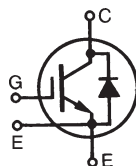


# 1200V XPT™ IGBT GenX3™ w/ Diode

## IXYN100N120C3H1

High-Speed IGBT  
for 20-50 kHz Switching



$$V_{CES} = 1200V$$

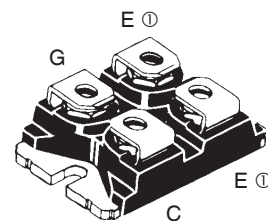
$$I_{C110} = 60A$$

$$V_{CE(sat)} \leq 3.50V$$

$$t_{fi(typ)} = 110ns$$

Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ C$ to $150^\circ C$	1200	V
$V_{CGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GE} = 1M\Omega$	1200	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ C$ (Chip Capability)	140	A
$I_{C110}$	$T_C = 110^\circ C$	60	A
$I_{F110}$	$T_C = 110^\circ C$	49	A
$I_{CM}$	$T_C = 25^\circ C$ , 1ms	420	A
$I_A$	$T_C = 25^\circ C$	50	A
$E_{AS}$	$T_C = 25^\circ C$	1.2	J
<b>SSOA</b> <b>(RBSOA)</b>	$V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 1\Omega$ Clamped Inductive Load	$I_{CM} = 200$ @ $V_{CE} \leq V_{CES}$	A
$P_C$	$T_C = 25^\circ C$	690	W
$T_J$		-55 ... +150	$^\circ C$
$T_{JM}$		150	$^\circ C$
$T_{stg}$		-55 ... +150	$^\circ C$
$V_{ISOL}$	50/60Hz $I_{ISOL} \leq 1mA$	$t = 1min$ $t = 1s$	2500 3000 V~ V~
$M_d$	Mounting Torque Terminal Connection Torque	1.5/13 1.3/11.5	Nm/lb.in. Nm/lb.in.
<b>Weight</b>		30	g

SOT-227B, miniBLOC  
E153432



G = Gate, C = Collector, E = Emitter  
① either emitter terminal can be used as Main or Kelvin Emitter

### Features

- Optimized for Low Switching Losses
- Square RBSOA
- Isolation Voltage 2500V~
- Anti-Parallel Sonic Diode
- Positive Thermal Coefficient of  $V_{ce(sat)}$
- Avalanche Rated
- 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

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
$V_{GE(th)}$	$I_C = 250\mu A$ , $V_{CE} = V_{GE}$	3.0		V
$I_{CES}$	$V_{CE} = V_{CES}$ , $V_{GE} = 0V$ $T_J = 125^\circ C$			50 $\mu A$ 3 mA
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 20V$			$\pm 100$ nA
$V_{CE(sat)}$	$I_C = 100A$ , $V_{GE} = 15V$ , Note 1 $T_J = 150^\circ C$	2.96 3.78	3.50	V V

Symbol Test Conditions ( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)		Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$I_C = 60\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$	30	50	S
$C_{ies}$ $C_{oes}$ $C_{res}$	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		4950	pF
			490	pF
			120	pF
$Q_{g(on)}$ $Q_{ge}$ $Q_{gc}$	$I_C = I_{C110}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$		260	nC
			47	nC
			102	nC
$t_{d(on)}$ $t_{ri}$ $E_{on}$ $t_{d(off)}$ $t_{fi}$ $E_{off}$	<b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b> $I_C = I_{C110}, V_{GE} = 15\text{V}$ $V_{CE} = 0.5 \cdot V_{CES}, R_G = 1\Omega$ Note 2		27	ns
			110	ns
			12.00	mJ
			120	ns
			110	ns
			4.90	mJ
$t_{d(on)}$ $t_{ri}$ $E_{on}$ $t_{d(off)}$ $t_{fi}$ $E_{off}$	<b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b> $I_C = I_{C110}, V_{GE} = 15\text{V}$ $V_{CE} = 0.5 \cdot V_{CES}, R_G = 1\Omega$ Note 2		27	ns
			116	ns
			15.00	mJ
			146	ns
			125	ns
			6.15	mJ
$R_{thJC}$ $R_{thCS}$			0.18	$^\circ\text{C/W}$
		0.05		$^\circ\text{C/W}$

