

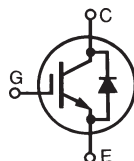
**XPT™ 650V IGBT
GenX3™ w/ Diode**
IXYH75N65C3D1

$$V_{CES} = 650V$$

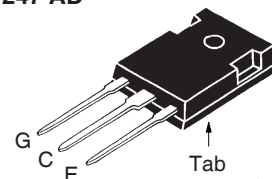
$$I_{C110} = 75A$$

$$V_{CE(sat)} \leq 2.3V$$

$$t_{fi(typ)} = 60ns$$

 Extreme Light Punch through
IGBT for 20-60kHz Switching


Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ C$ to $175^\circ C$	650	V
V_{CGR}	$T_J = 25^\circ C$ to $175^\circ C$, $R_{GE} = 1M\Omega$	650	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ C$ (Chip Capability)	175	A
I_{LRMS}	Terminal Current Limit	160	A
I_{C110}	$T_C = 110^\circ C$	75	A
I_{F110}	$T_C = 110^\circ C$	66	A
I_{CM}	$T_C = 25^\circ C$, 1ms	360	A
I_A	$T_C = 25^\circ C$	30	A
E_{AS}	$T_C = 25^\circ C$	300	mJ
SSOA (RBSOA)	$V_{GE} = 15V$, $T_{VJ} = 150^\circ C$, $R_G = 3\Omega$ Clamped Inductive Load	$I_{CM} = 150$ $V_{CE} \leq V_{CES}$	A
t_{sc} (SCSOA)	$V_{GE} = 15V$, $V_{CE} = 360V$, $T_J = 150^\circ C$ $R_G = 82\Omega$, Non Repetitive	8	μs
P_C	$T_C = 25^\circ C$	750	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	$^\circ C$
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 Fast 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 ($T_J = 25^\circ C$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu A$, $V_{GE} = 0V$	650		V
$V_{GE(th)}$	$I_C = 250\mu A$, $V_{CE} = V_{GE}$	3.5		6.0 V
I_{CES}	$V_{CE} = V_{CES}$, $V_{GE} = 0V$ $T_J = 150^\circ C$			25 μA 3 mA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 100 nA
$V_{CE(sat)}$	$I_C = 60A$, $V_{GE} = 15V$, Note 1 $T_J = 150^\circ C$		1.8 2.2	V V

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$I_C = 60\text{A}, V_{CE} = 10\text{V}$, Note 1	25	44	S
C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		3410	pF
C_{oes}			330	pF
C_{res}			73	pF
$Q_{g(on)}$	$I_C = 60\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$		122	nC
Q_{ge}			22	nC
Q_{gc}			60	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 60\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 400\text{V}, R_G = 3\Omega$ Note 2		26	ns
t_{ri}			65	ns
E_{on}			2.00	mJ
$t_{d(off)}$			93	ns
t_{fi}			60	ns
E_{off}			0.95	mJ
$t_{d(on)}$	Inductive load, $T_J = 150^\circ\text{C}$ $I_C = 60\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 400\text{V}, R_G = 3\Omega$ Note 2		26	ns
t_{ri}			64	ns
E_{on}			3.40	mJ
$t_{d(off)}$			115	ns
t_{fi}			64	ns
E_{off}			1.30	mJ
R_{thJC}			0.20	$^\circ\text{C}/\text{W}$
R_{thCS}		0.21		$^\circ\text{C}/\text{W}$

Reverse Diode (FRED)

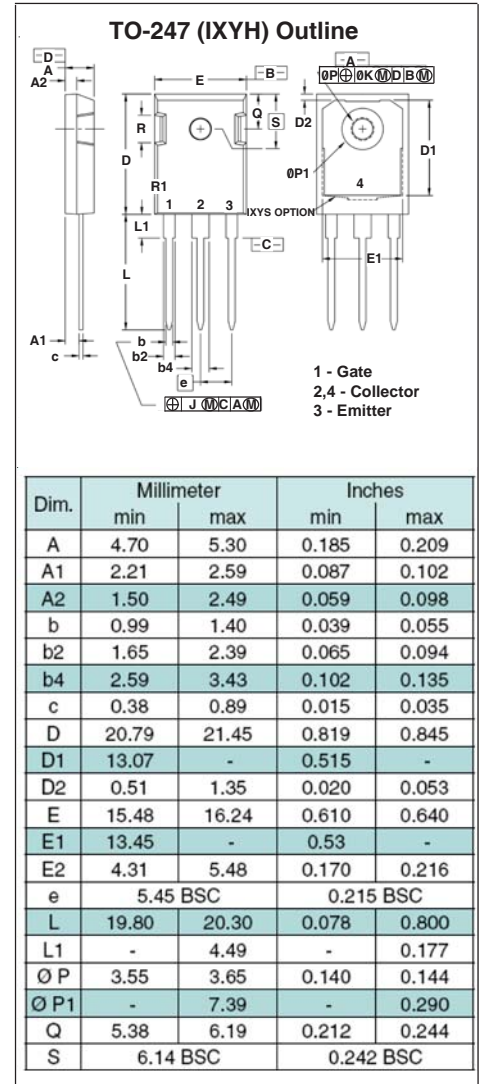
Symbol	Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
V_F	$I_F = 50\text{A}, V_{GE} = 0\text{V}$, Note 1			2.50 V
		$T_J = 150^\circ\text{C}$	1.45	V
I_{rr}	$I_F = 50\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 700\text{A}/\mu\text{s}, V_R = 400\text{V}$	$T_J = 150^\circ\text{C}$	30	A
t_{rr}		$T_J = 150^\circ\text{C}$	135	ns
R_{thJC}				0.45 $^\circ\text{C}/\text{W}$

