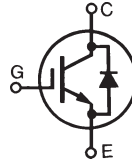


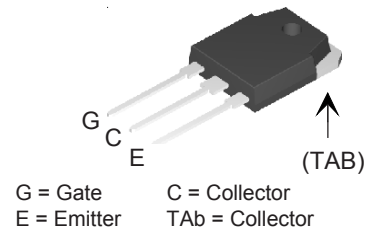
**Polar™ High Speed  
IGBT  
with Anti-Parallel Diode  
for PDP Sustain Circuit**

**IXGQ85N33PCD1**

$$\begin{aligned} V_{CES} &= 330 \text{ V} \\ I_{CP} &= 340 \text{ A} \\ V_{CE(sat)} &\leq 2.1 \text{ V} \end{aligned}$$



**TO-3P**



**Features**

- International standard package
- Fast  $t_{fi}$  for minimum turn off switching losses
- MOS Gate turn-on - drive simplicity
- Positive  $dV_{sat}/dt$  for paralleling

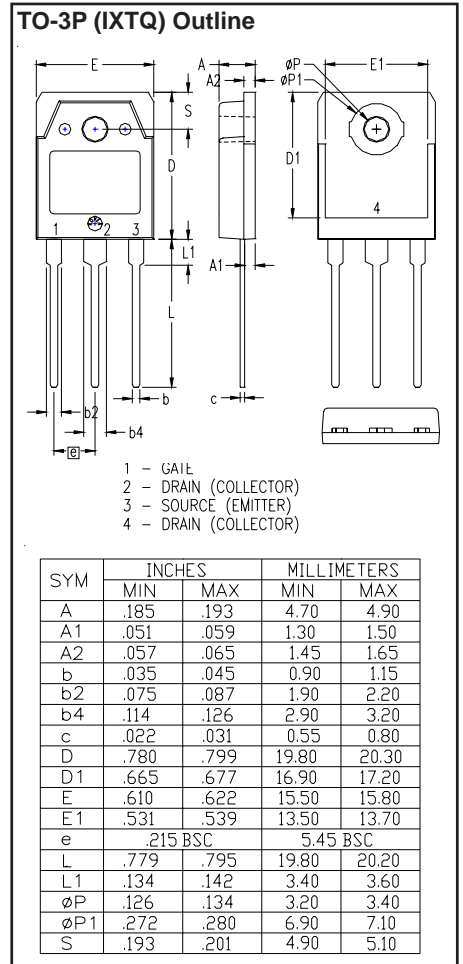
Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	330	V
$V_{GEM}$		$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ\text{C}$ , IGBT chip capability	85	A
$I_{CP}$	$T_J \leq 150^\circ\text{C}$ , $t_p \leq 1 \mu\text{s}$ , $D \leq 1\%$	340	A
$I_{DP}$	$T_J \leq 150^\circ\text{C}$ , $t_p < 10 \mu\text{s}$	40	A
$I_{C(RMS)}$	Lead current limit	75	A
<b>SSOA</b> <b>(RBSOA)</b>	$V_{GE} = 15 \text{ V}$ , $T_{VJ} = 150^\circ\text{C}$ , $R_G = 20 \Omega$ Clamped inductive load, $V_{CE} < 300 \text{ V}$	$I_{CM} = 96$	A
$P_C$	$T_C = 25^\circ\text{C}$	150	W
$T_J$		-55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-55 ... +150	$^\circ\text{C}$
	Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s	300	$^\circ\text{C}$
	Plastic body	260	
$M_d$	Mounting torque	1.3/10	Nm/lb.in. $\leq$
<b>Weight</b>		5.5	g

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$V_{GE(th)}$	$I_C = 1 \text{ mA}$ , $V_{CE} = V_{GE}$	3.0		6.0 V
$I_{CES}$	$V_{CE} = 330 \text{ V}$			1 $\mu\text{A}$
	$V_{GE} = 0 \text{ V}$ $T_J = 125^\circ\text{C}$			200 $\mu\text{A}$
$I_{GES}$	$V_{CE} = 0 \text{ V}$ , $V_{GE} = \pm 20 \text{ V}$			$\pm 100 \text{ nA}$
$V_{CE(sat)}$	$V_{GE} = 15 \text{ V}$ , Note 1	$I_C = 50 \text{ A}$	1.43	2.1 V
		$T_J = 125^\circ\text{C}$	1.47	V
		$I_C = 100 \text{ A}$	1.85	3.0 V
		$T_J = 125^\circ\text{C}$	2.0	V