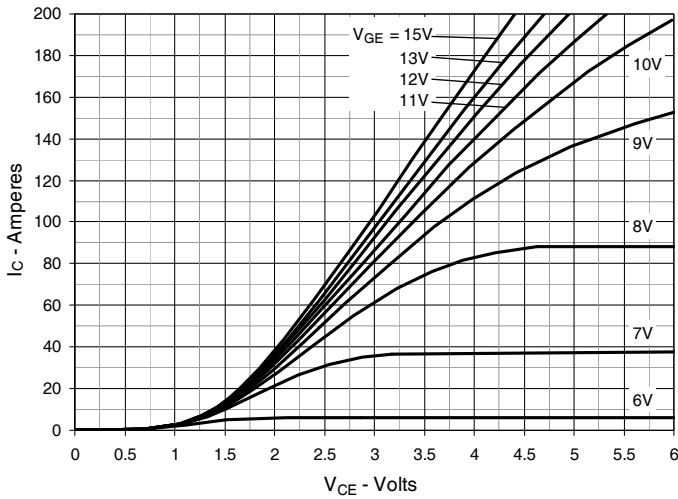
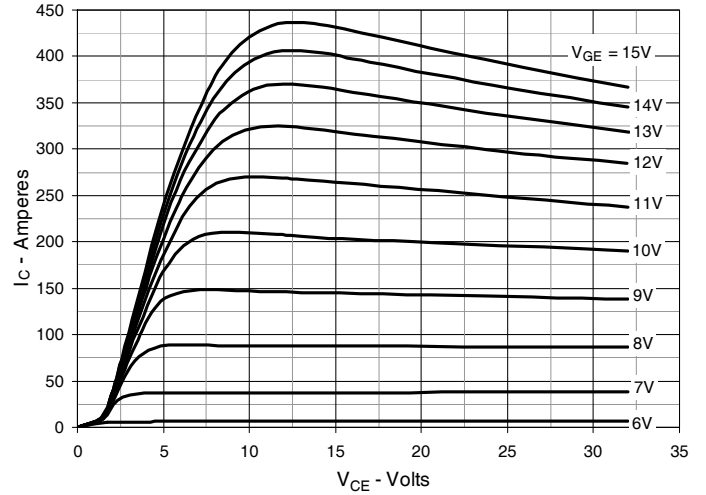
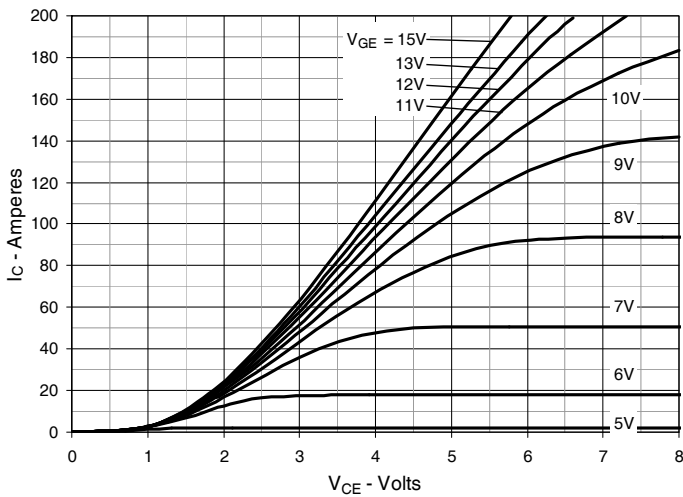
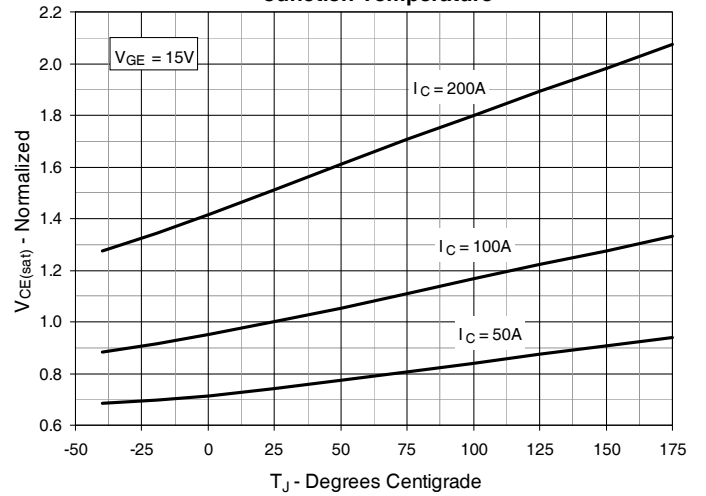
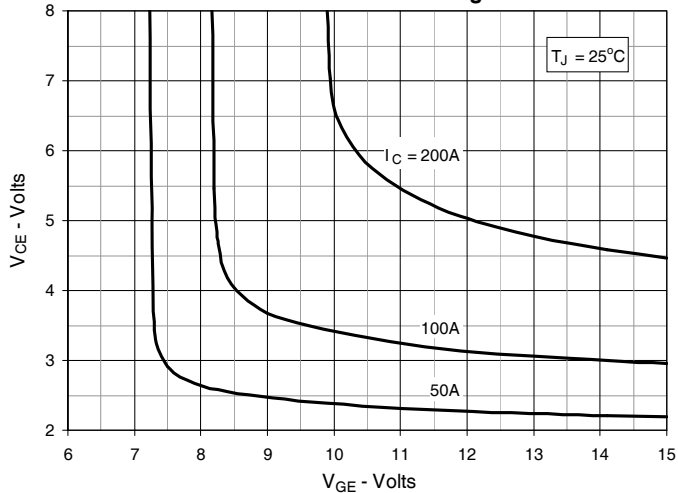
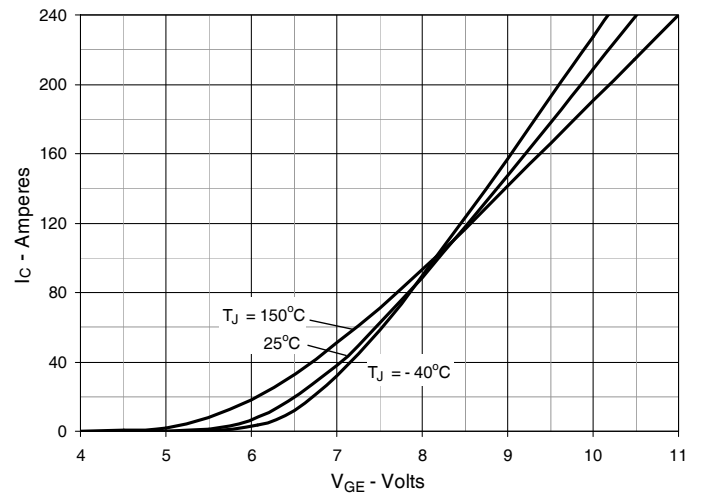
**Reverse Sonic Diode (FRD)**

