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IXYS CORP

E153432

1590 BUCKEYE DR
MILPITAS, CA 95035-7418 USA

Power Switching Semi-Conductors, Model(s) CS followed by additional letters and/or numbers, followed by M.

Power Switching Semi-Conductors, Model(s) D followed by additional letters and/or numbers, followed by M.

Power Switching Semi-Conductors, Model(s) D, C, M or I followed by additional letters and/or numbers, followed by PN or PM.

Power Switching Semi-Conductors, Model(s) DS followed by additional letters and/or numbers, followed by M.

Power Switching Semi-Conductors, Model(s) IX followed by additional letters and/or numbers, followed by M.

Power Switching Semi-Conductors, Model(s) IX followed by an upper case letter, followed by N, followed by any number 01 through 99999, followed by additional numbers and letters.

Semi-conductor diodes, thyristors, IGBT or MOSFETS, ISO247 package, Model(s) IX J Series IX, followed by one letter B, C, D, E, F, G, H, K, L, S, T, U, X, or Y, followed by J, may be followed by 01-09, 1R1-1R9, 1-9, 10-99, or 100-999 may be followed by N or P, may be followed by 01-10, 1-99 or 100-800, may be followed by up to six alpha-numeric characters.

Semi-conductor diodes, thyristors, IGBT or MOSFETS, ISOPLUS I4-PAC package, Model(s) IX F Series IX, followed by one letter B, C, D, E, F, G, H, K, L, S, T, U, X, or Y, followed by L, may be followed by 01-09, 1R1-1R9, 1-9, 10-99, or 100-999 may be followed by N or P, may be followed by 01-10, 1-99 or 100-800, may be followed by up to six alpha-numeric characters.

Semi-conductor diodes, thyristors, IGBT or MOSFETS, ISOPLUS SMPD package, Model(s) IXM2001 IX, followed by one letter B, C, D, E, F, G, H, K, L, S, T, U, X, or Y, followed by L, may be followed by 01-09, 1R1-1R9, 1-9, 10-99, or 100-999 may be followed by N or P, may be followed by 01-10, 1-99 or 100-800, may be followed by up to six alpha-numeric characters.

Semi-conductor diodes, thyristors, IGBT or MOSFETS, ISOPLUS SMPD package, Model(s) MDIX4X30N65B3 IX, followed by one letter B, C, D, E, F, G, H, K, L, S, T, U, X, or Y, followed by L, may be followed by 01-09, 1R1-1R9, 1-9, 10-99, or 100-999 may be followed by N or P, may be followed by 01-10, 1-99 or 100-800, may be followed by up to six alpha-numeric characters.

Semi-conductor diodes, thyristors, IGBT or MOSFETS, ISOPLUS SMPD package, Model(s) MMIX IX, followed by one letter B, C, D, E, F, G, H, K, L, S, T, U, X, or Y, followed by L, may be followed by 01-09, 1R1-1R9, 1-9, 10-99, or 100-999 may be followed by N or P, may be followed by 01-10, 1-99 or 100-800, may be followed by up to six alpha-numeric characters.

Semi-conductor diodes, thyristors, IGBT or MOSFETS, ISOPLUS SMPD package, Model(s) MMIX1992 IX, followed by one letter B, C, D, E, F, G, H, K, L, S, T, U, X, or Y, followed by L, may be followed by 01-09, 1R1-1R9, 1-9, 10-99, or 100-999 may be followed by N or P, may be followed by 01-10, 1-99 or 100-800, may be followed by up to six alpha-numeric characters.

Semi-conductor diodes, thyristors, IGBT or MOSFETS, ISOPLUS220 package, Model(s) IX followed by one letter B, C, D, E, F, G, H, K, L, S, T, U, X, or Y, followed by C, may be followed by 01-09, 1R1-1R9, 1-9, 10-99, or 100-999 may be followed by N or P, may be followed by 01-10, 1-99 or 100-800, may be followed by up to six alpha-numeric characters.

Semi-conductor diodes, thyristors, IGBT or MOSFETS, ISOPLUS264 package, Model(s) IX L Series IX, followed by one letter B, C, D, E, F, G, H, K, L, S, T, U, X, or Y, followed by L, may be followed by 01-09, 1R1-1R9, 1-9, 10-99, or 100-999 may be followed by N or P, may be followed by 01-10, 1-99 or 100-800, may be followed by up to six alpha-numeric characters.

Semi-conductor diodes, thyristors, IGBT or MOSFETS, SSMPD package, Model(s) MMJX MMJX, followed by 1, 2, 3, followed by B, C, D, E, F, G, H, K, L, S, T, U, X, or Y, followed by number 1-999, followed by N or P, followed by number 1-800, may be followed by up to 6 alpha-numeric characters.