Notes:

1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.
2. Switching times & energy losses may increase for higher $V_{CE}(\text{clamp})$, T_J or R_G .

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 @ $T_J = 25^\circ\text{C}$

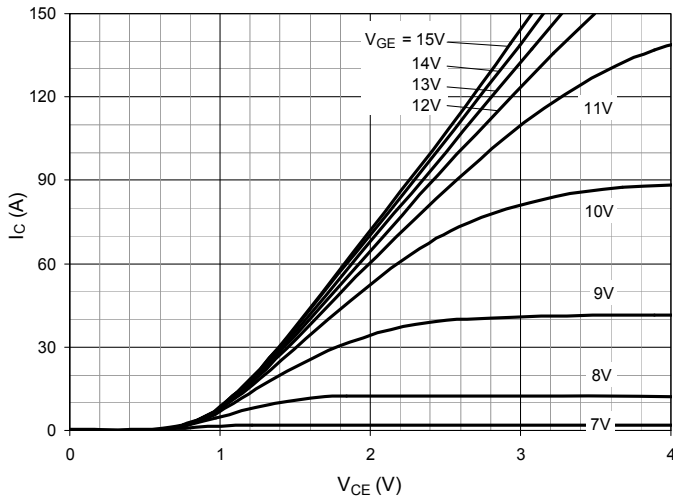


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