Symbol Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)		Characteristic Values		
		Min.	Typ.	Max.
$V_F$	$I_F = 60\text{A}, V_{GE} = 0\text{V}, \text{Note 1}$ $T_J = 125^\circ\text{C}$		1.95	2.7 V V
$I_{RM}$ $t_{rr}$	$I_F = 60\text{A}, V_{GE} = 0\text{V},$ $-di_F/dt = 700\text{A}/\mu\text{s}, V_R = 600\text{V}$ $T_J = 125^\circ\text{C}$		50	A
			235	ns
$R_{thJC}$				0.52 $^\circ\text{C/W}$

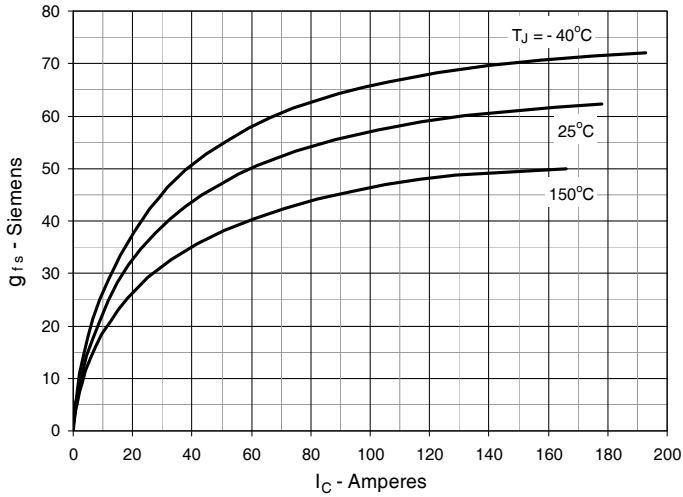
**Notes:**

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

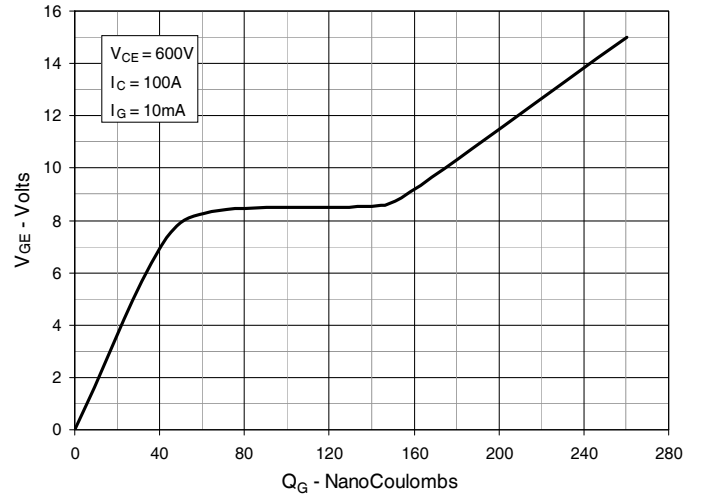
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

