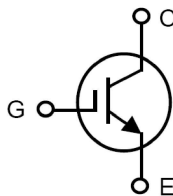


# 1200V XPT™ GenX4™ IGBT

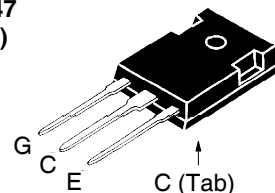
## IXYH55N120A4

Ultra Low-V<sub>sat</sub> PT IGBT for  
up to 5kHz Switching



$V_{CES} = 1200V$   
 $I_{C110} = 55A$   
 $V_{CE(sat)} \leq 1.8V$   
 $t_{fi(typ)} = 270ns$

TO-247  
(IXYH)



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

Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ C$ to $175^\circ C$	1200	V
$V_{CGR}$	$T_J = 25^\circ C$ to $175^\circ C$ , $R_{GE} = 1M\Omega$	1200	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ C$	175	A
$I_{C110}$	$T_C = 110^\circ C$	55	A
$I_{CM}$	$T_C = 25^\circ C$ , 1ms	350	A
<b>SSOA</b> <b>(RBSOA)</b>	$V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 5\Omega$ Clamped Inductive Load	$I_{CM} = 110$ $V_{CE} \leq 0.8 \cdot V_{CES}$	A
$P_C$	$T_C = 25^\circ C$	650	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 1.6 mm (0.062 in.) from Case for 10s	300	$^\circ C$
$M_d$	Mounting Torque	1.13 / 10	Nm/lb.in
<b>Weight</b>		6	g

### Features

- Optimized for Low Conduction Losses
- Positive Thermal Coefficient of  $V_{ce(sat)}$
- International Standard Package

### Advantages

- High Power Density
- Low Gate Drive Requirement

### Applications

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

Symbol	Test Conditions ( $T_J = 25^\circ C$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{CES}$	$I_C = 250\mu A$ , $V_{GE} = 0V$	1200		V
$V_{GE(th)}$	$I_C = 250\mu A$ , $V_{CE} = V_{GE}$	4.0		6.5 V
$I_{CES}$	$V_{CE} = V_{CES}$ , $V_{GE} = 0V$ $T_J = 150^\circ C$			5 $\mu A$ 2.5 mA
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 20V$			$\pm 100$ nA
$V_{CE(sat)}$	$I_C = 55A$ , $V_{GE} = 15V$ , Note 1 $T_J = 150^\circ C$		1.5 1.8	1.8 V V

