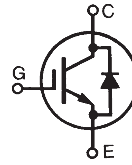
IXYS

Advance Technical Information

High Voltage XPT™ IGBT w/ Diode

IXYF30N170CV1

V_{CES} = 1700V
I_{C110} = 20A
$V_{CE(sat)}$ ≤ 4.0V
$t_{fi(typ)}$ = 95ns

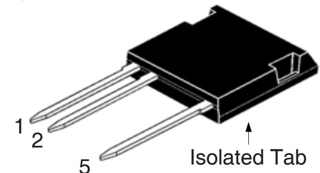


(Electrically Isolated Tab)

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 175°C	1700	V
V_{CGR}	T_J = 25°C to 175°C, R_{GE} = 1MΩ	1700	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	36	A
I_{C110}	T_C = 110°C	20	A
I_{F110}	T_C = 110°C	20	A
I_{CM}	T_C = 25°C, 1ms	260	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 150°C, R_G = 2.7Ω	I_{CM} = 120	A
	Clamped Inductive Load	1360	V
P_C	T_C = 25°C	230	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	°C
F_C	Mounting Force	20..120 / 4.5..27	Nm/lb.in.
V_{ISOL}	50/60Hz, 1 Minute	2500	V~
Weight		8	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250μA, V_{GE} = 0V	1700			V
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = 0.8 • V_{CES}, V_{GE} = 0V			25	μA
	Note 3, T_J = 125°C			4	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 30A, V_{GE} = 15V, Note 1		3.5	4.0	V
	T_J = 150°C		4.6		V

ISOPLUS i4-Pak™



1 = Gate
2 = Emitter
5 = Collector

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 2500V~ Electrical Isolation
- High Blocking Voltage
- High Peak Current Capability
- Low Saturation Voltage

Advantages

- Low Gate Drive Requirement
- High Power Density

Applications

- Switch-Mode and Resonant-Mode Power Supplies
- Uninterruptible Power Supplies (UPS)
- Laser Generators
- Capacitor Discharge Circuits
- AC Switches

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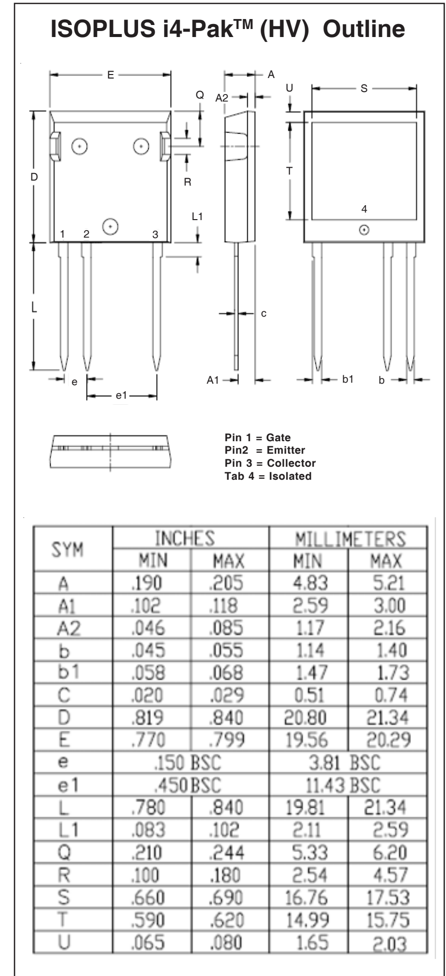
Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.
g_{fs}	I_C = 30A, V_{CE} = 10V, Note 1	17	28	S
R_{Gi}	Gate Input Resistance		2.8	Ω
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		3100	pF
C_{oes}			210	pF
C_{res}			55	pF
$Q_{g(on)}$	I_C = 30A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		150	nC
Q_{ge}			15	nC
Q_{gc}			65	nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		16	ns
t_{ri}	I_C = 30A, V_{GE} = 15V		33	ns
E_{on}	V_{CE} = 0.5 • V_{CES}, R_G = 2.7Ω		3.6	mJ
$t_{d(off)}$	Note 3		143	ns
t_{fi}			95	ns
E_{off}			1.8	mJ
$t_{d(on)}$	**Inductive load, T_J = 150°C**		16	ns
t_{ri}	I_C = 30A, V_{GE} = 15V		33	ns
E_{on}	V_{CE} = 0.5 • V_{CES}, R_G = 2.7Ω		5.5	mJ
$t_{d(off)}$	Note 3		193	ns
t_{fi}			134	ns
E_{off}			3.5	mJ
R_{thJC}				0.65 °C/W
R_{thCS}			0.15	°C/W