Semi-conductor diodes, thyristors, or MOSFETS, 247 hole-less package, Model(s) DSE (a), IXBR (a), IXGR (a), IXLR (a), IXSR (a), IXTR (a)

Semi-conductor diodes, thyristors, or MOSFETS, ISOPLUS247 package, Model(s) IX followed by one letter B, C, D, E, F, G, H, K, L, S, T, U, X, or Y, followed by R, may be followed by 01-09, 1R1-1R9, 1-9, 10-99, or 100-999 may be followed by N or P, may be followed by 01-10, 1-99 or 100-800, may be followed by up to six alpha-numeric characters.

(a) - Followed by up to 10 numbers and letters.

Marking: Company name and model designation.

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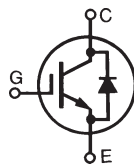
**High Voltage XPT™
IGBT w/ Diode**
IXYF30N170CV1

$$V_{CES} = 1700V$$

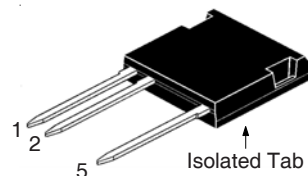
$$I_{C110} = 20A$$

$$V_{CE(sat)} \leq 4.0V$$

$$t_{fi(typ)} = 95ns$$


(Electrically Isolated Tab)

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

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

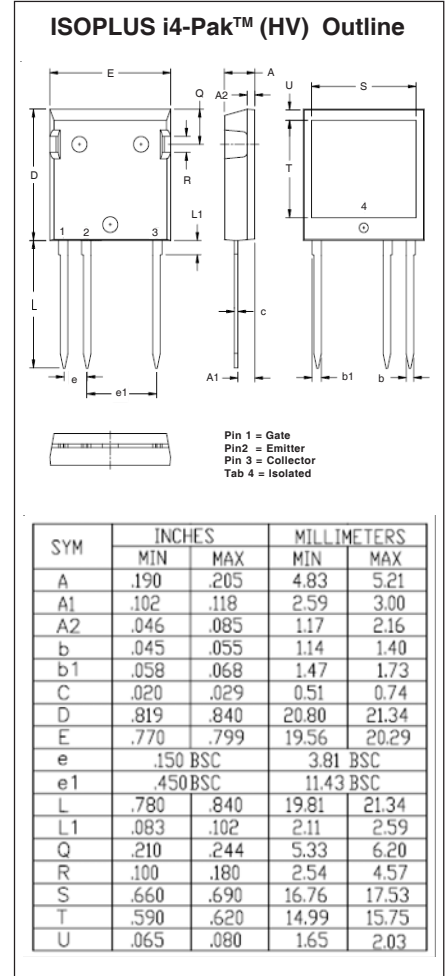
- Low Gate Drive Requirement
- High Power Density

Applications

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

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

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



Reverse Diode (FRED)

Symbol Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)		Characteristic Value		
		Min.	Typ.	Max.
V_F	$I_F = 30\text{A}, V_{GE} = 0\text{V}$, Note 1			3.5 V
I_{RM}	$I_F = 30\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 500\text{A}/\mu\text{s}$ $V_R = 1200\text{V}, T_J = 150^\circ\text{C}$	$T_J = 150^\circ\text{C}$	3.7	V
t_{rr}			32	A
R_{thJC}				0.86 $^\circ\text{C/W}$

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 .