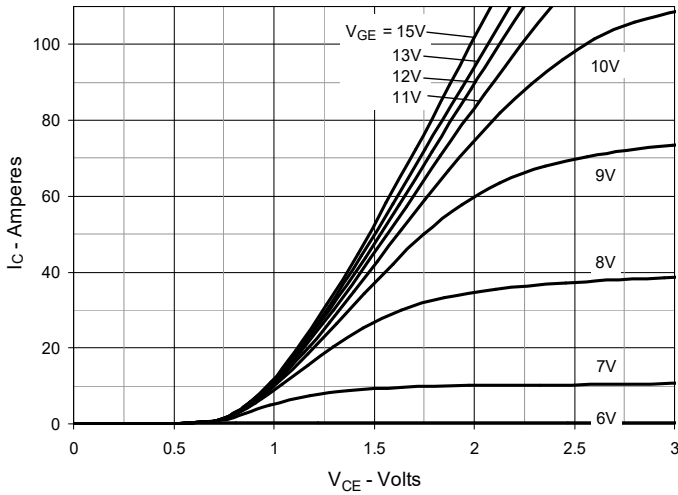
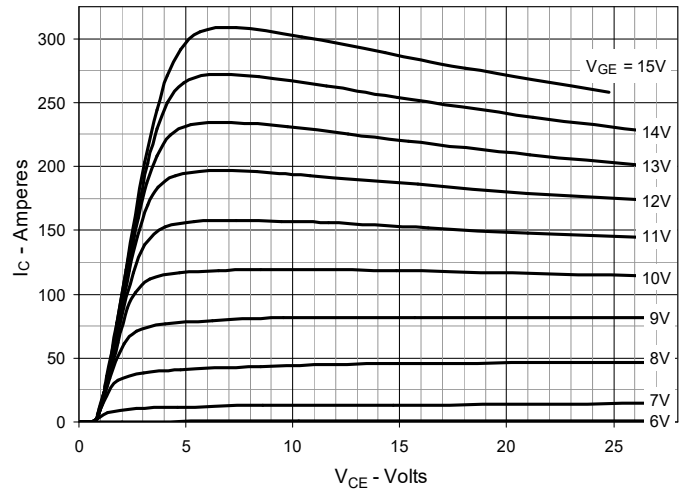
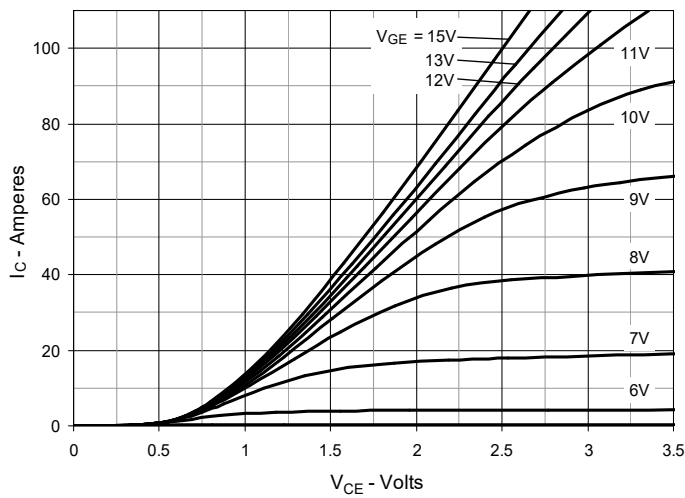
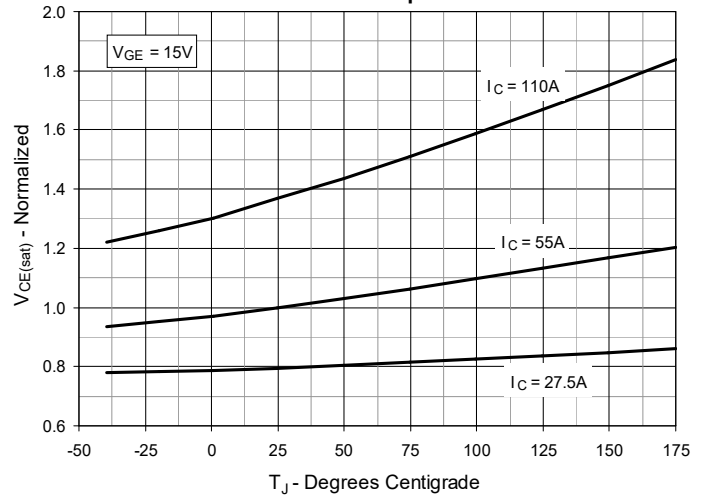
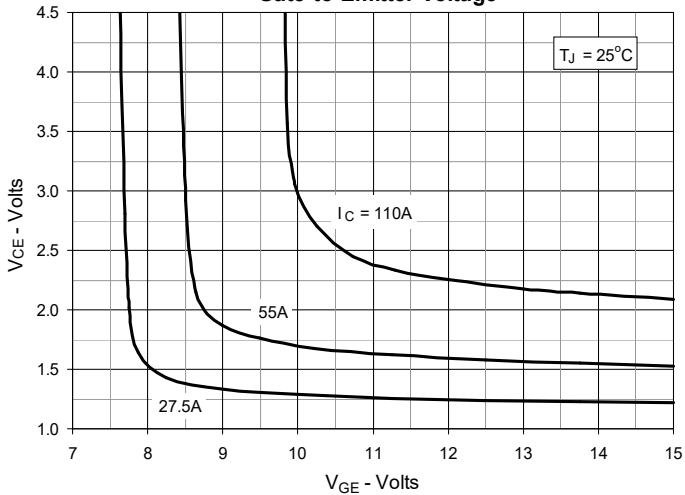
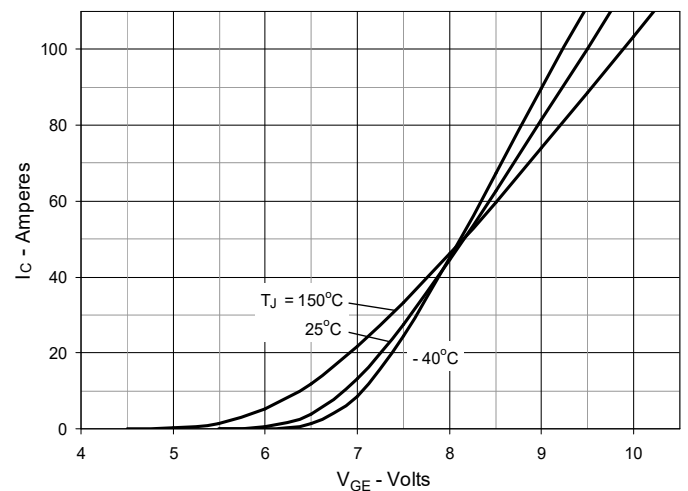
Symbol Test Conditions ( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)		Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$I_C = 55\text{A}, V_{CE} = 10\text{V}$ , Note 1	22	36	S
$C_{ies}$	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		2150	pF
$C_{oes}$			125	pF
$C_{res}$			80	pF
$Q_{g(on)}$	$I_C = 55\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$		110	nC
$Q_{ge}$			17	nC
$Q_{gc}$			56	nC
$t_{d(on)}$	<b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b> $I_C = 40\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 0.5 \cdot V_{CES}, R_G = 5\Omega$ Note 2		23	ns
$t_{ri}$			35	ns
$E_{on}$			2.3	mJ
$t_{d(off)}$			300	ns
$t_{fi}$			270	ns
$E_{off}$			5.3	mJ
$t_{d(on)}$	<b>Inductive load, <math>T_J = 150^\circ\text{C}</math></b> $I_C = 40\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 0.5 \cdot V_{CES}, R_G = 5\Omega$ Note 2		21	ns
$t_{ri}$			33	ns
$E_{on}$			3.8	mJ
$t_{d(off)}$			380	ns
$t_{fi}$			530	ns
$E_{off}$			8.8	mJ
$R_{thJC}$				0.23 $^\circ\text{C/W}$
$R_{thCS}$		0.21		$^\circ\text{C/W}$