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.190	.205	4.83	5.21
A1	.102	.118	2.59	3.00
A2	.046	.085	1.17	2.16
b	.045	.055	1.14	1.40
b1	.058	.068	1.47	1.73
C	.020	.029	0.51	0.74
D	.819	.840	20.80	21.34
E	.770	.799	19.56	20.29
e	.150 BSC		3.81 BSC	
e1	.450BSC		11.43 BSC	
L	.780	.840	19.81	21.34
L1	.083	.102	2.11	2.59
Q	.210	.244	5.33	6.20
R	.100	.180	2.54	4.57
S	.660	.690	16.76	17.53
T	.590	.620	14.99	15.75
U	.065	.080	1.65	2.03

Reverse Diode (FRED)

(T_J = 25°C, Unless Otherwise Specified)

Symbol	Test Conditions	Characteristic Value Min.	Typ.	Max.
V_F	I_F = 30A,V_{GE} = 0V, Note 1			3.5 V
	T_J = 150°C		3.7	V
I_{RM}	I_F = 30A,V_{GE} = 0V, -di_F/dt = 500A/µs,		32	A
t_{rr}	V_R = 1200V, T_J = 150°C		175	ns
R_{thJC}				0.86°C/W

Notes:

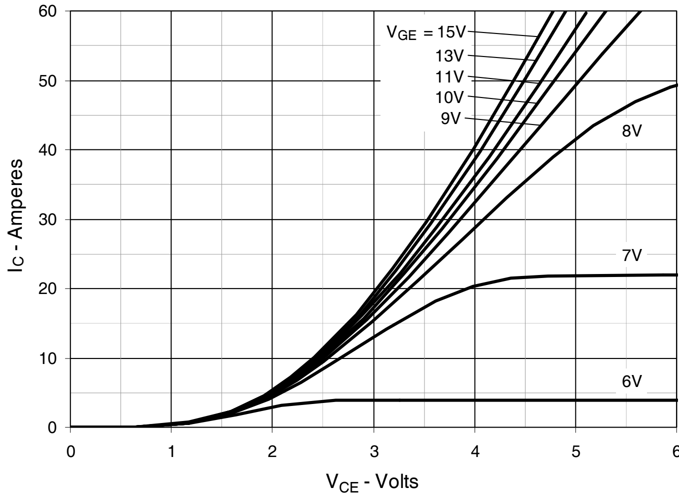
1. Pulse test, t ≤ 300µs, duty cycle, d ≤ 2%.
2. Part must be heatsunk for high-temp Ices measurement.
3. Switching times & energy losses may increase for higher V_{CE}(Clamp), T_J or R_G.

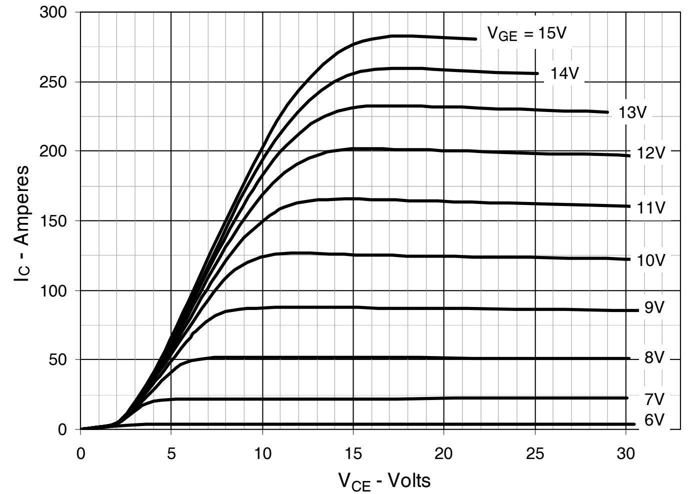
ADVANCE TECHNICAL INFORMATION

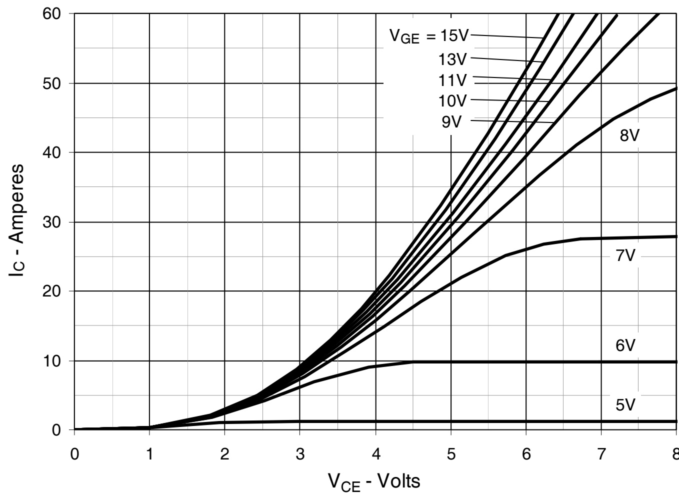
The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