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	

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

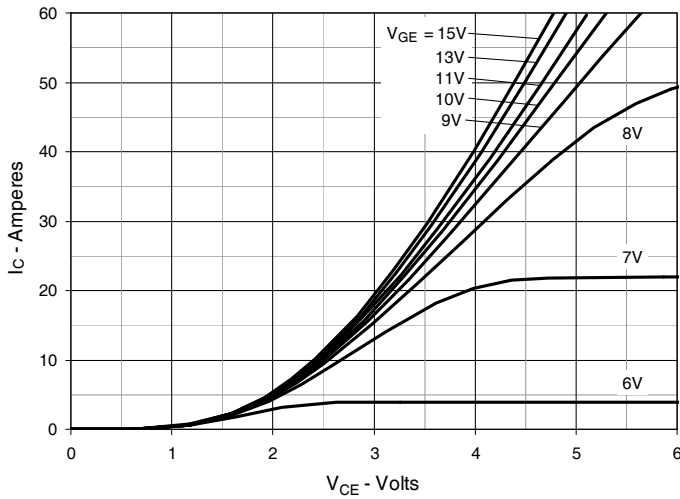


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

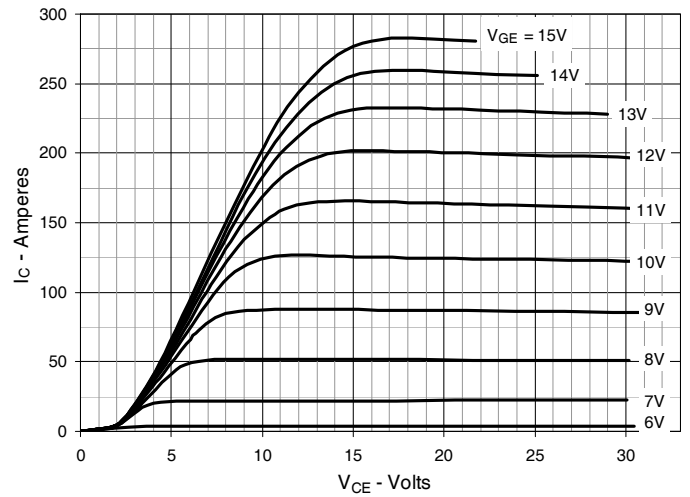


Fig. 3. Output Characteristics @ $T_J = 150^\circ\text{C}$