**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**


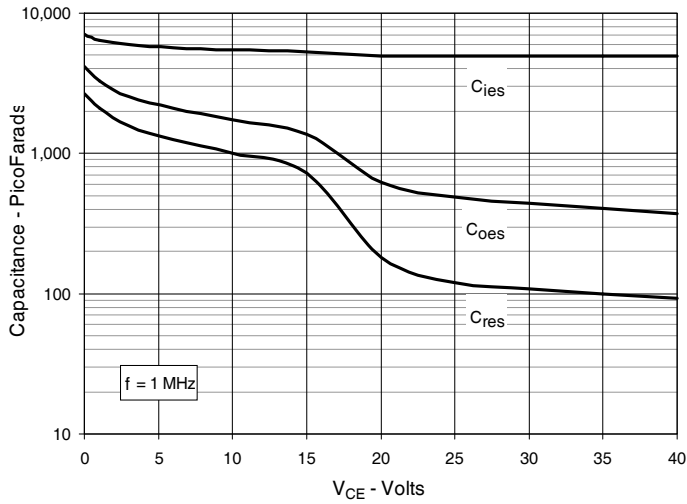
**Fig. 7. Transconductance**



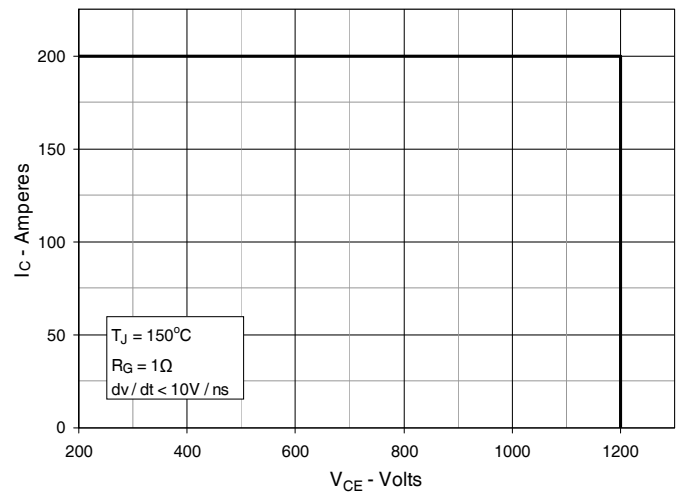
**Fig. 8. Gate Charge**



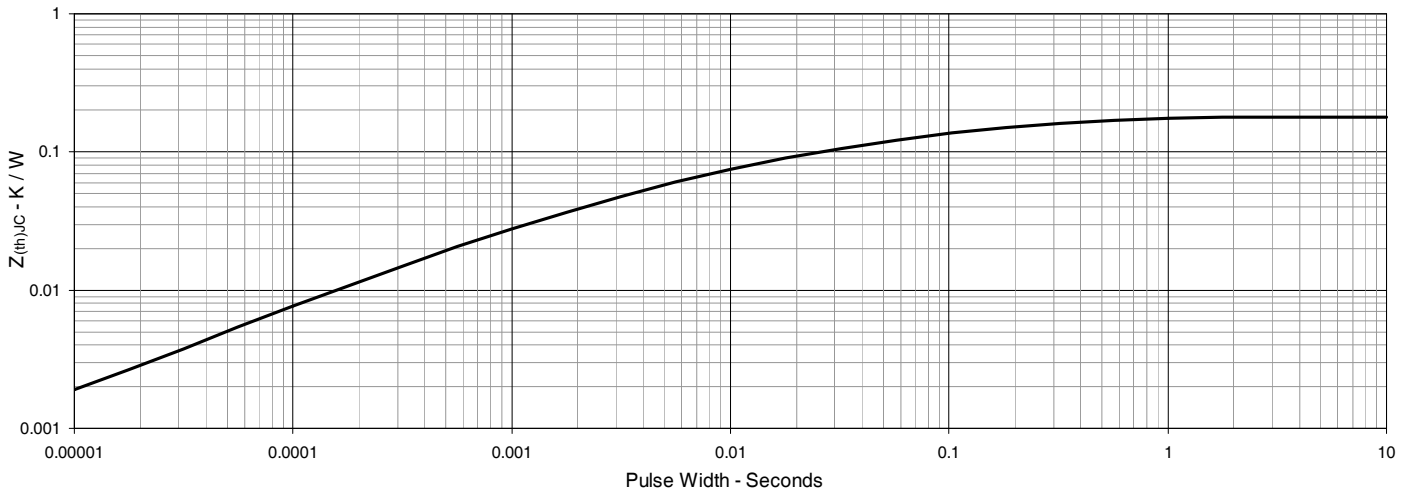
**Fig. 9. Capacitance**



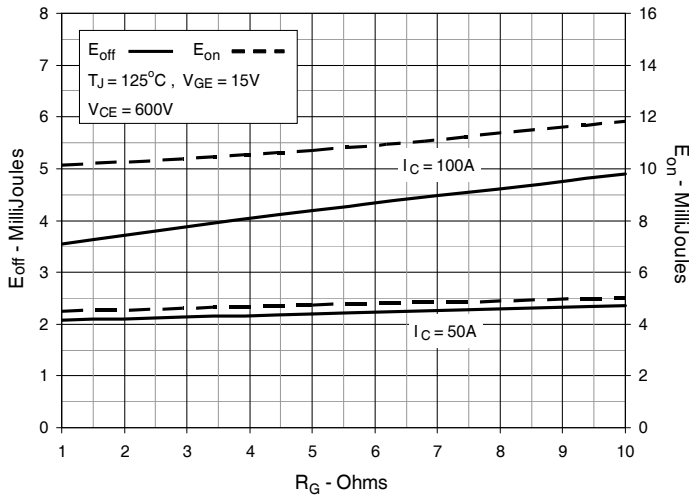