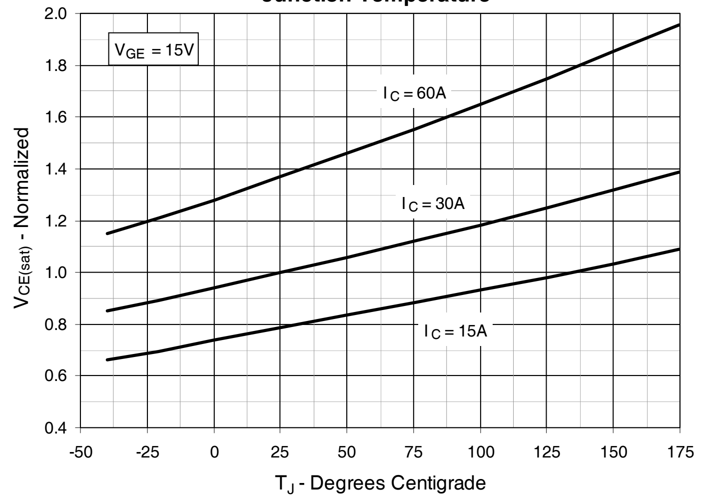
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

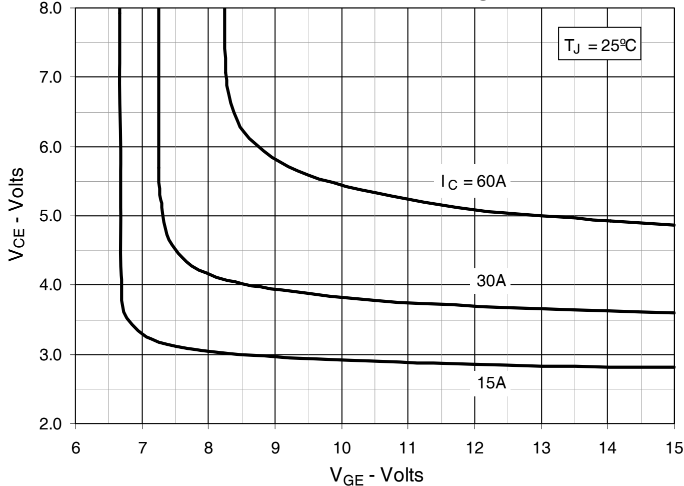
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585 7,005,734 B2 7,157,338B2 4,860,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692 7,063,975 B2 4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 B1 6,583,505 6,710,463 6,771,478 B2 7,071,537

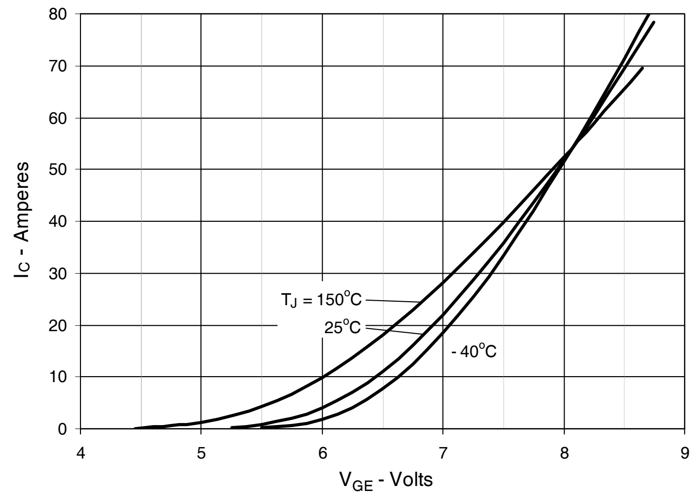












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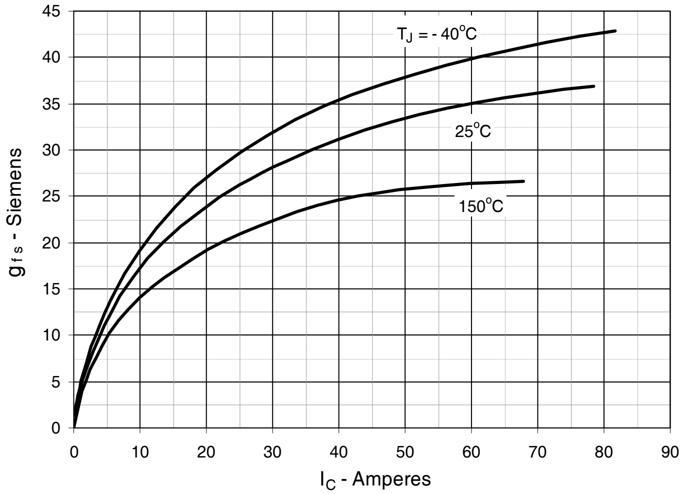