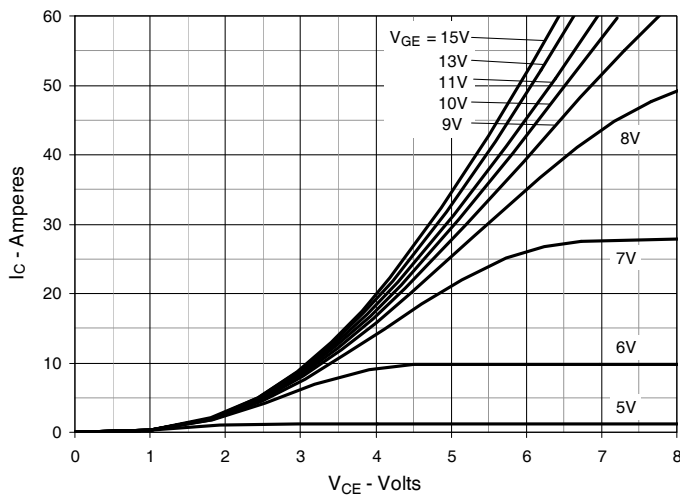


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

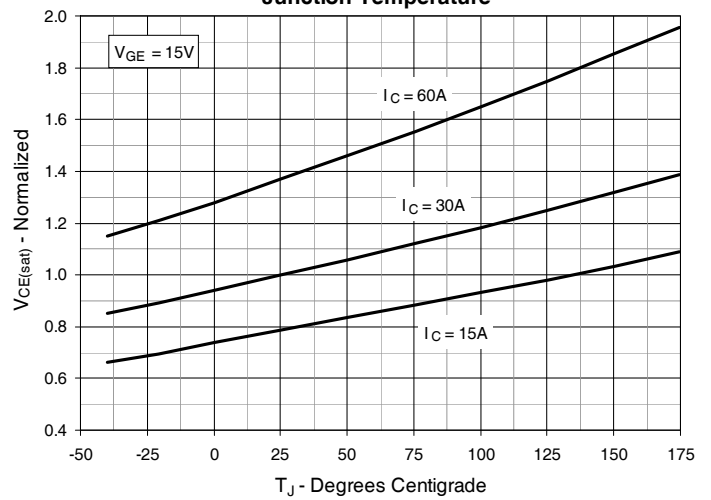


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

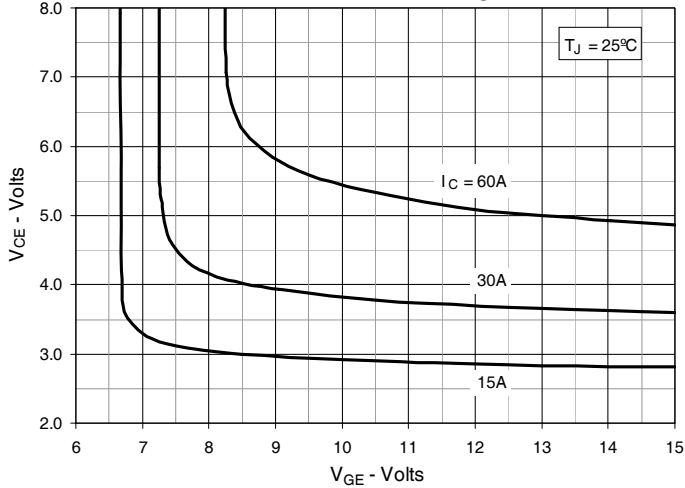


Fig. 6. Input Admittance