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$I_C = 43\text{ A}, V_{CE} = 10\text{ V}$	30	49	S
$C_{ies}$	$V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$		2200	pF
$C_{oes}$			155	pF
$C_{res}$			25	pF
$Q_g$	$I_C = 43\text{ A}, V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$		80	nC
$Q_{ge}$			15	nC
$Q_{gc}$			23	nC
$t_{d(on)}$	Resistive load, $T_J = 25^\circ\text{C}$ $I_C = 50\text{ A}, V_{GE} = 15\text{ V}$ $V_{CE} = 240\text{ V}, R_G = 5\ \Omega$		20	ns
$t_{ri}$			43	ns
$t_{d(off)}$			87	ns
$t_{fi}$			72	350 ns
$t_{d(on)}$	Resistive load, $T_J = 125^\circ\text{C}$ $I_C = 50\text{ A}, V_{GE} = 15\text{ V}$ $V_{CE} = 240\text{ V}, R_G = 5\ \Omega$		20	ns
$t_{ri}$			95	ns
$t_{d(off)}$			88	ns
$t_{fi}$			130	ns
$R_{thJC}$				0.833 K/W
$R_{thCK}$		0.25		K/W

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ unless otherwise specified)		
		Min.	Typ.	Max.
$V_F$	$I_F = 20\text{ A}, V_{GE} = 0\text{ V}, \text{Note 1}$ $I_F = 40\text{ A}, V_{GE} = 0\text{ V}, \text{Note 1}$			2.0 V 2.8 V
$R_{thJC}$				2.5 K/W
$t_{rr}$				250 ns