**Fig. 10. Reverse-Bias Safe Operating Area**



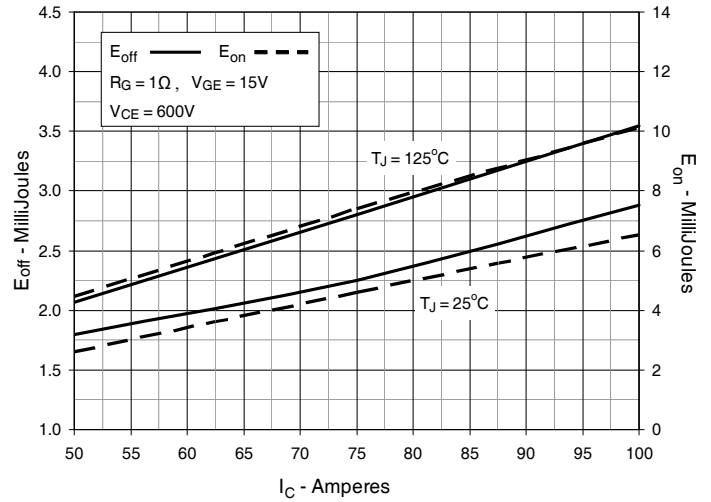
**Fig. 11. Maximum Transient Thermal Impedance (IGBT)**



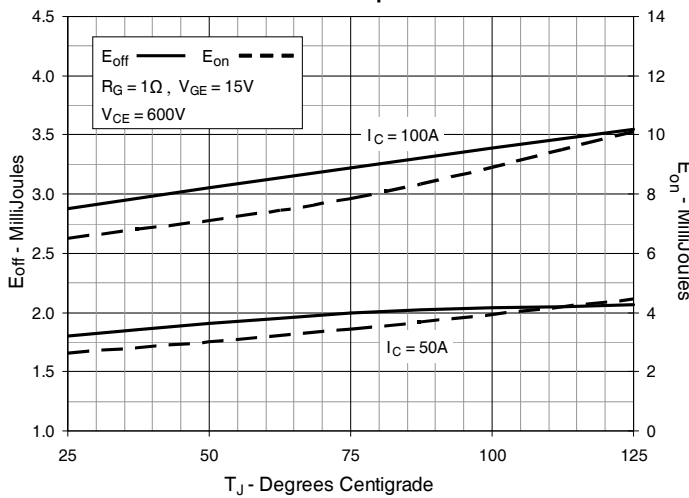
**Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance**



