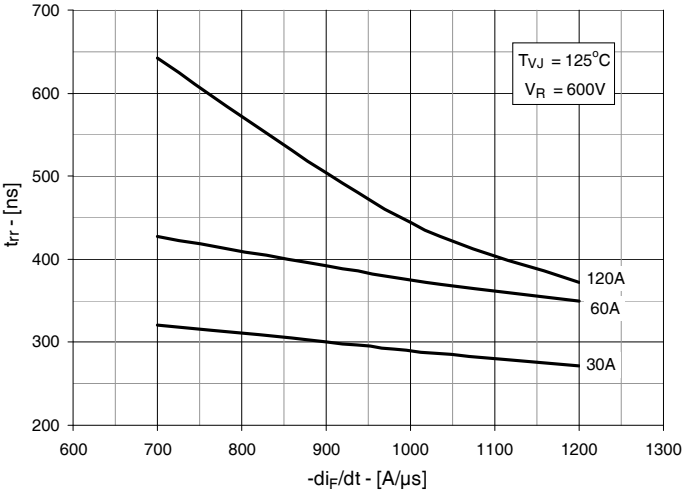


Fig. 25. Recovery Energy E_{rec} vs. -di_F/dt

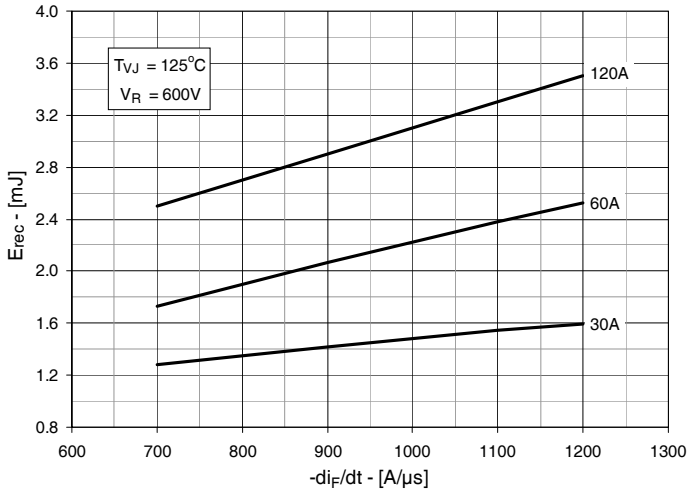
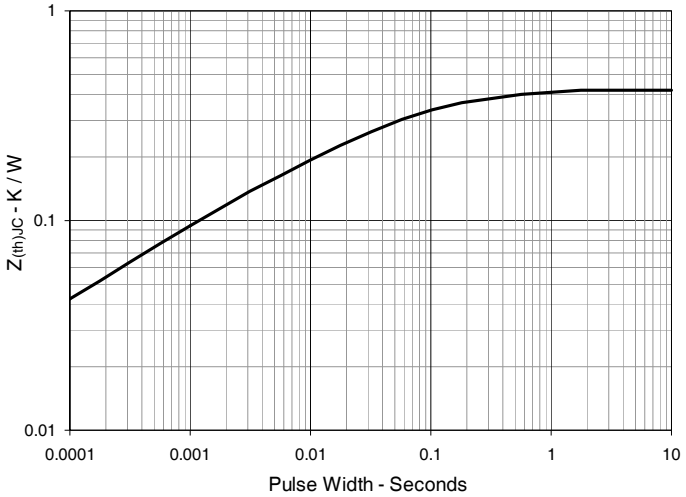


Fig. 26. Maximum Transient Thermal Impedance



© 2018 IXYS CORPORATION, All Rights Reserved



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.