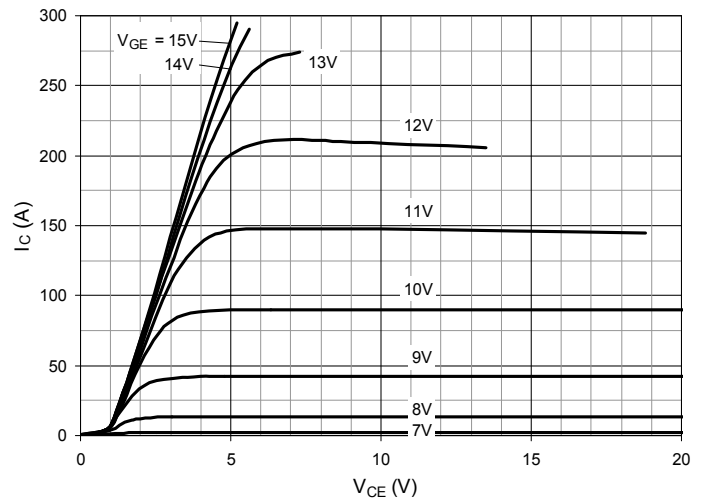


Fig. 3. Output Characteristics @ $T_J = 150^\circ\text{C}$

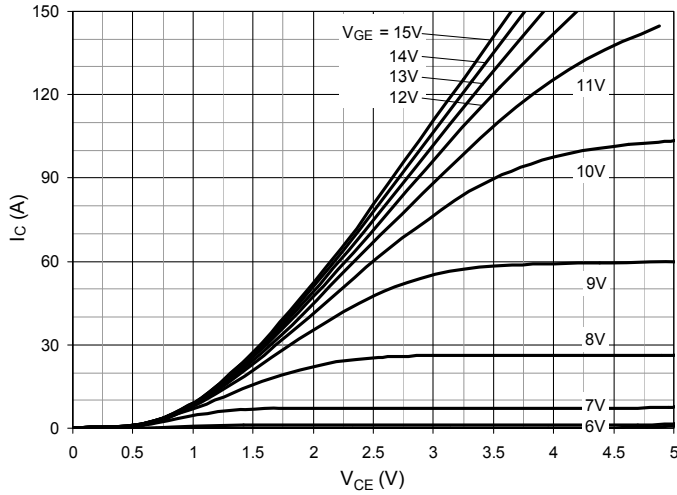


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

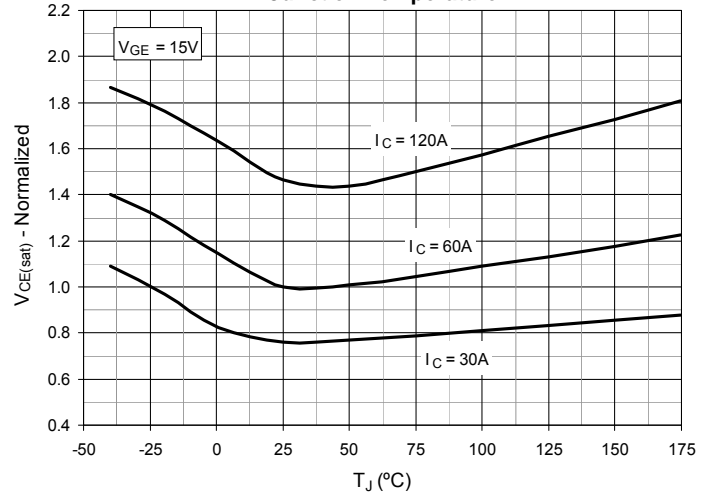


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

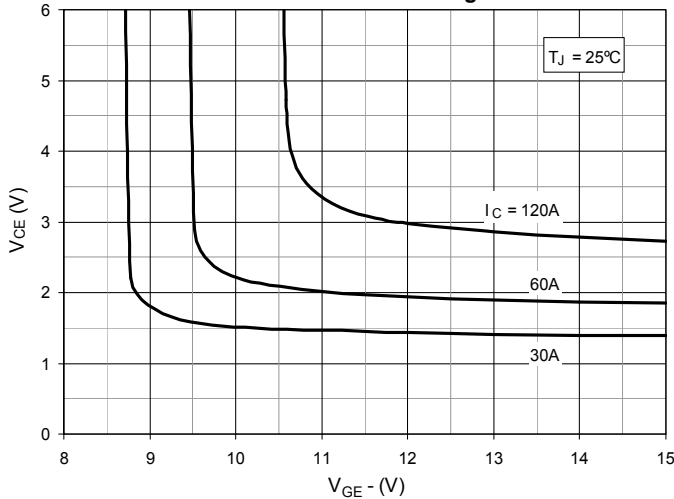