Fig. 7. Transconductance
T_J = - 40°C
25°C
150°C
g_{fs} - Siemens
I_C - Amperes

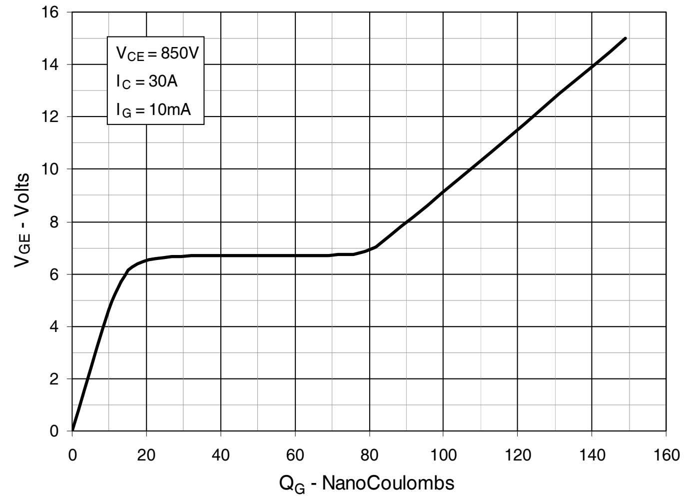


Fig. 8. Gate Charge
V_{CE} = 850V
I_C = 30A
I_G = 10mA
V_{GE} - Volts
Q_G - NanoCoulombs

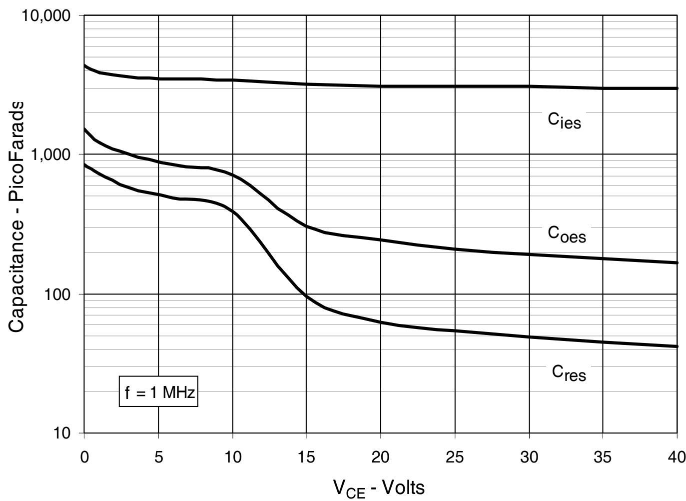


Fig. 9. Capacitance
C_{ies}
C_{oes}
C_{res}
f = 1 MHz
Capacitance - PicoFarads
V_{CE} - Volts

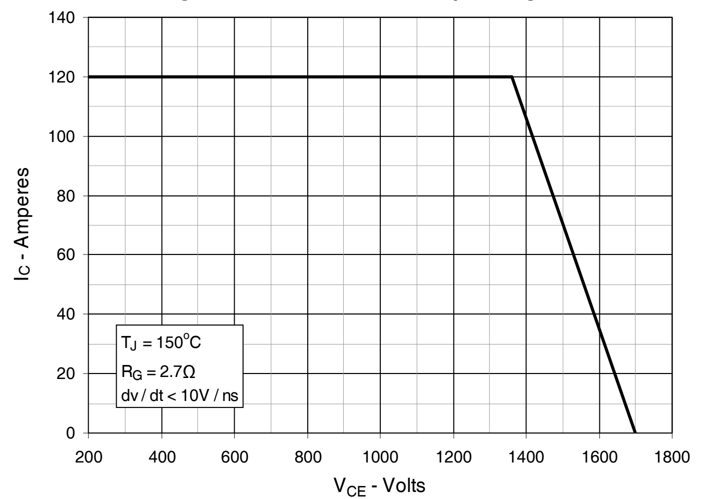


Fig. 10. Reverse-Bias Safe Operating Area
T_J = 150°C
R_G = 2.7Ω
dv / dt < 10V / ns
I_C - Amperes
V_{CE} - Volts