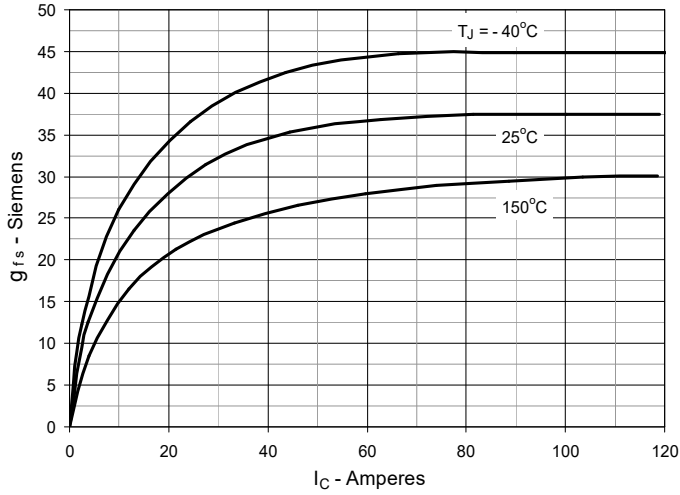
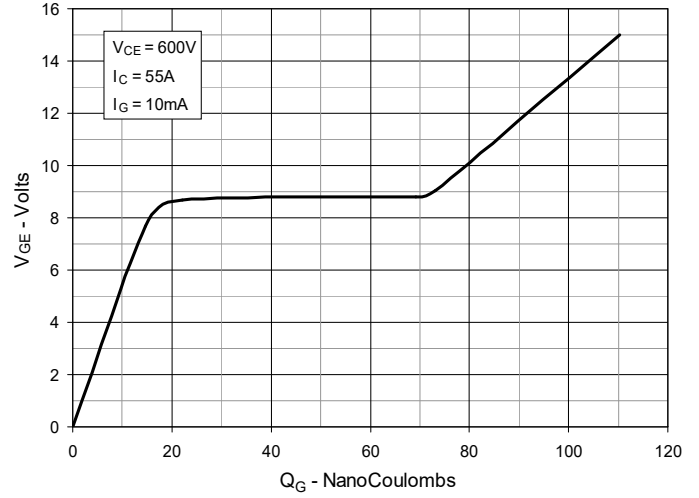
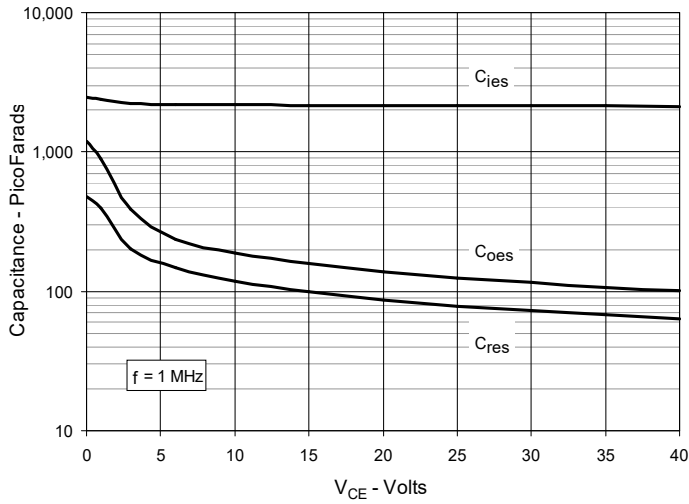
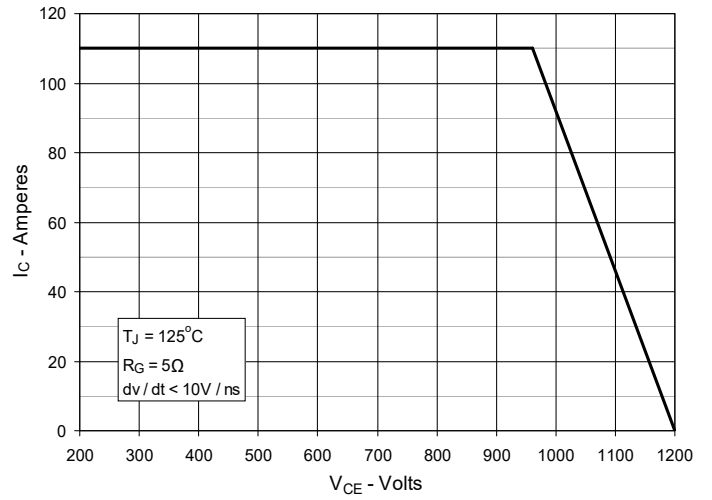
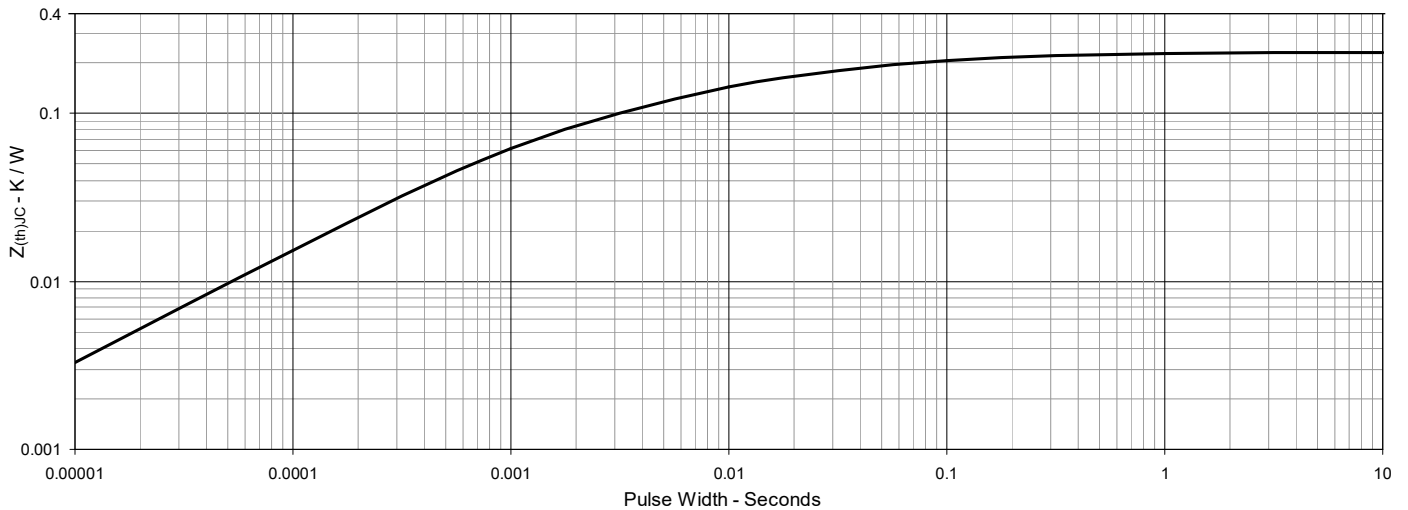
**Notes:**