Fig. 6. Input Admittance

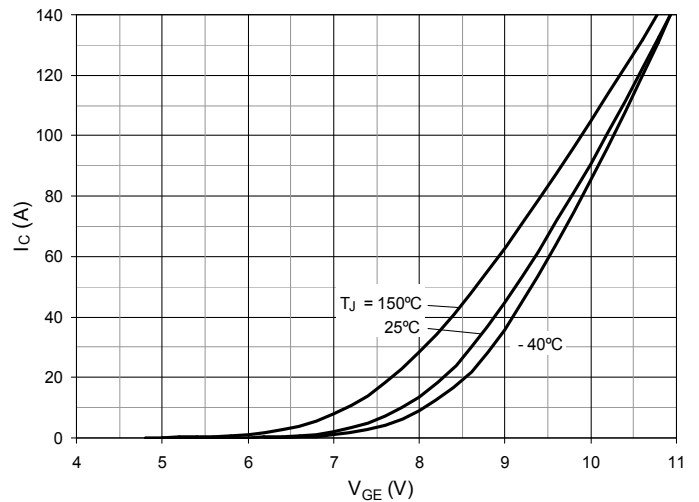


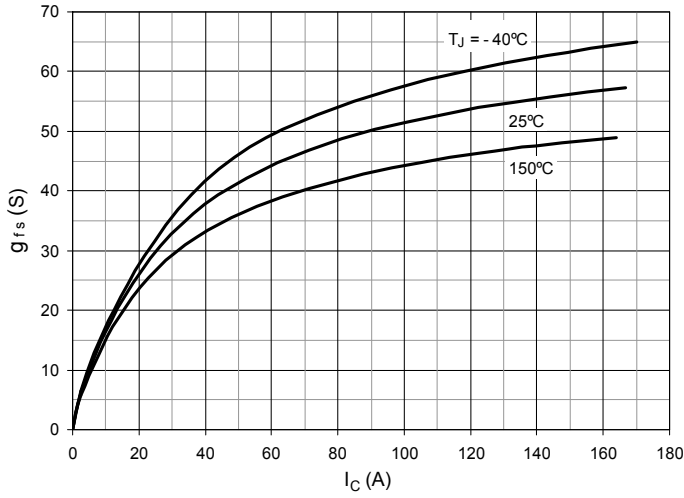
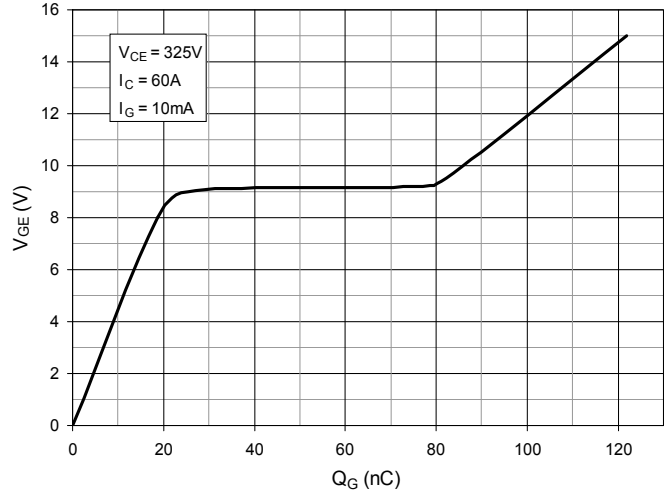
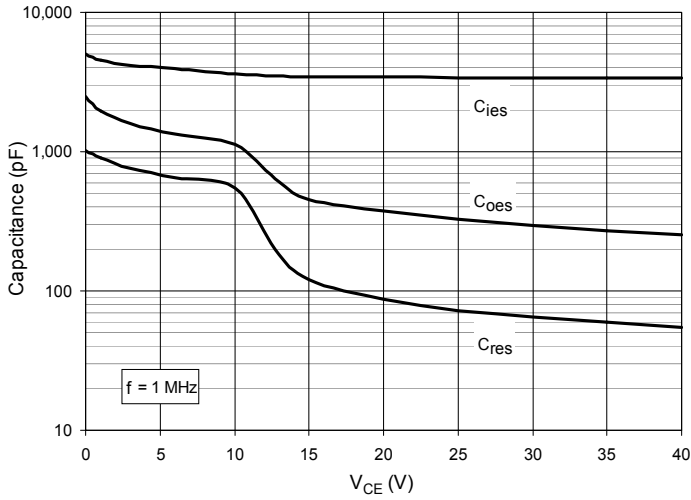
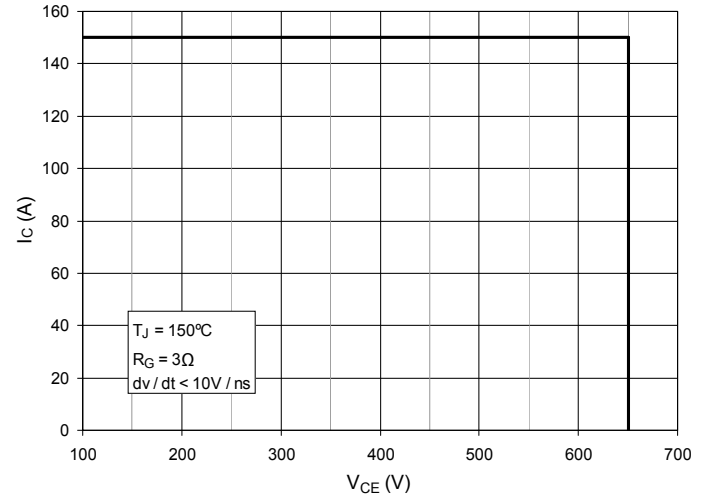
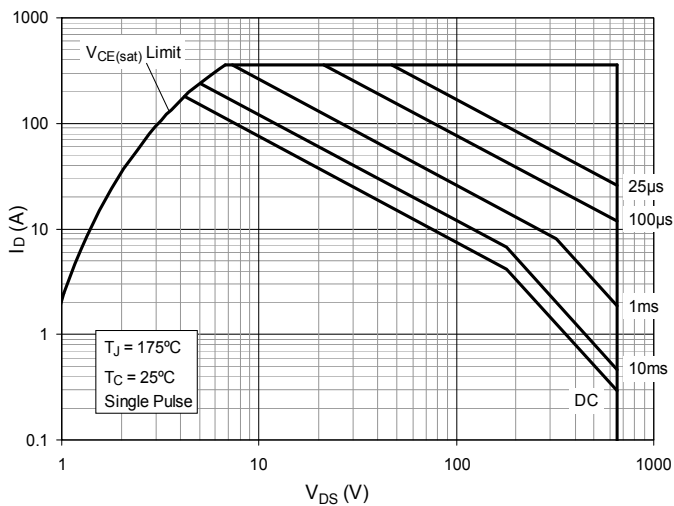
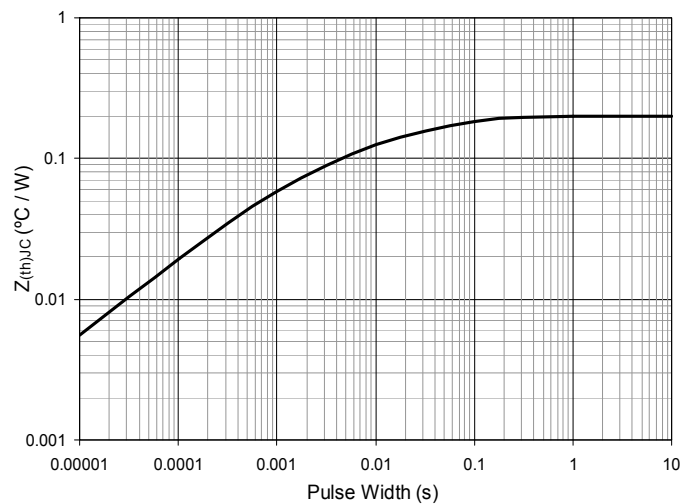
Fig. 7. Transconductance