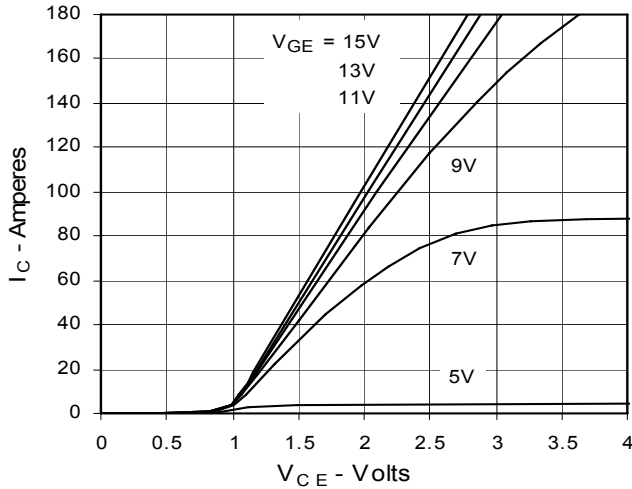
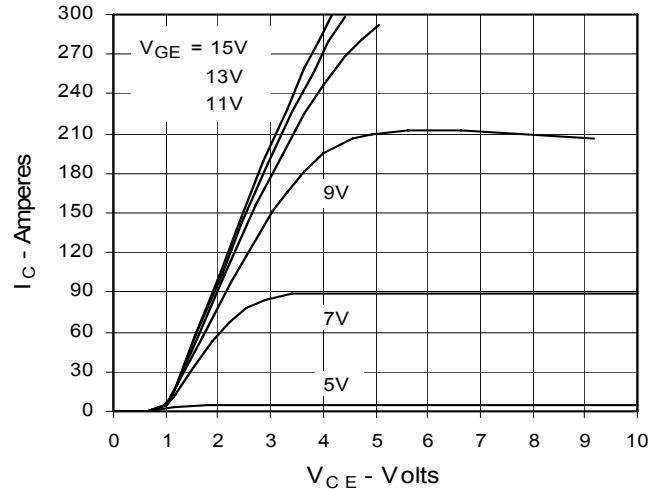
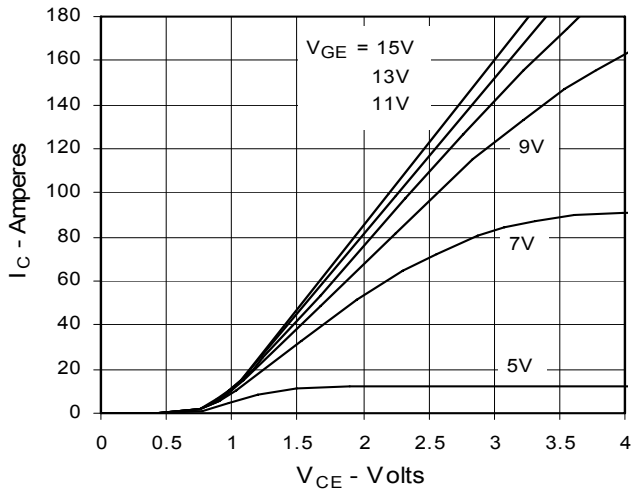
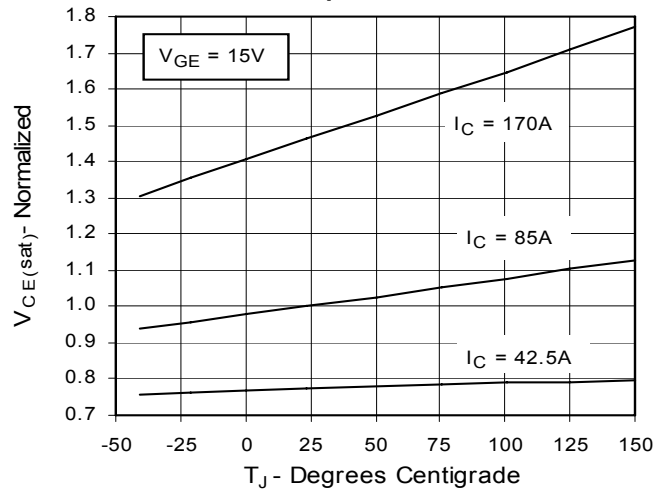
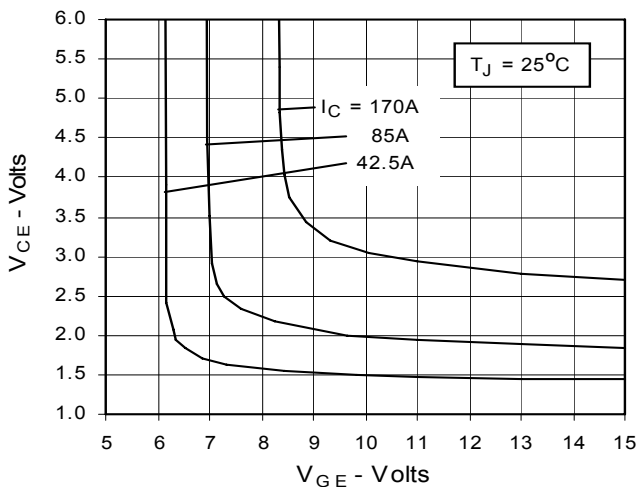
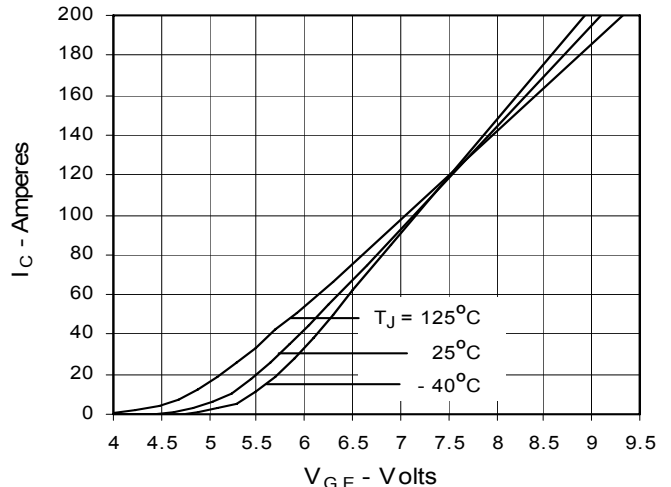
Note 1: Pulse test,  $t \leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$