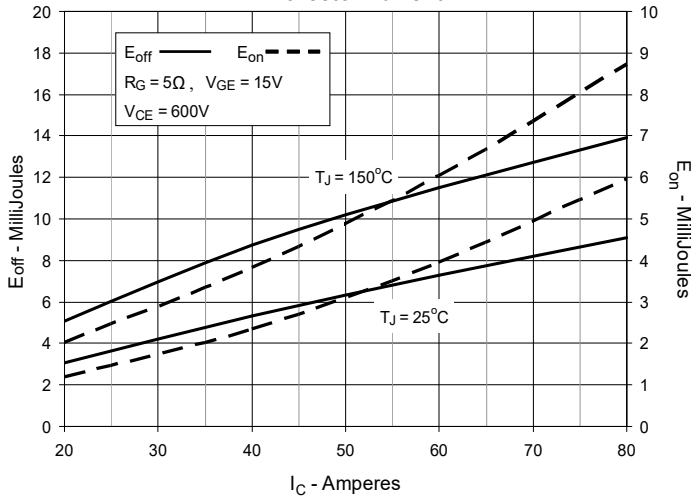
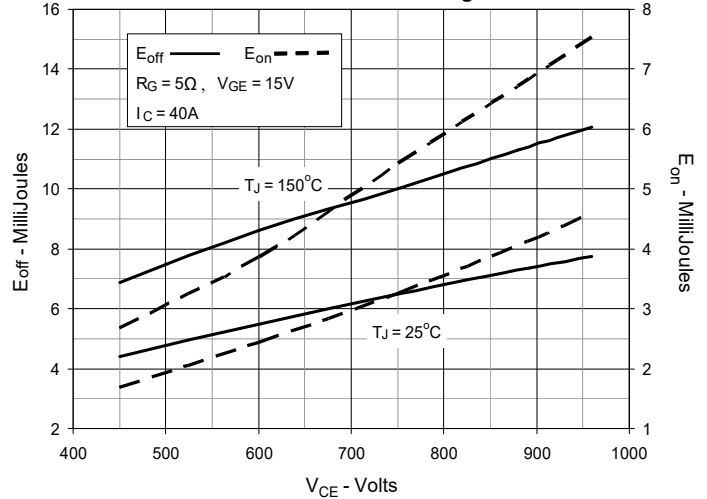
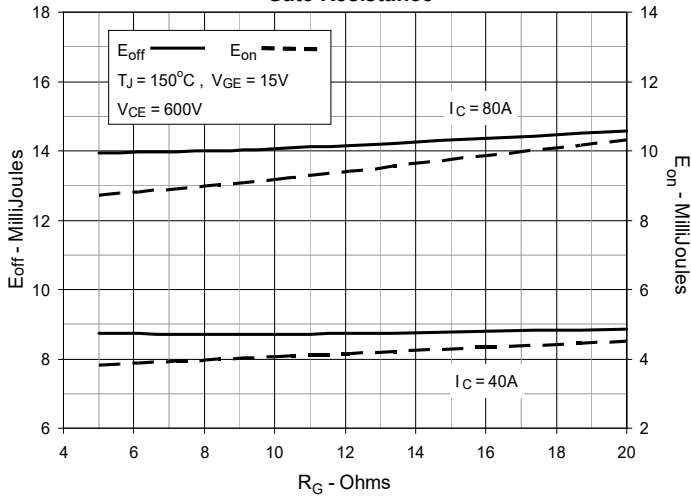
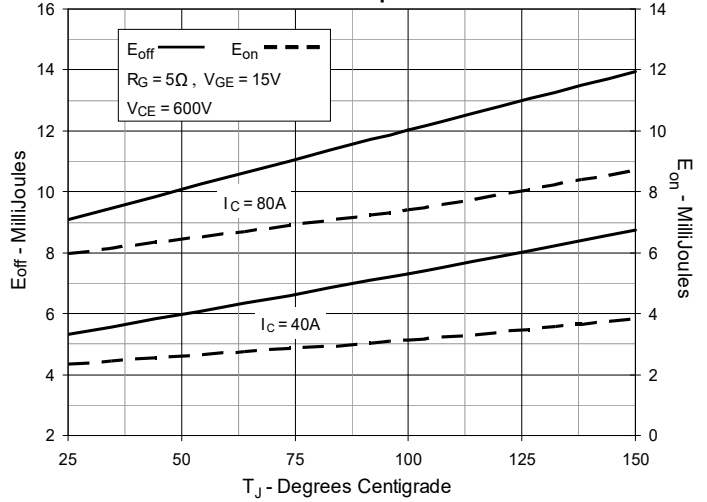
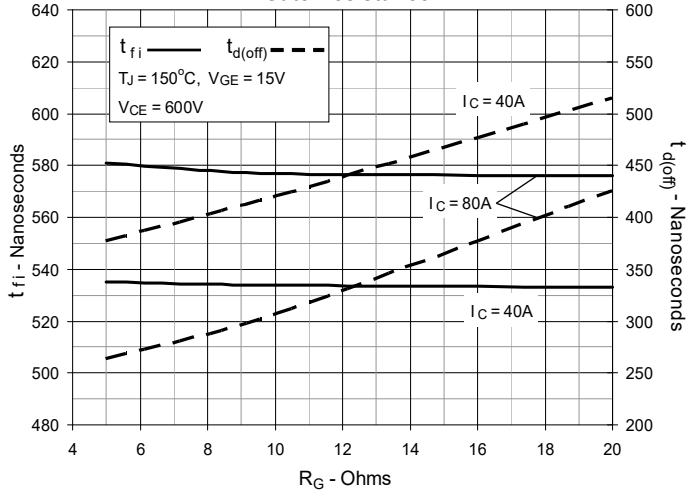