Fig. 8. Gate Charge

Fig. 9. Capacitance

Fig. 10. Reverse-Bias Safe Operating Area

Fig. 11. Forward-Bias Safe Operating Area

Fig. 12. Maximum Transient Thermal Impedance (IGBT)


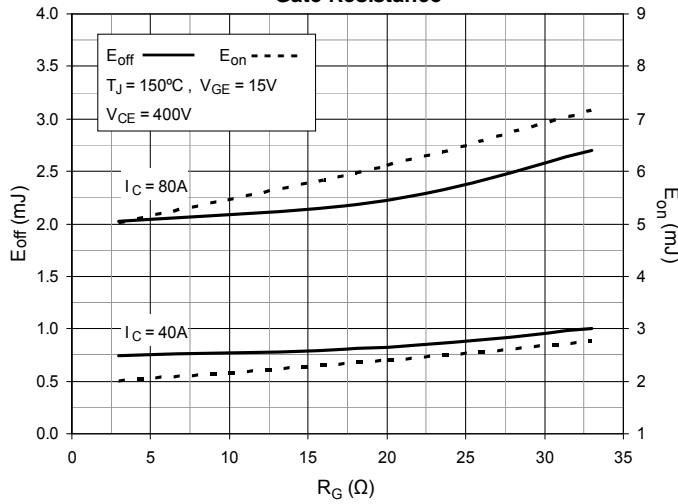
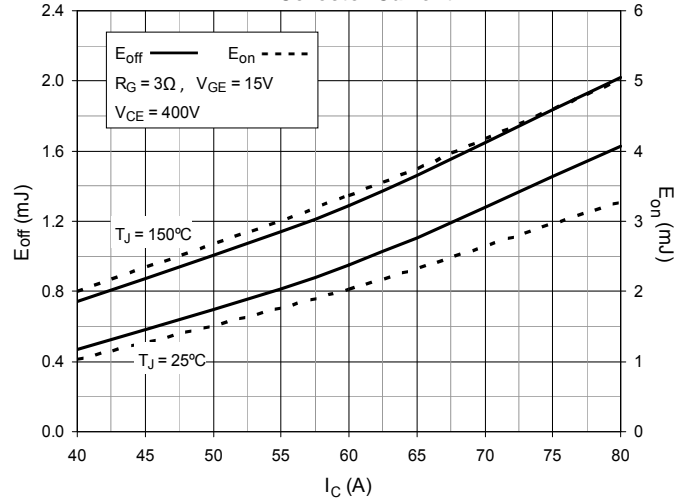
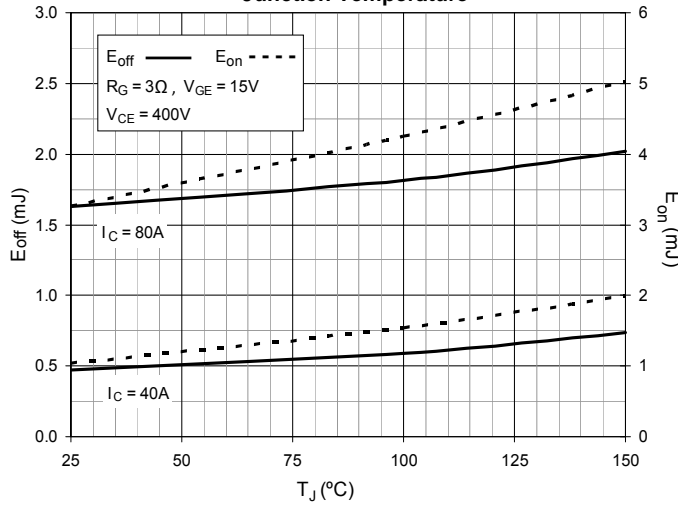
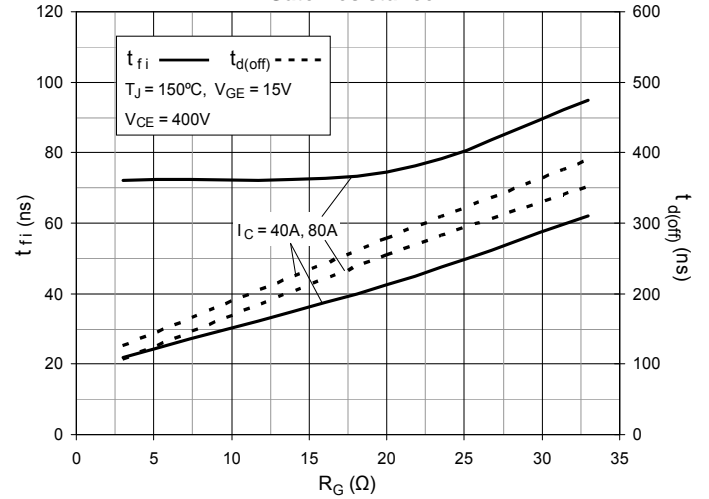
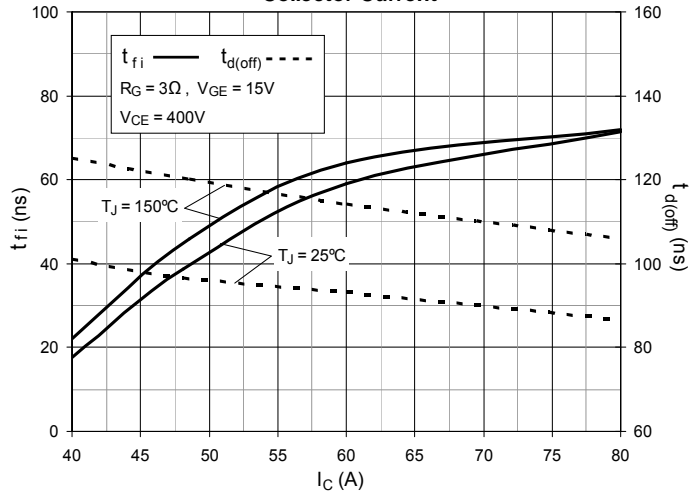
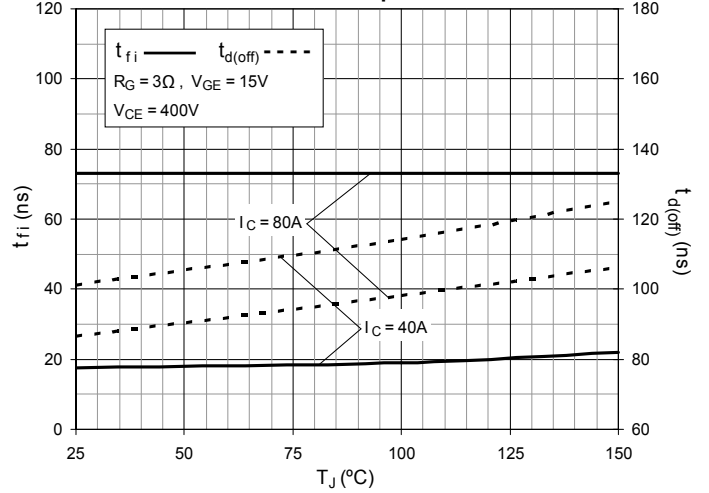
Fig. 13. Inductive Switching Energy Loss vs. Gate Resistance