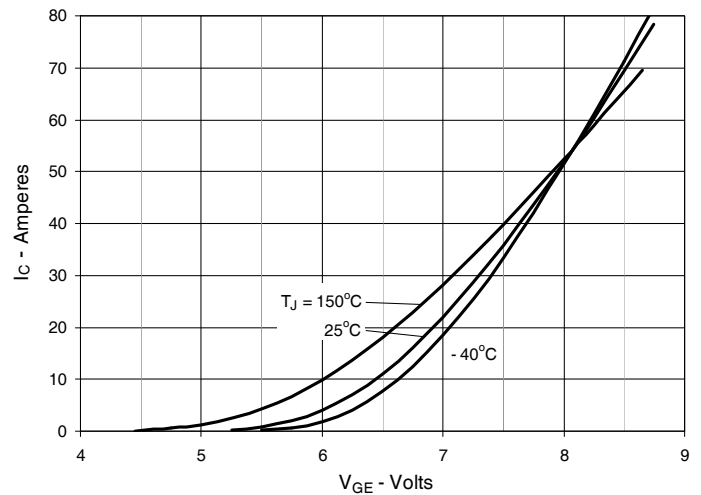


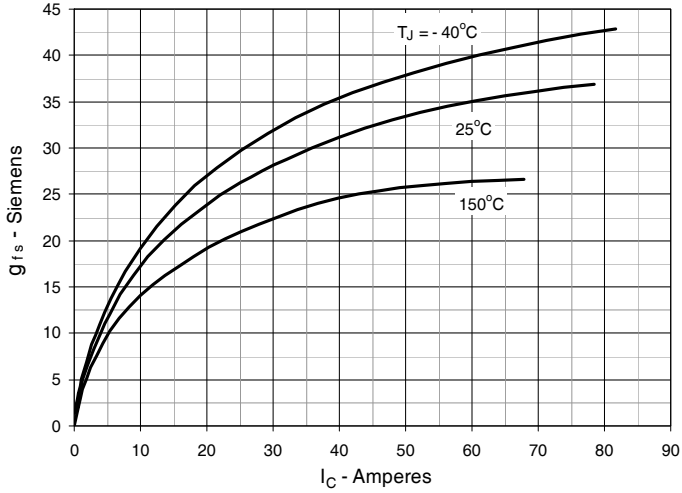
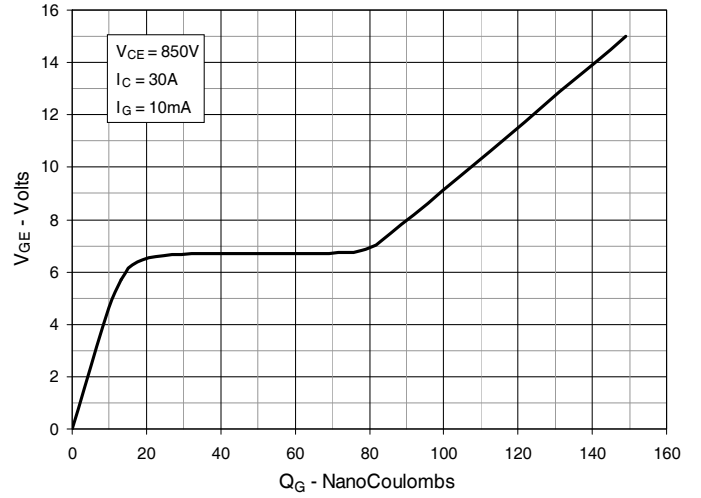
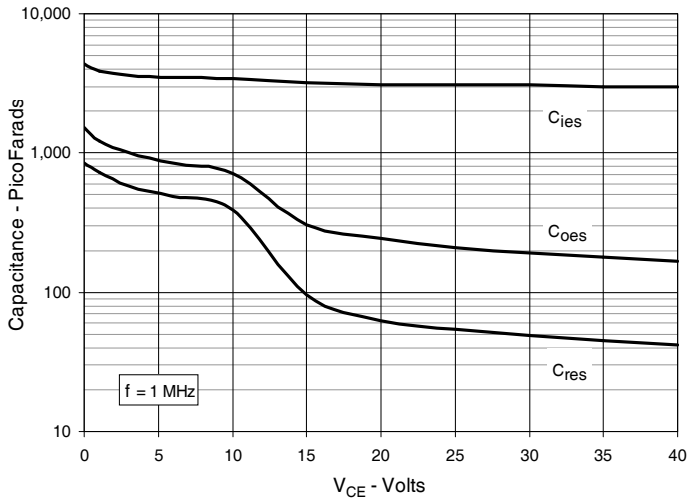
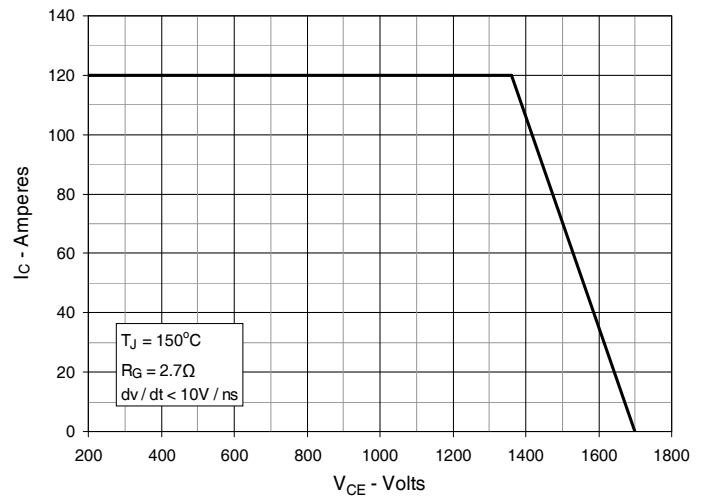
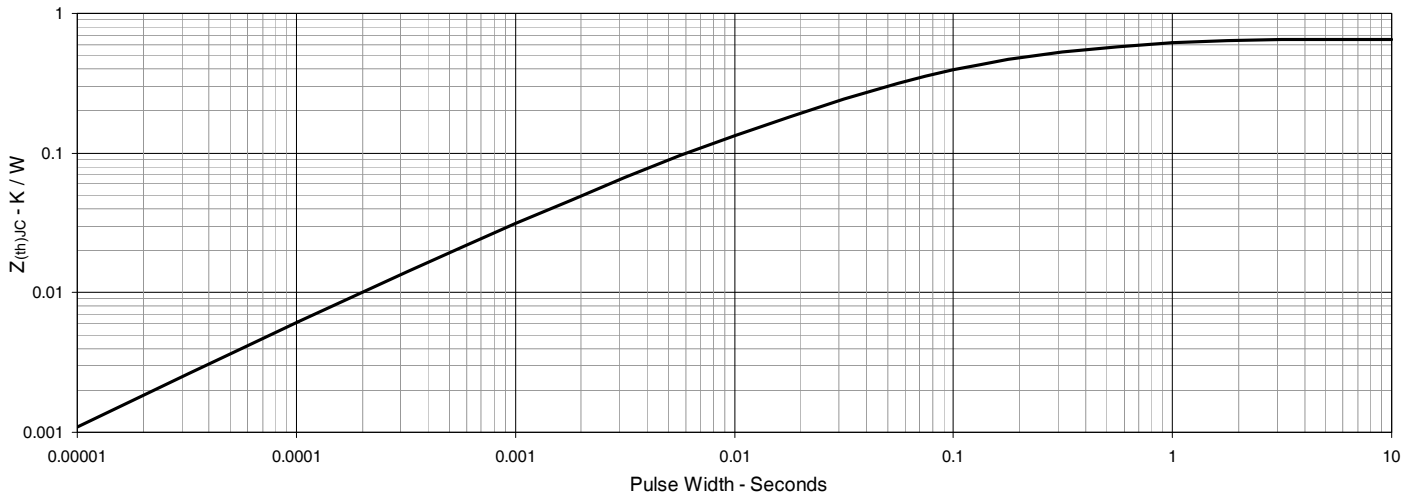
Fig. 7. Transconductance