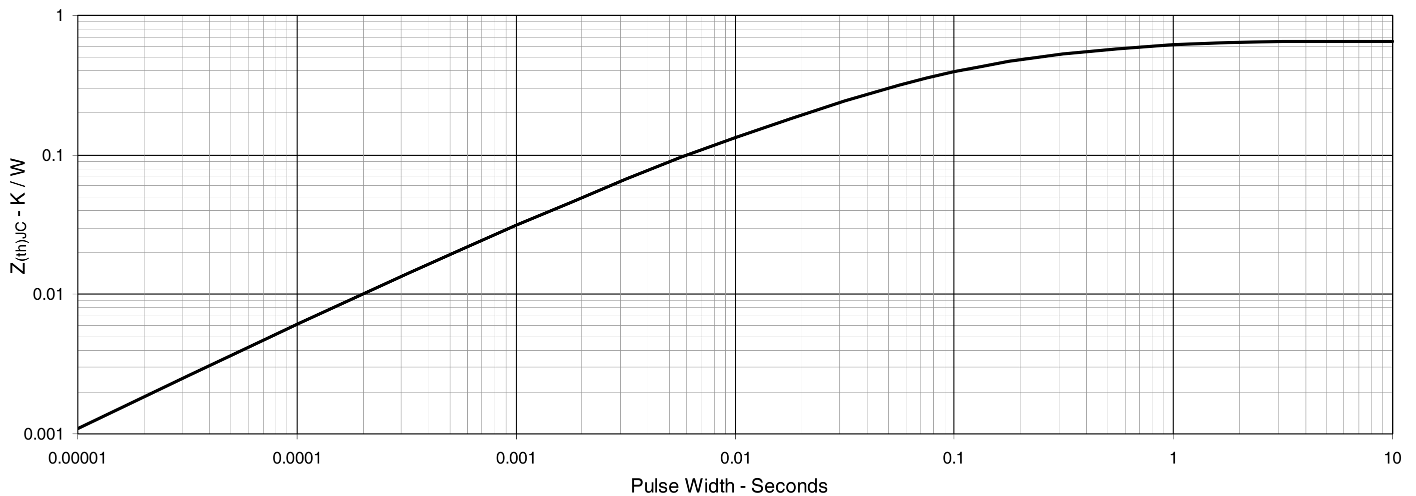
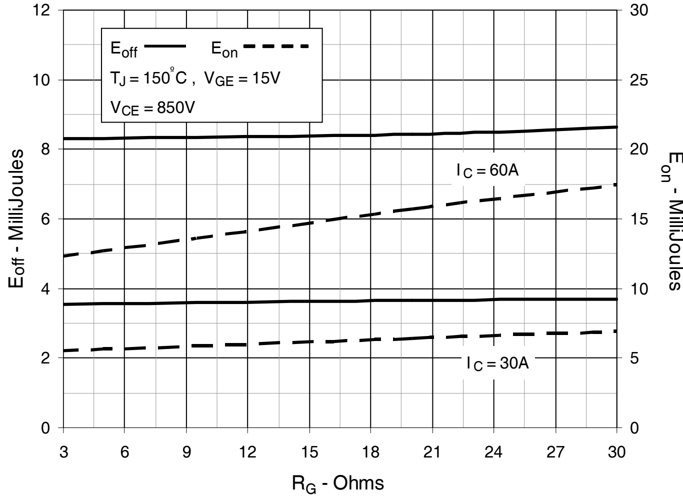
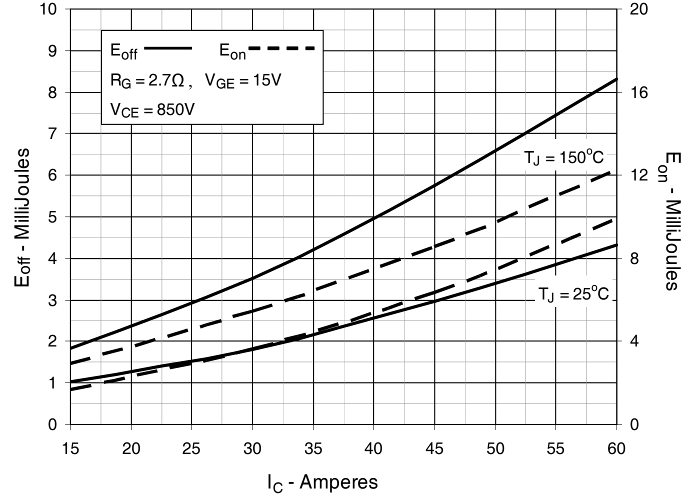
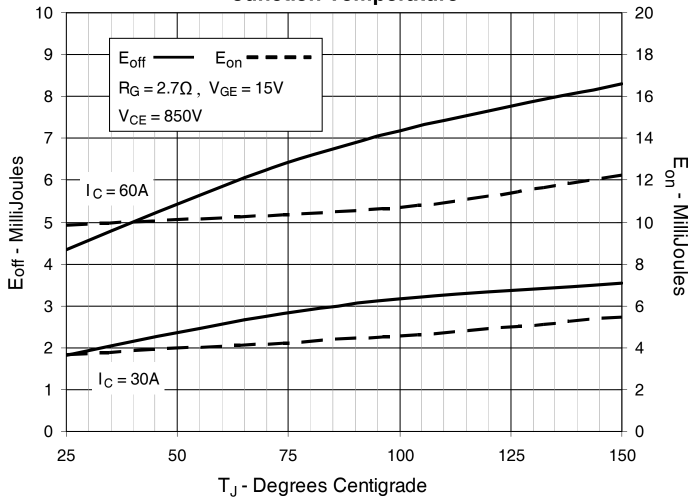
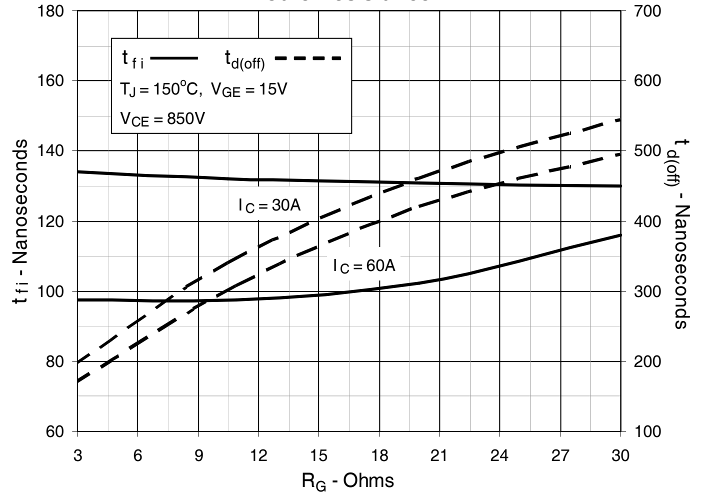