Fig. 14. Inductive Switching Energy Loss vs. Collector Current

Fig. 15. Inductive Switching Energy Loss vs. Junction Temperature

Fig. 16. Inductive Turn-off Switching Times vs. Gate Resistance

Fig. 17. Inductive Turn-off Switching Times vs. Collector Current

Fig. 18. Inductive Turn-off Switching Times vs. Junction Temperature


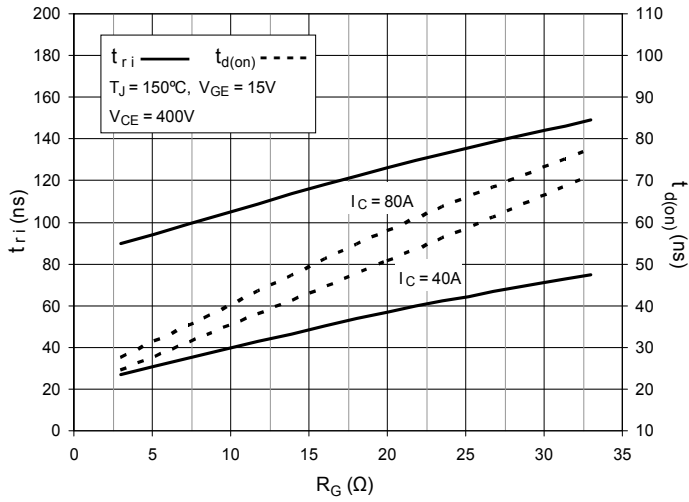
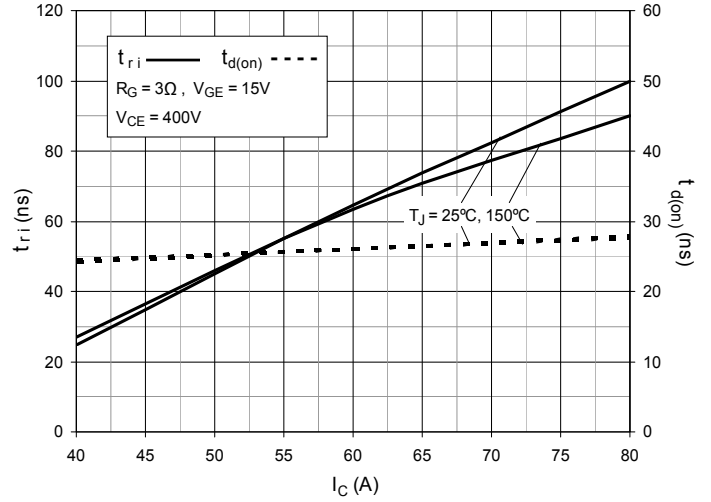
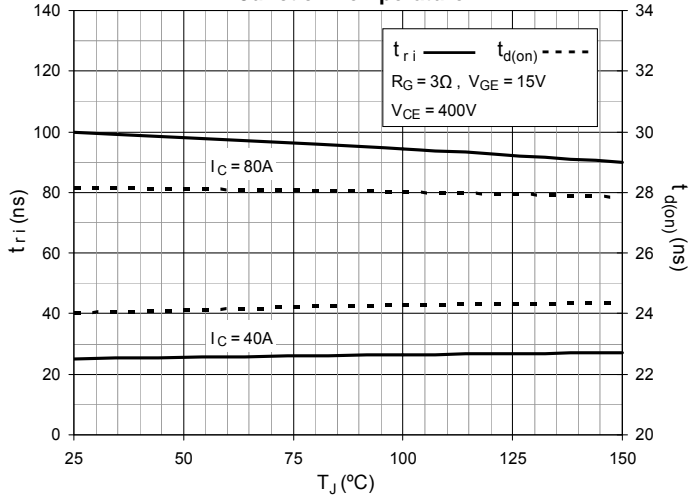