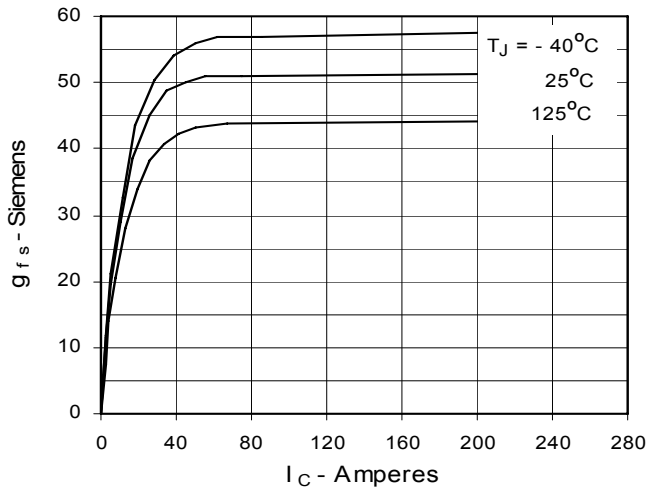
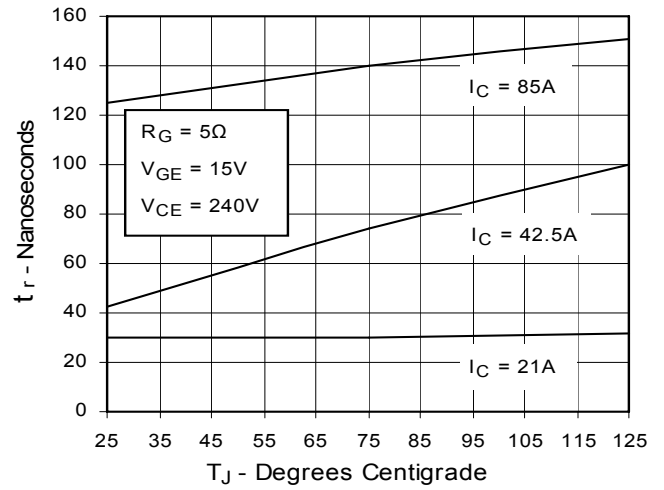
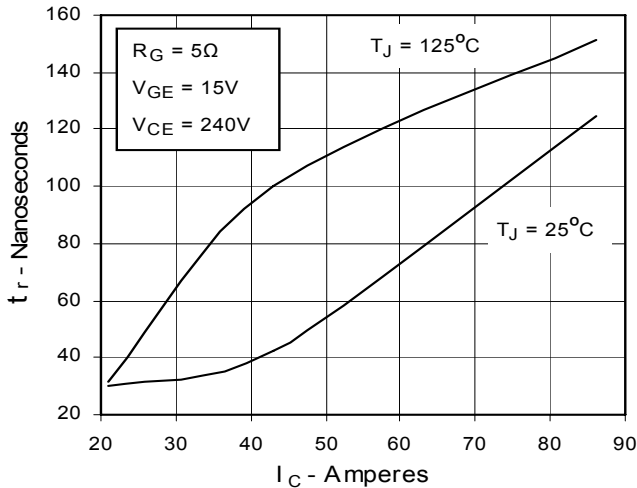
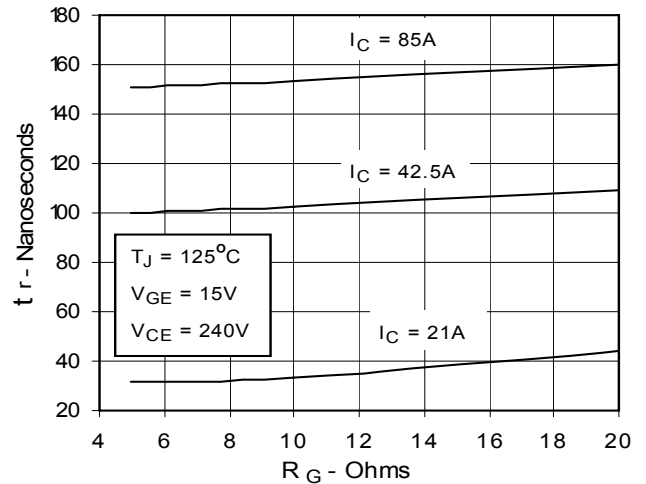
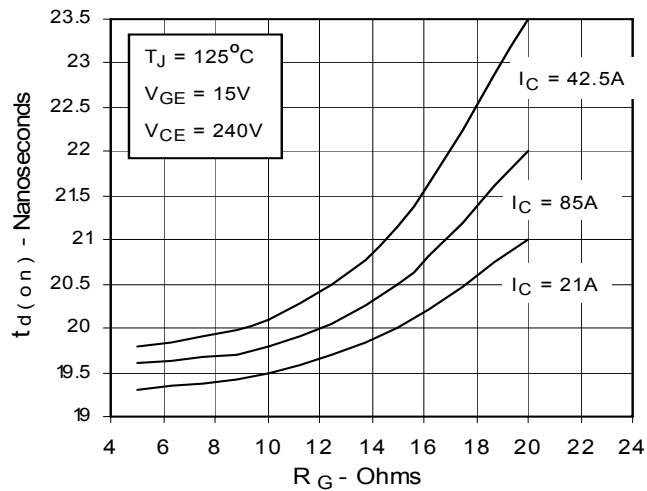
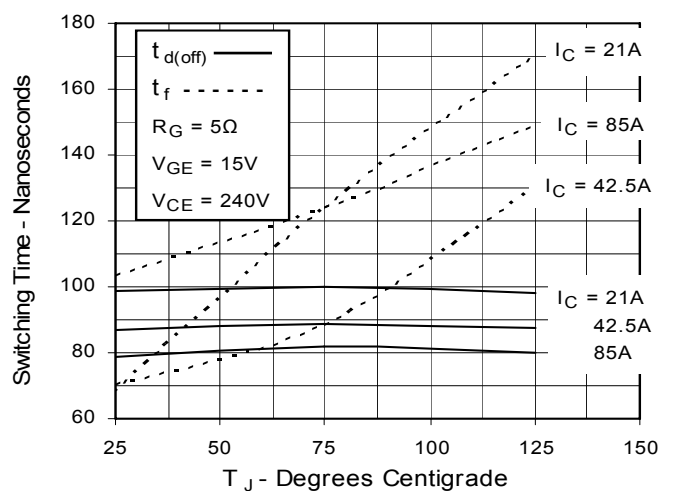