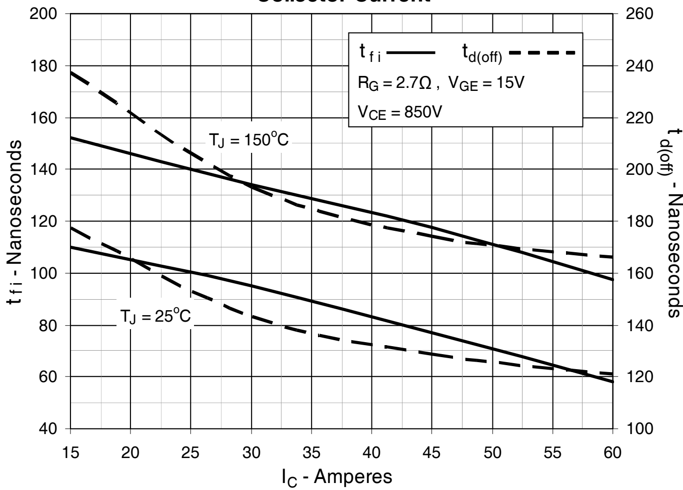
Fig. 11. Maximum Transient Thermal Impedance (IGBT)
$Z_{(th)JC}$ - K / W
Pulse Width - Seconds