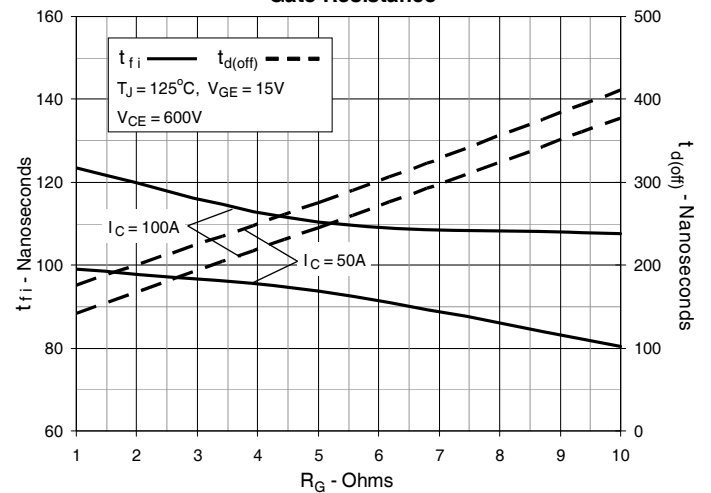
**Fig. 13. Inductive Switching Energy Loss vs. Collector Current**



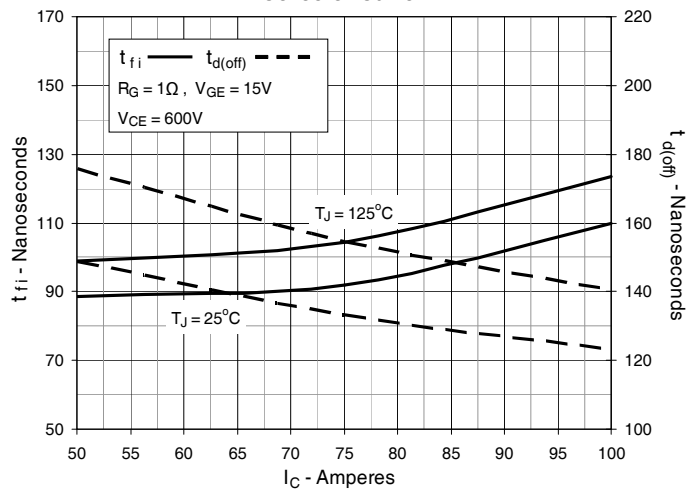
**Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature**



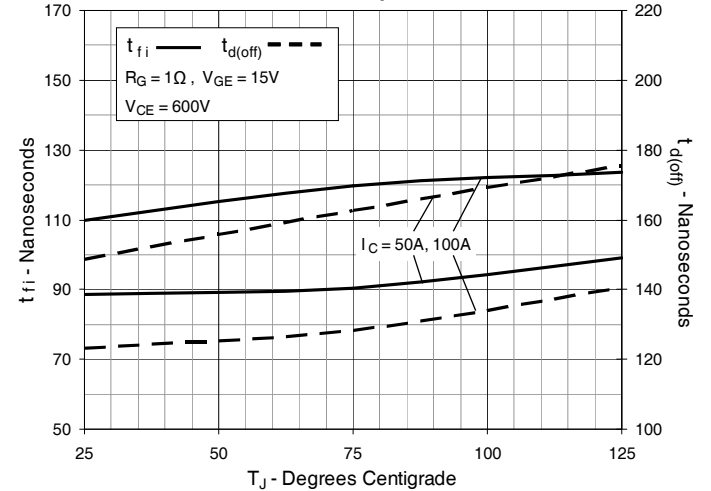
**Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance**



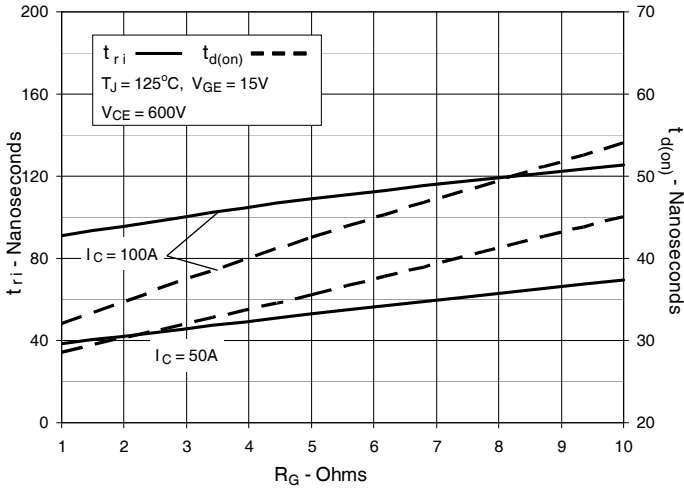
**Fig. 16. Inductive Turn-off Switching Times vs. Collector Current**