IXYS reserves the right to change limits, test conditions and dimensions.

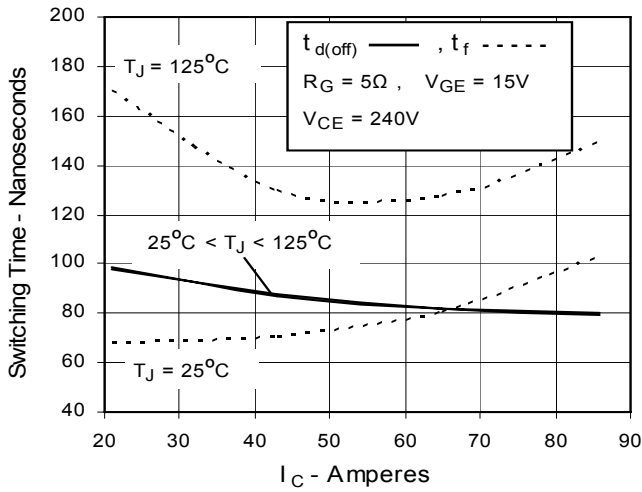
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

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
4,850,072	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	

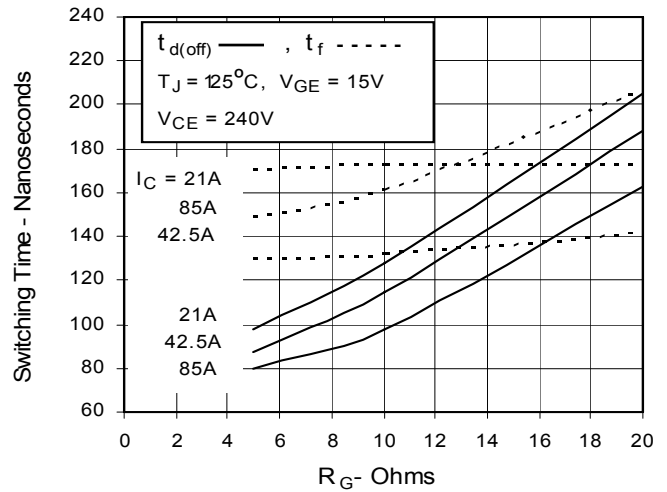
**Fig. 1. Output Characteristics  
@ 25 °C**