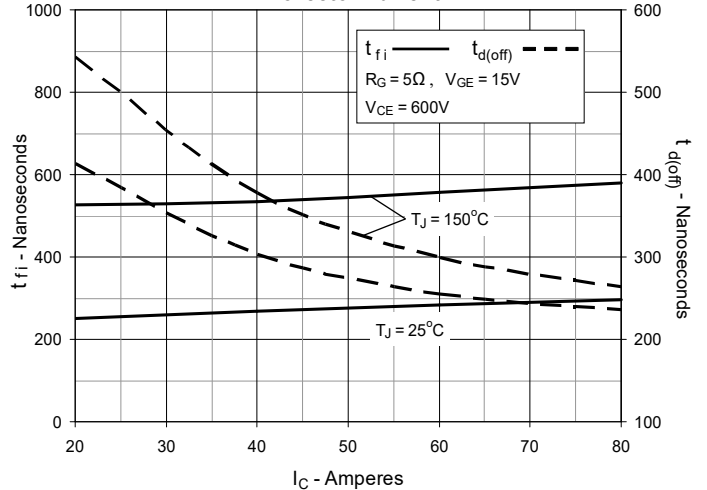
1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .
2. Switching times & energy losses may increase for higher  $V_{CE}$  (clamp),  $T_J$  or  $R_G$ .