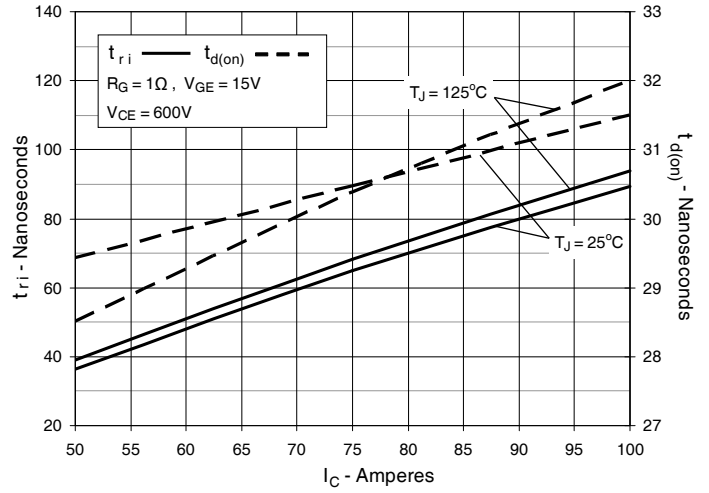
**Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature**



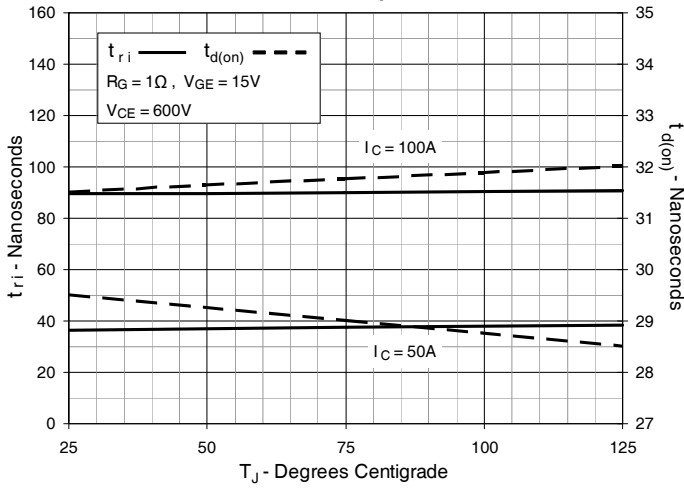
**Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance**



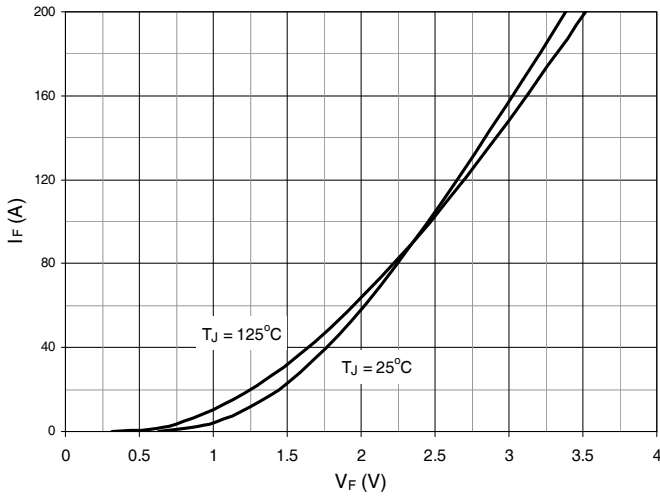
**Fig. 19. Inductive Turn-on Switching Times vs. Collector Current**