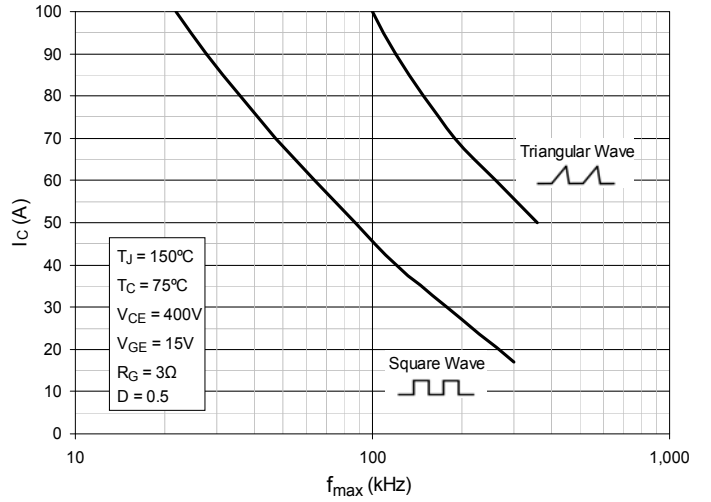
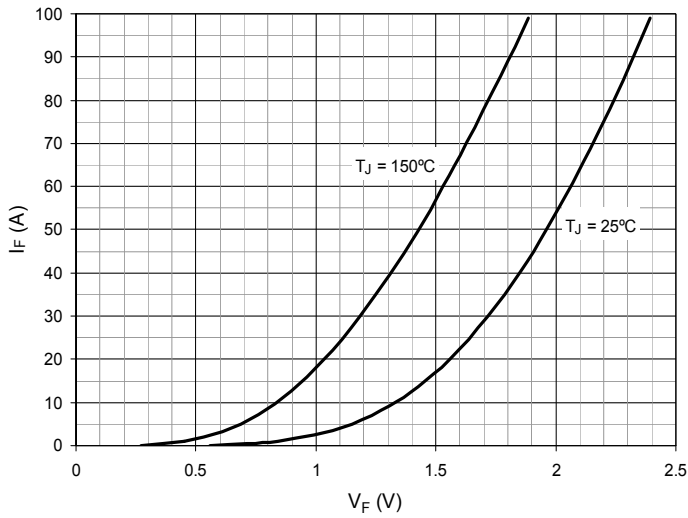
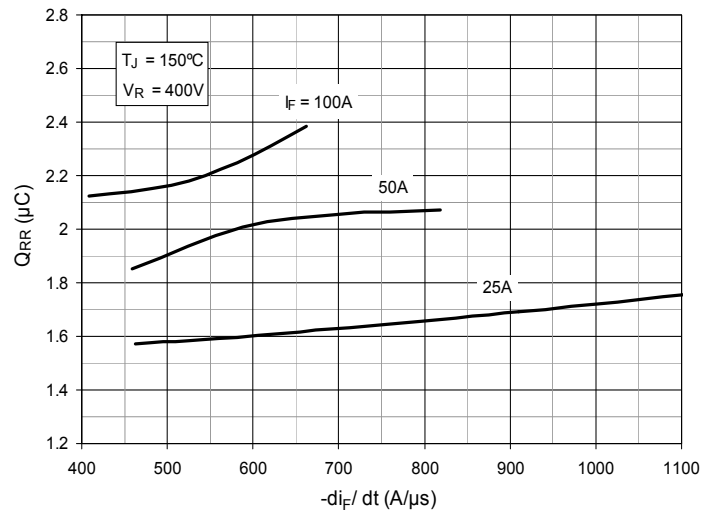
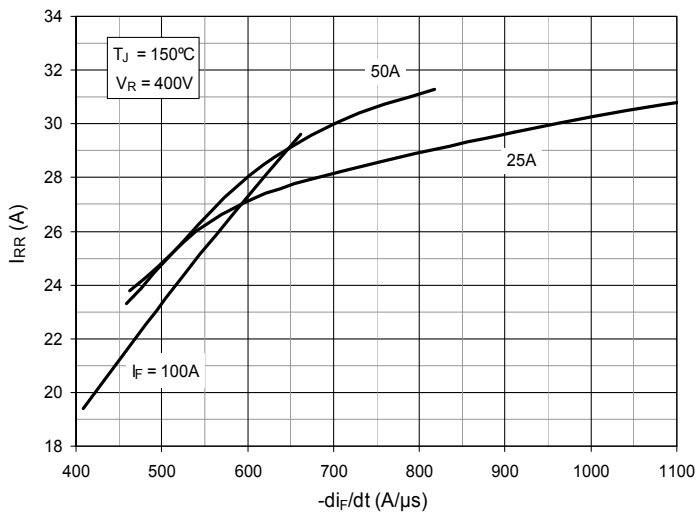
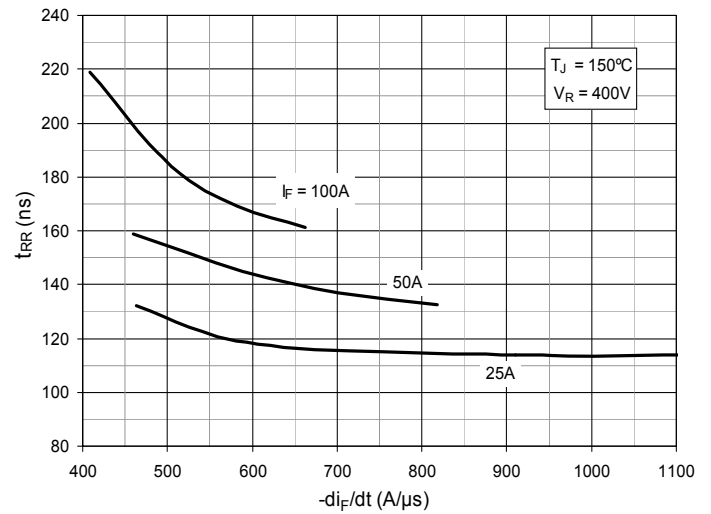
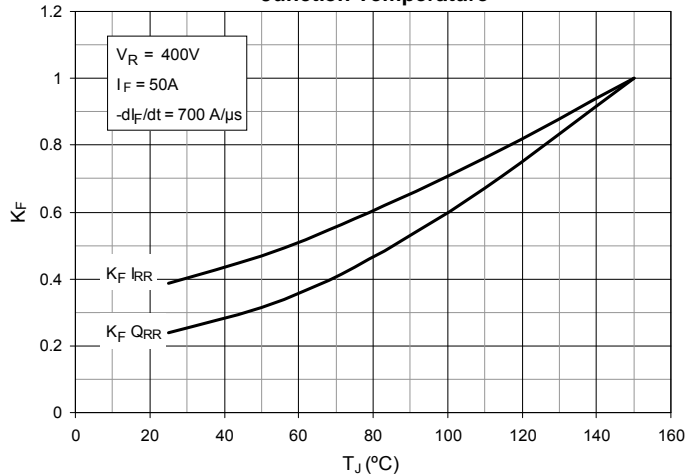
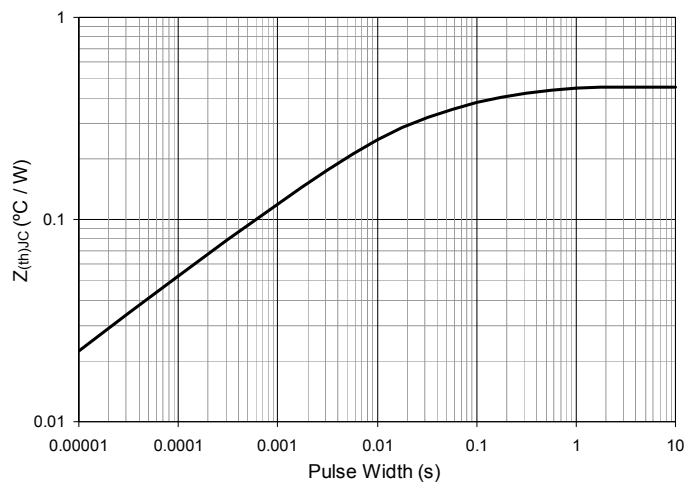
Fig. 19. Inductive Turn-on Switching Times vs. Gate Resistance

Fig. 20. Inductive Turn-on Switching Times vs. Collector Current

Fig. 21. Inductive Turn-on Switching Times vs. Junction Temperature

Fig. 22. Maximum Peak Load Current vs. Frequency


Fig. 23. Diode Forward Characteristics

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

Fig. 25. Reverse Recovery Current vs. $-di_F/dt$

Fig. 26. Reverse Recovery Time vs. $-di_F/dt$

Fig. 27. Dynamic Parameters Q_{RR} , I_{RR} vs. Junction Temperature

Fig. 28. Maximum Transient Thermal Impedance (Diode)




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