Fig. 8. Gate Charge

Fig. 9. Capacitance

Fig. 10. Reverse-Bias Safe Operating Area

Fig. 11. Maximum Transient Thermal Impedance (IGBT)


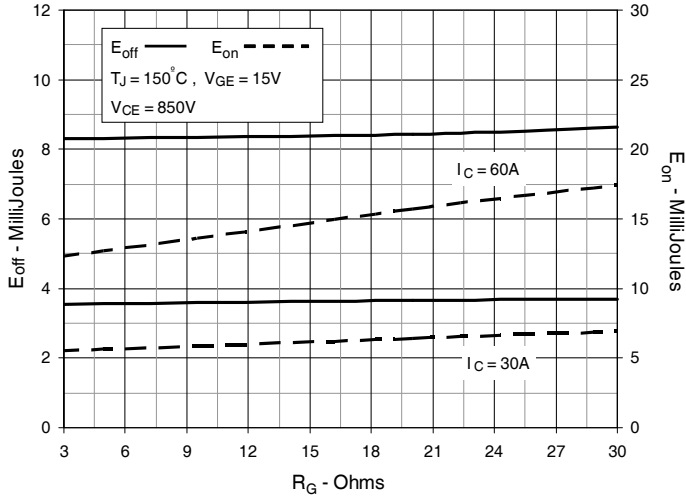
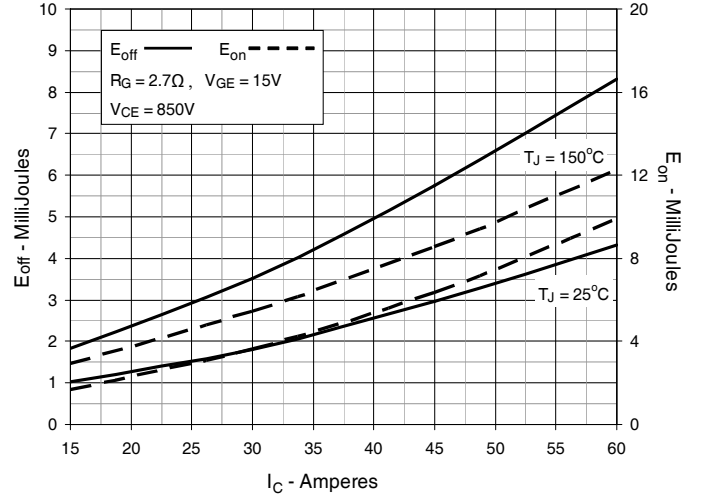
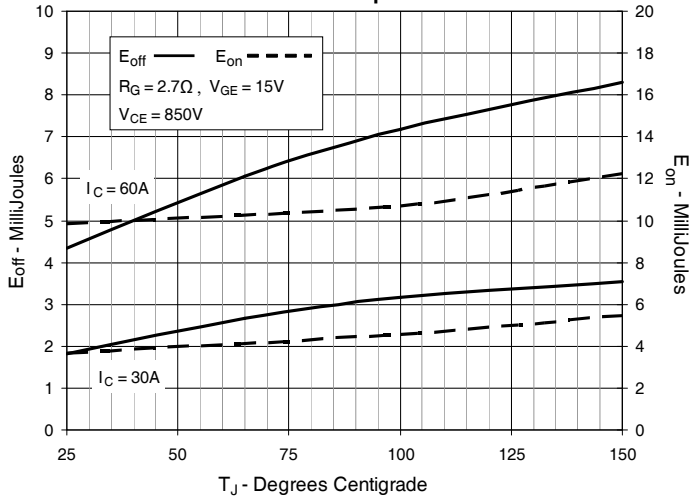
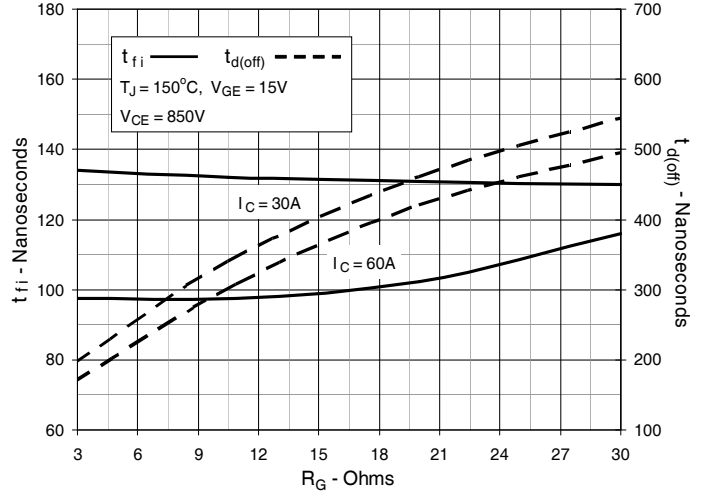
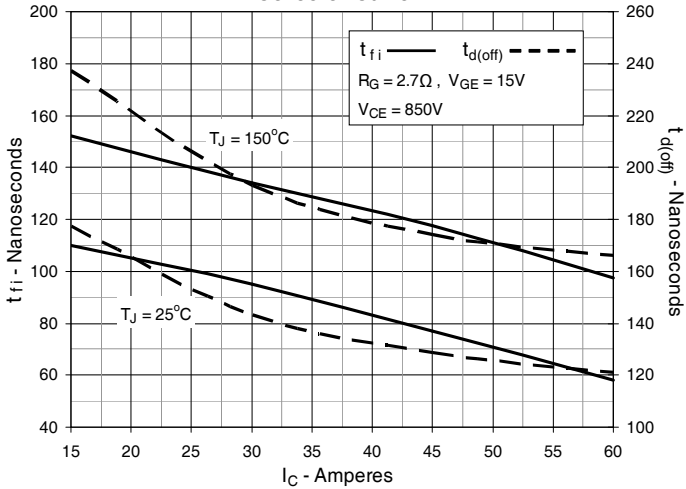
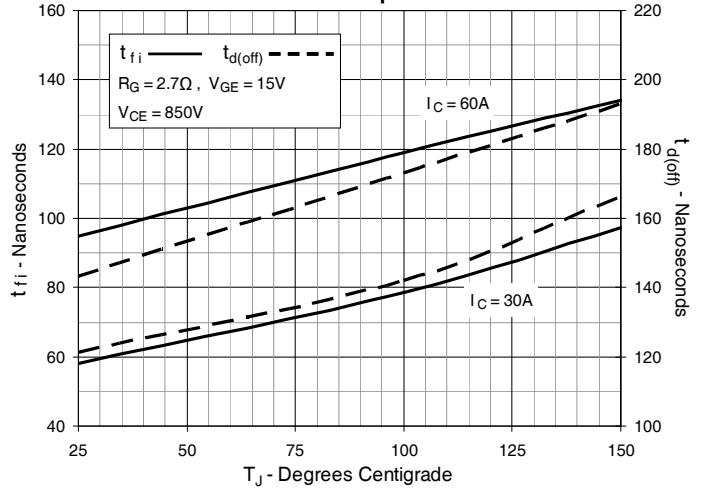
Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