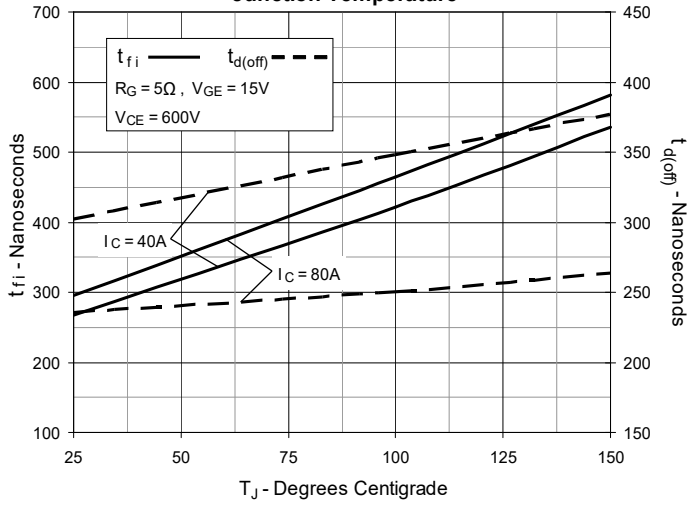
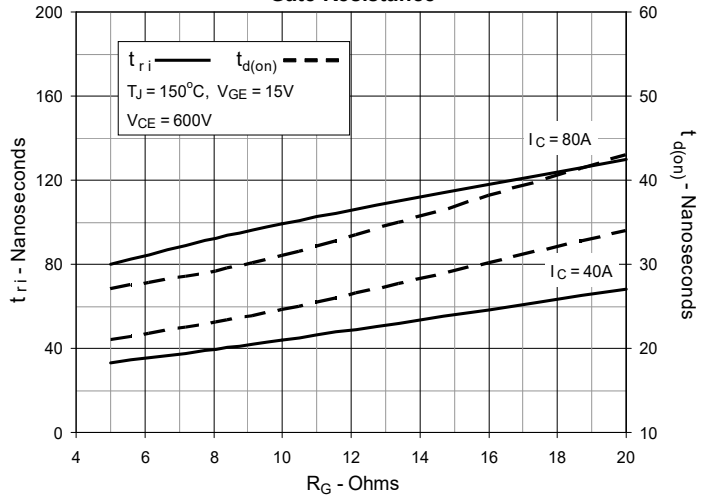
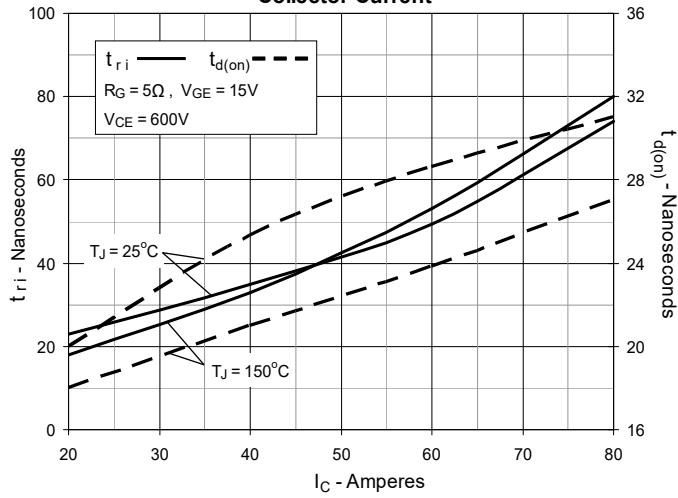
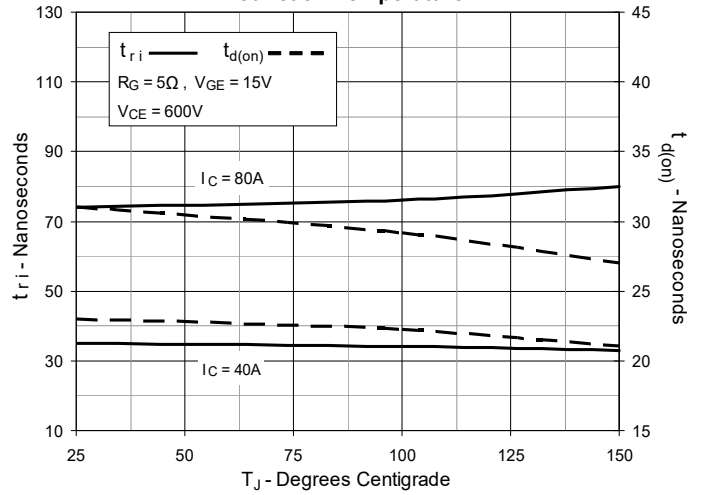
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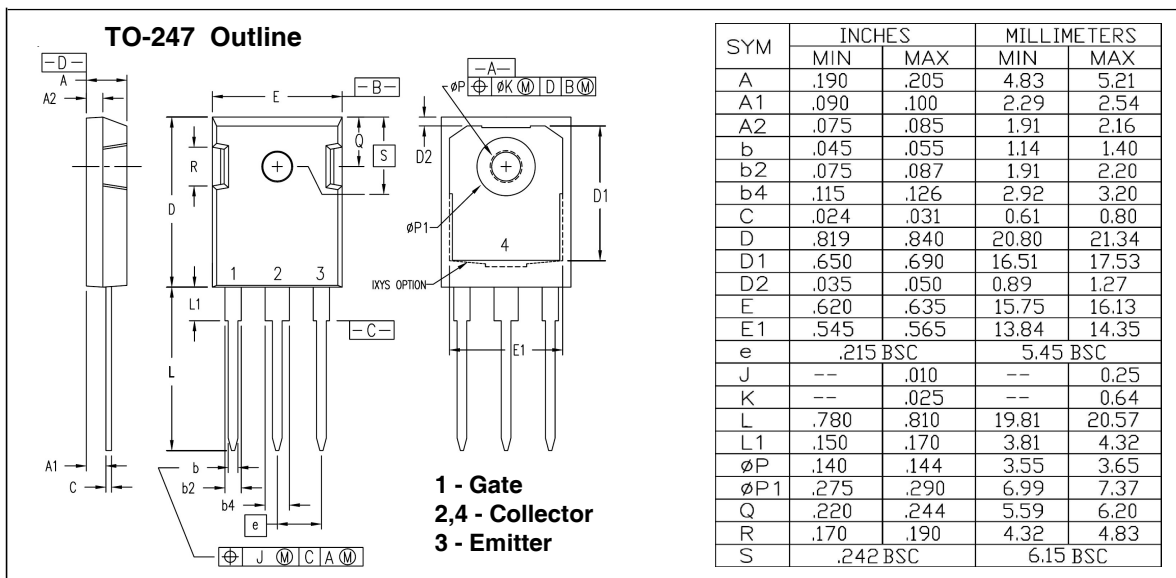
IXYS MOSFETs and IGBTs are covered	4,835,592	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065 B1	6,683,344	6,727,585	7,005,734 B2	7,157,338B2
by one or more of the following U.S. patents:	4,860,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692	7,063,975 B2	
	4,881,106	5,034,796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

**Fig. 13. Inductive Switching Energy Loss vs. Collector-Emitter Voltage**

**Fig. 14. Inductive Switching Energy Loss vs. Gate Resistance**

**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**






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