**Fig. 2. Extended Output Characteristics  
@ 25 °C**

**Fig. 3. Output Characteristics  
@ 125 °C**

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

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

**Fig. 6. Input Admittance**


**Fig. 7. Transconductance**

**Fig. 8. Resistive Turn-On Rise Time vs. Junction Temperature**

**Fig. 9. Resistive Turn-On Rise Time vs. Collector Current**

**Fig. 10. Resistive Turn-On Rise Time vs. Gate Resistance**

**Fig. 11. Resistive Turn-On Delay Time vs. Gate Resistance**

**Fig. 12. Resistive Turn-Off Switching Time vs. Junction Temperature**


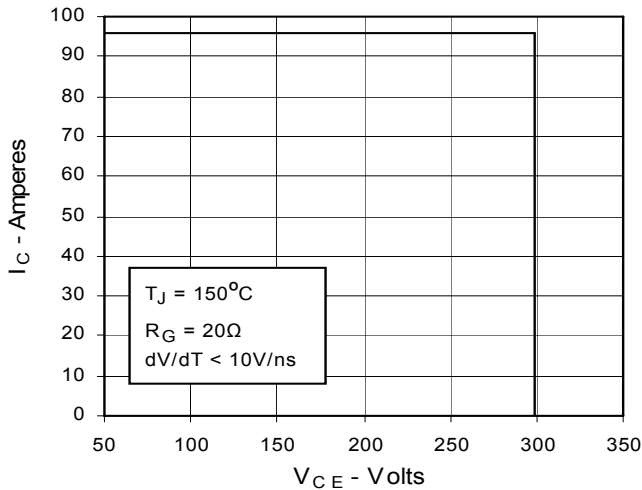
**Fig. 13. Resistive Turn-Off Switching Time vs. Collector Current**



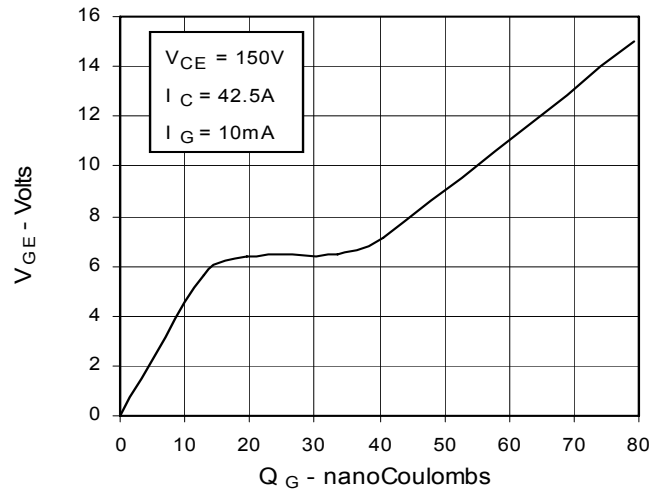
**Fig. 14. Resistive Turn-off Switching Time vs. Gate Resistance**



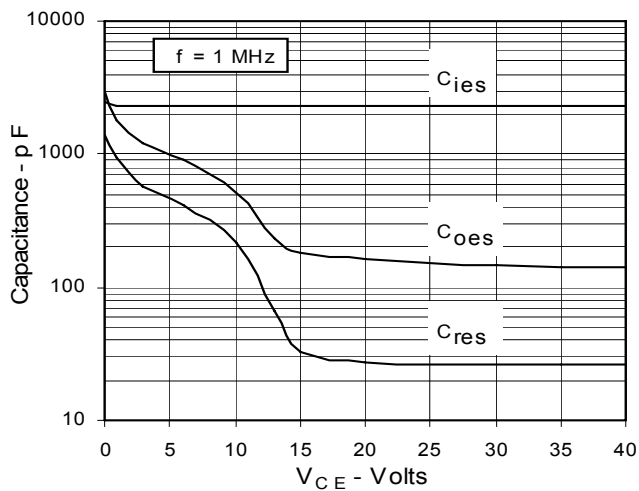
**Fig. 15. Reverse-Bias Safe Operating Area**



**Fig. 16. Gate Charge**



**Fig. 17. Capacitance**



**Fig. 18. Maximum Transient Thermal Resistance**