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

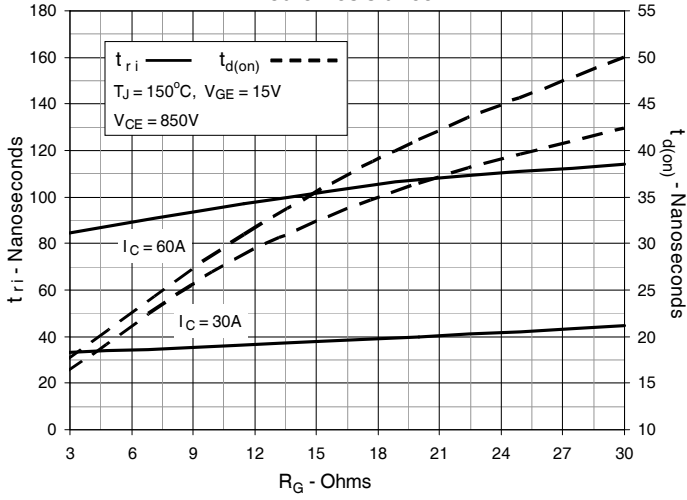


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

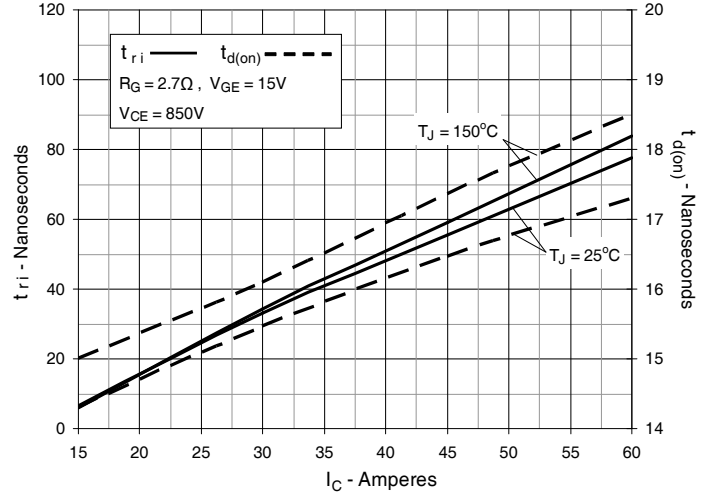


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature

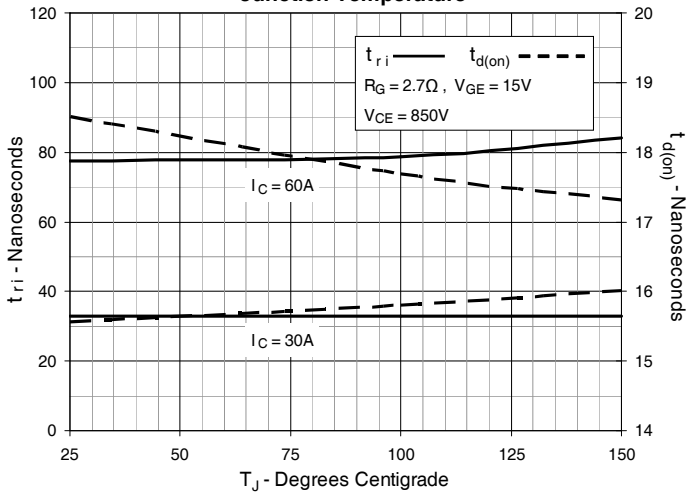
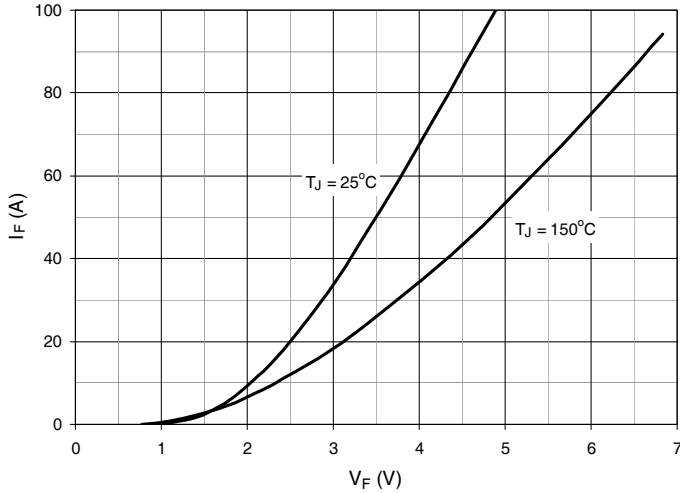