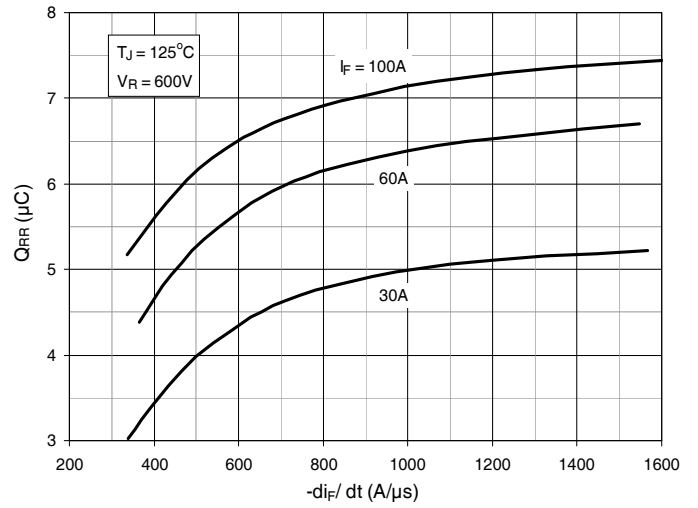
**Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature**



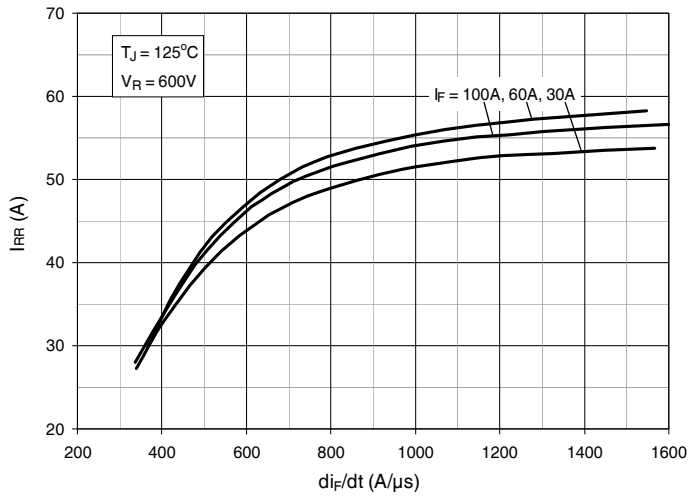
**Fig. 21. Diode Forward Characteristics**



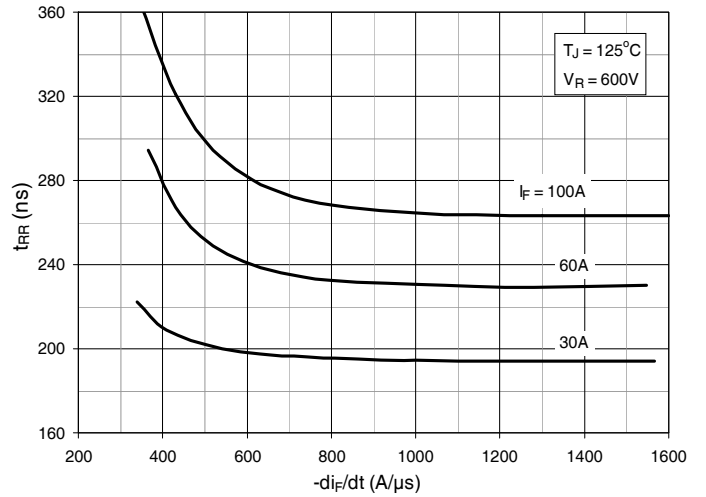
**Fig. 22. Reverse Recovery Charge vs.  $-di_F/dt$**



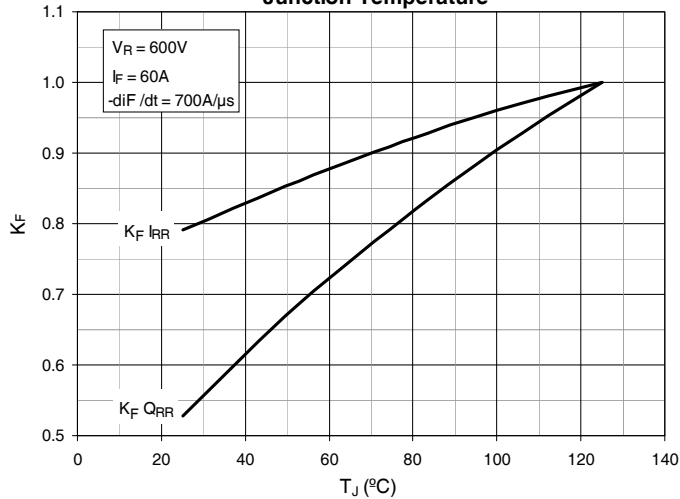
**Fig. 23. Reverse Recovery Current vs.  $-di_F/dt$**



**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)**