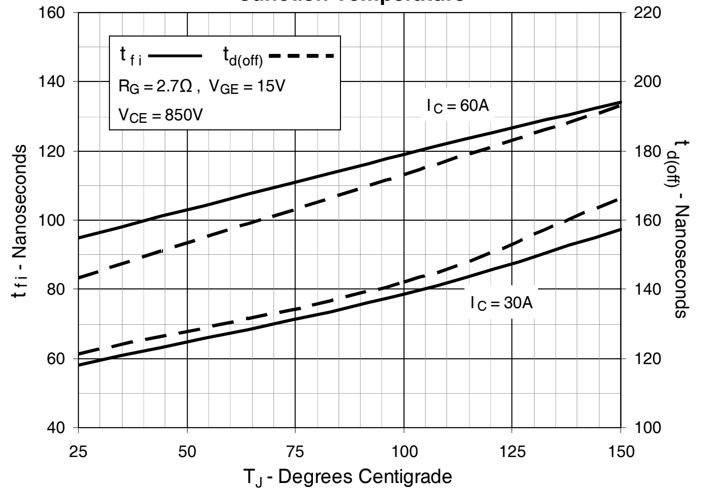












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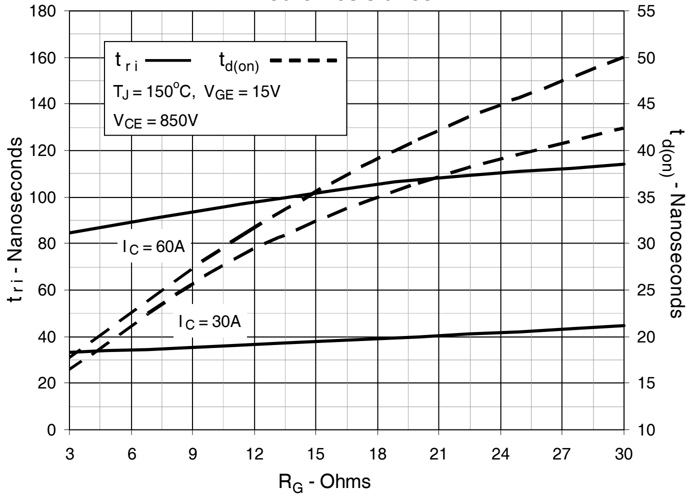
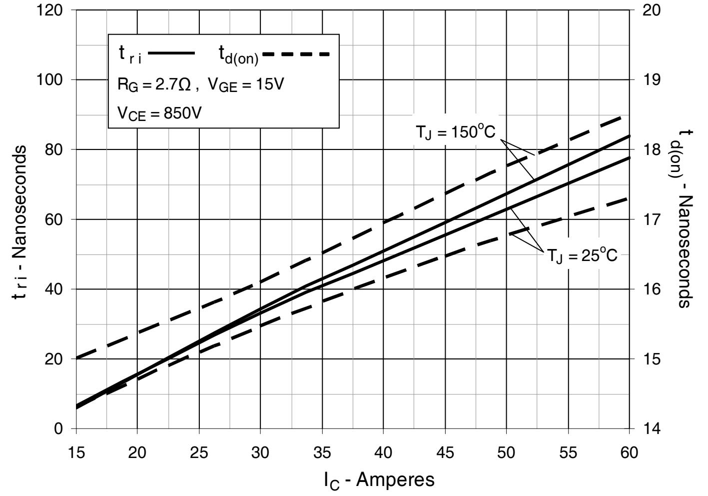
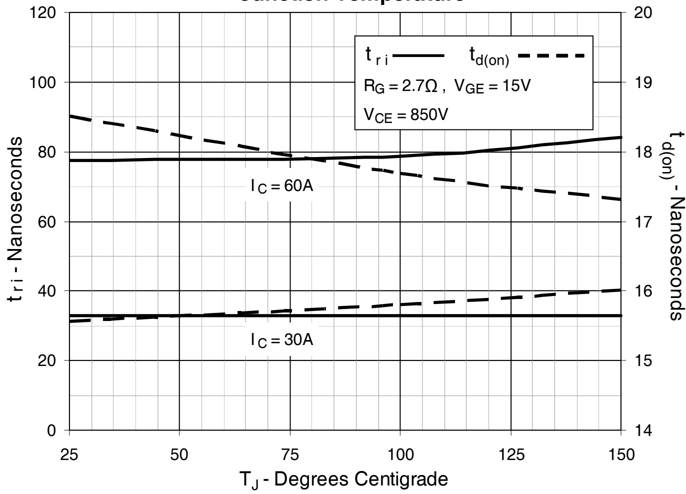






IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

Fig. 21. Diode Forward Characteristics

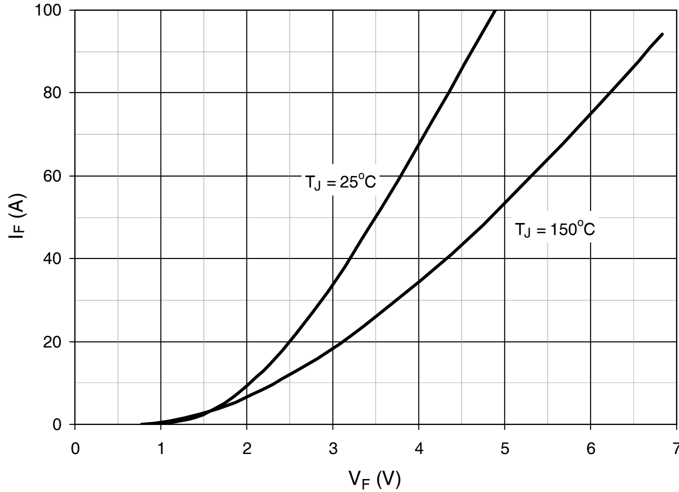


Fig. 22. Reverse Recovery Charge vs. $-di_F/dt$

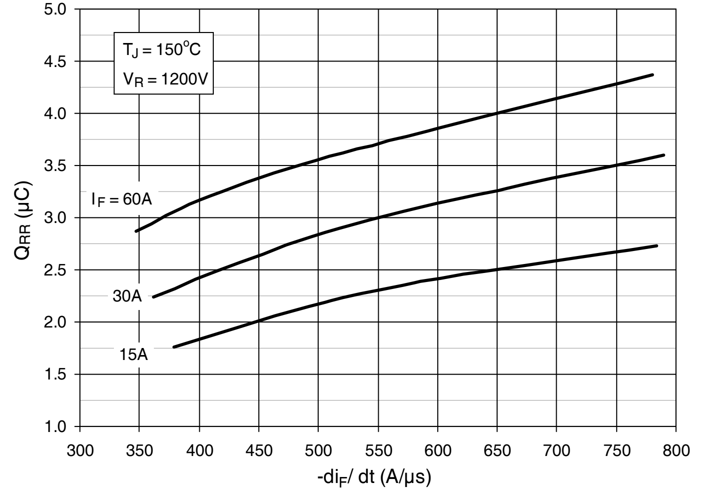


Fig. 23. Reverse Recovery Current vs. $-di_F/dt$

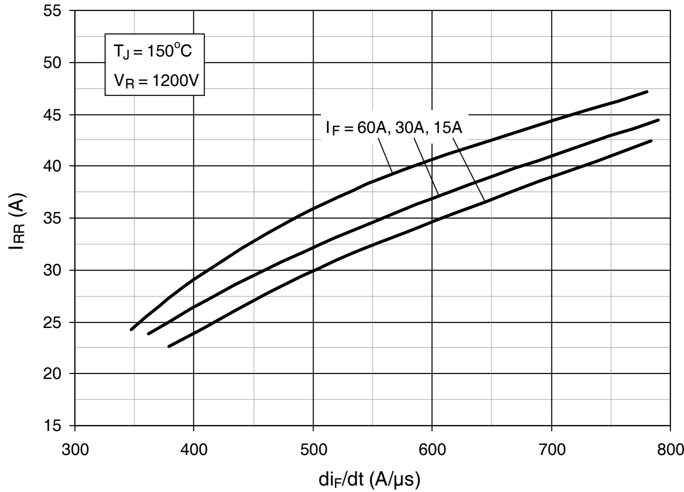


Fig. 24. Reverse Recovery Time vs. $-di_F/dt$

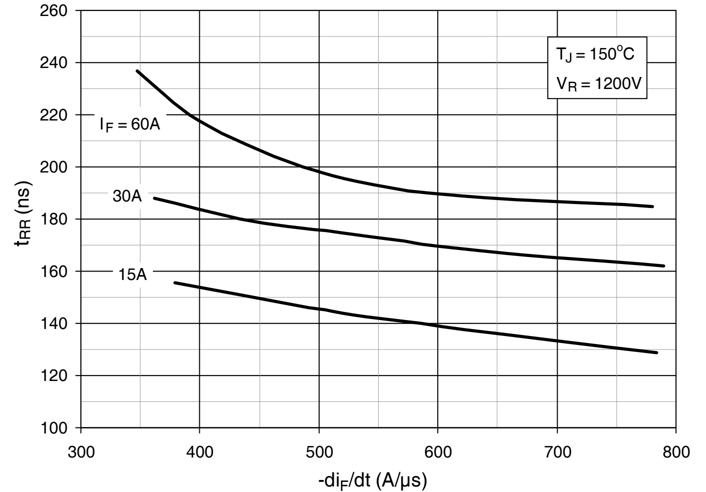


Fig. 25. Dynamic Parameters Q_{RR}, I_{RR} vs. Junction Temperature

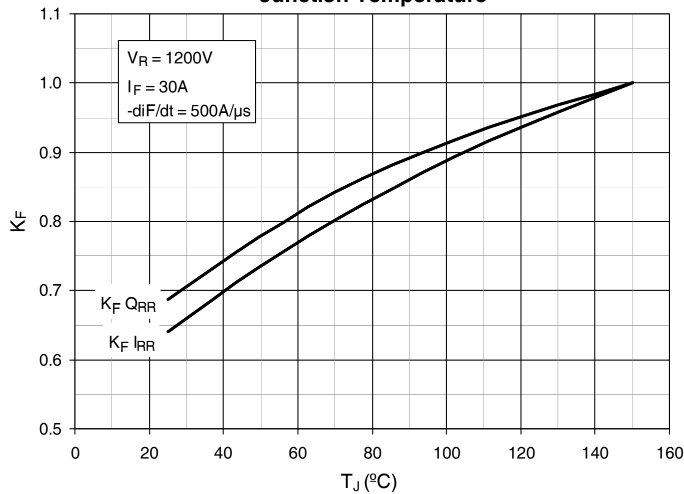
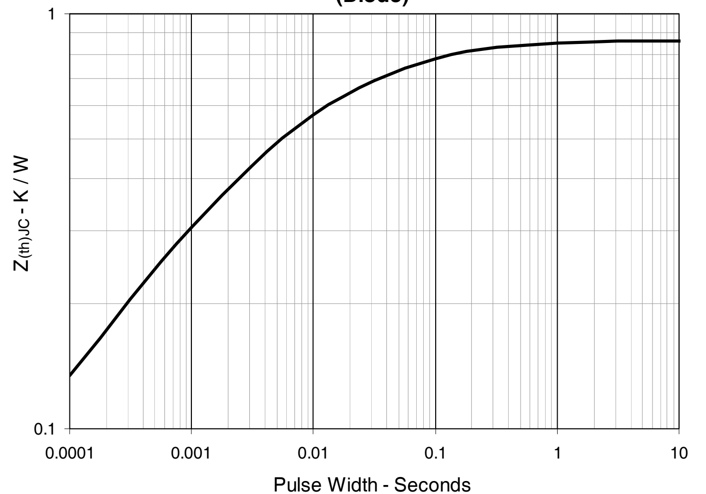


Fig. 26. Maximum Transient Thermal Impedance (Diode)



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