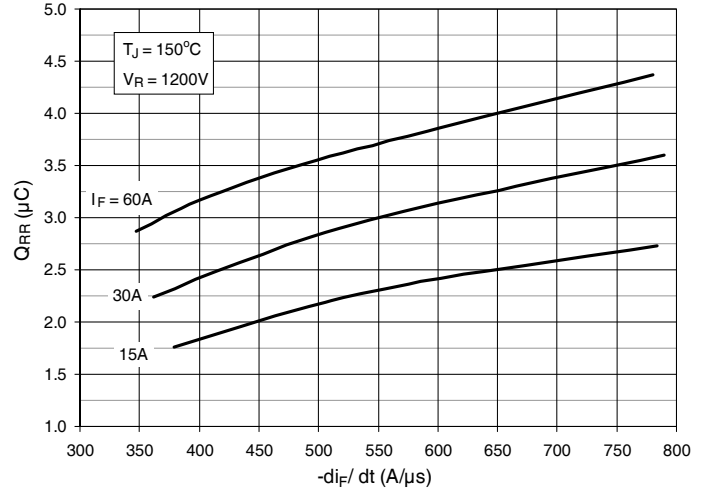
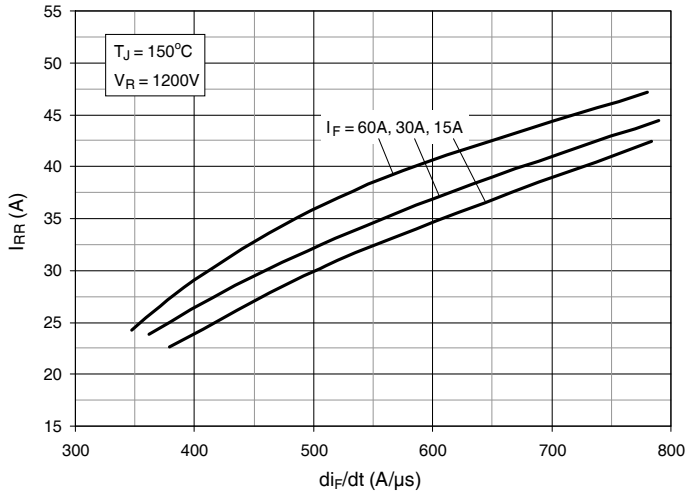
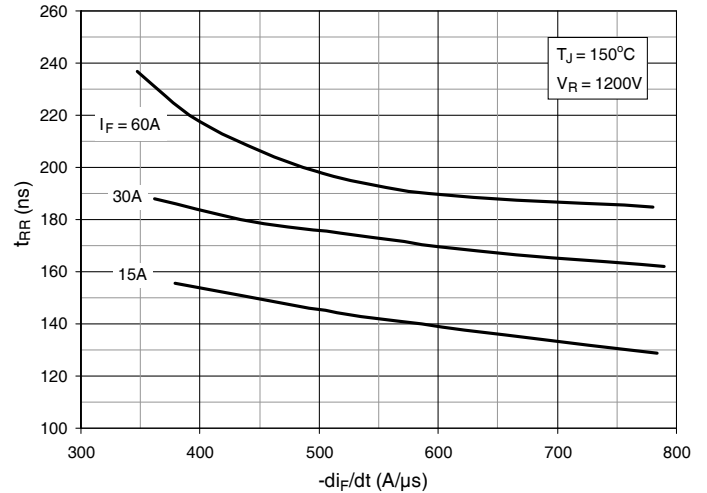
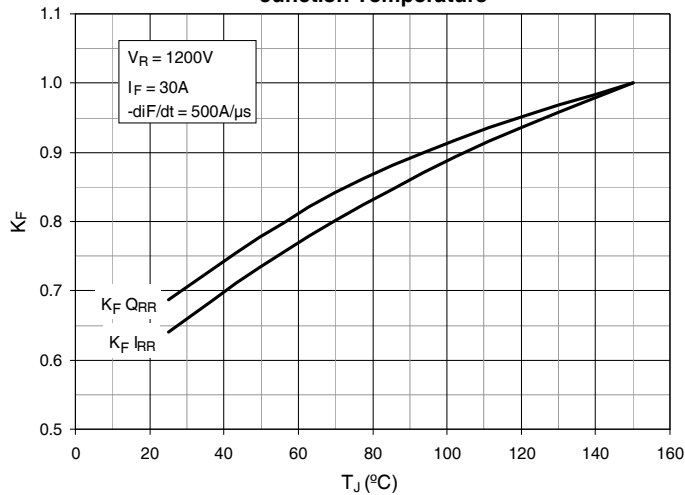
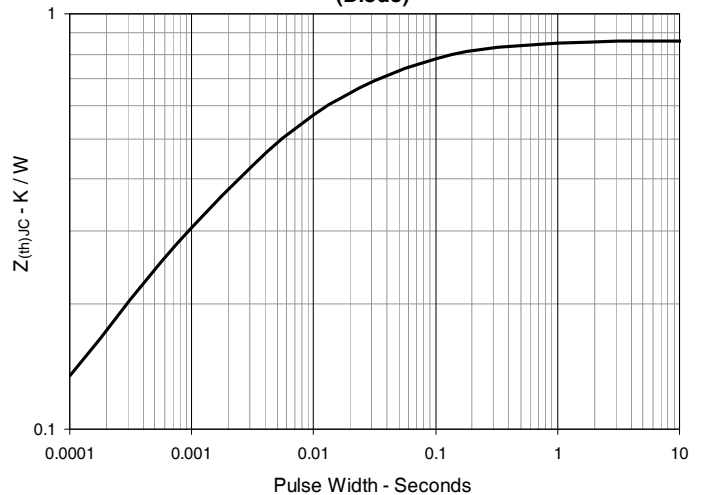


Fig. 21. Diode Forward Characteristics

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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