

**Polar™  
IGBT**

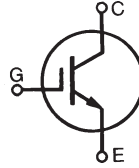
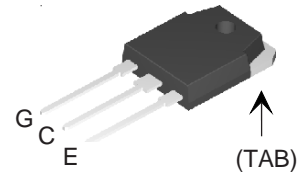
for PDP Applications

**IXGQ90N27PB**

$$V_{CES} = 270 \text{ V}$$

$$I_{CP} = 340 \text{ A}$$

$$V_{CE(sat)} \leq 2.1 \text{ V}$$


**TO-3P**

 G = Gate      C = Collector  
 E = Emitter    TAB = Collector

**Features**

- International standard package
- Low  $V_{CE(sat)}$ 
  - for minimum on-state conduction losses
- MOS Gate turn-on
  - drive simplicity

**Applications**

- PDP Screen Drivers

Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	270	V
$V_{GEM}$		$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ\text{C}$ , IGBT chip capability	90	A
$I_{CPEAK}$	$T_J \leq 150^\circ\text{C}$ , $t_p \leq 1 \mu\text{s}$ , $D \leq 1\%$	340	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, $V_{CE} < 270 \text{ V}$	$I_{CM} = 90$	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	$^\circ\text{C}$
$T_L$	Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s	300	$^\circ\text{C}$
$T_{SOLD}$	Maximum plastic body temperature for 10 S	260	$^\circ\text{C}$
$M_d$	Mounting torque	1.3/10	Nm/lb.in.
<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		5.5 V
$I_{CES}$	$V_{CE} = 270 \text{ V}$			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	$I_C = 50 \text{ A}$	1.3	2.1 V
		$T_J = 125^\circ\text{C}$	1.3	V
		$I_C = 100 \text{ A}$	1.67	V
		$T_J = 125^\circ\text{C}$	1.80	V

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$I_C = 45\text{ A}, V_{CE} = 10\text{ V}$ , Note 1	30	48	S
$C_{ies}$	$V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$		2750	pF
$C_{oes}$			180	pF
$C_{res}$			48	pF
$Q_g$	$I_C = 45\text{ A}, V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$		79	nC
$Q_{ge}$			16	nC
$Q_{gc}$			29	nC
$t_{d(on)}$	Resistive load, $T_J = 25^\circ\text{C}$ $I_C = 50\text{ A}, V_{GE} = 15\text{ V}$ $V_{CE} = 200\text{ V}, R_G = 5\ \Omega$		21	ns
$t_{ri}$			43	ns
$t_{d(off)}$			82	ns
$t_{fi}$			170	350 ns
$t_{d(on)}$	Resistive load, $T_J = 125^\circ\text{C}$ $I_C = 50\text{ A}, V_{GE} = 15\text{ V}$ $V_{CE} = 200\text{ V}, R_G = 5\ \Omega$		21	ns
$t_{ri}$			68	ns
$t_{d(off)}$			88	ns
$t_{fi}$			340	ns
$R_{thJC}$				0.833 K/W
$R_{thCS}$		0.25		K/W

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

**TO-3P Outline**

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.193	4.70	4.90
A1	.051	.059	1.30	1.50
A2	.057	.065	1.45	1.65
b	.035	.045	0.90	1.15
b2	.075	.087	1.90	2.20
b4	.114	.126	2.90	3.20
c	.022	.031	0.55	0.80
D	.780	.799	19.80	20.30
D1	.665	.677	16.90	17.20
E	.610	.622	15.50	15.80
E1	.531	.539	13.50	13.70
e	.215 BSC		5.45 BSC	
L	.779	.795	19.80	20.20
L1	.134	.142	3.40	3.60
$\phi P$	.126	.134	3.20	3.40
$\phi P1$	.272	.280	6.90	7.10
S	.193	.201	4.90	5.10

1 - GATE  
2 - DRAIN (COLLECTOR)  
3 - SOURCE (EMITTER)  
4 - DRAIN (COLLECTOR)

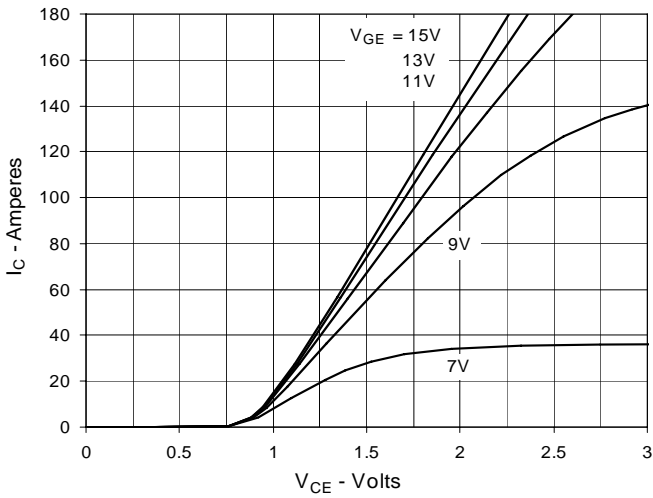
### PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

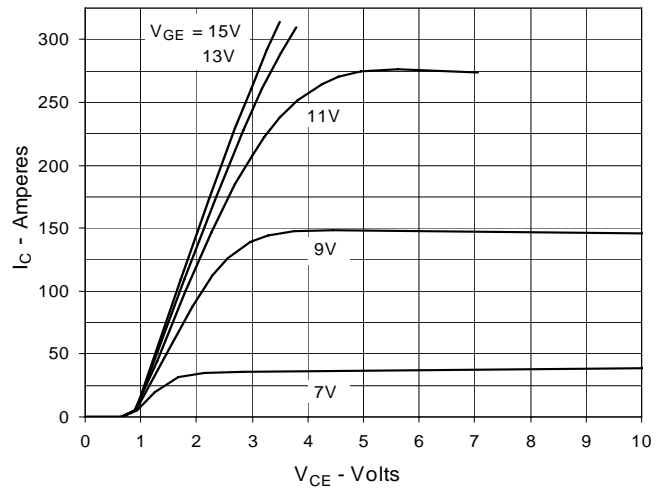
IXYS reserves the right to change limits, test conditions and dimensions.

IXYS MOSFETs and IGBTs are covered by 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  
one or more of the following U.S. patents: 4,850,072 5,017,508 5,063,307 5,381,025 5,381,025 6,259,123 B1 6,534,343 6,710,405B2 6,759,692  
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

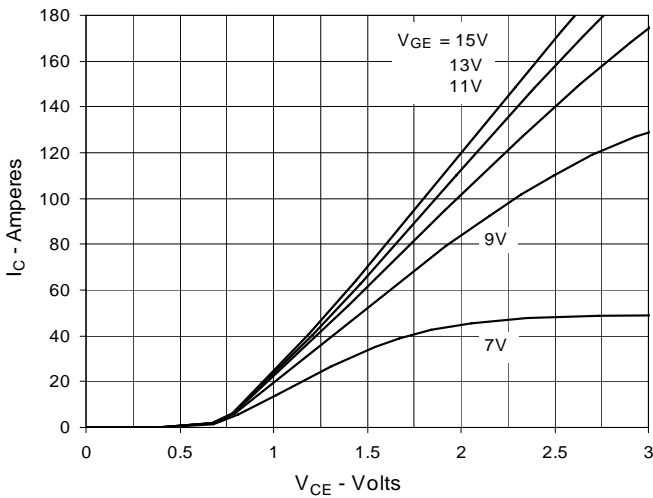
**Fig. 1. Output Characteristics @ 25°C**



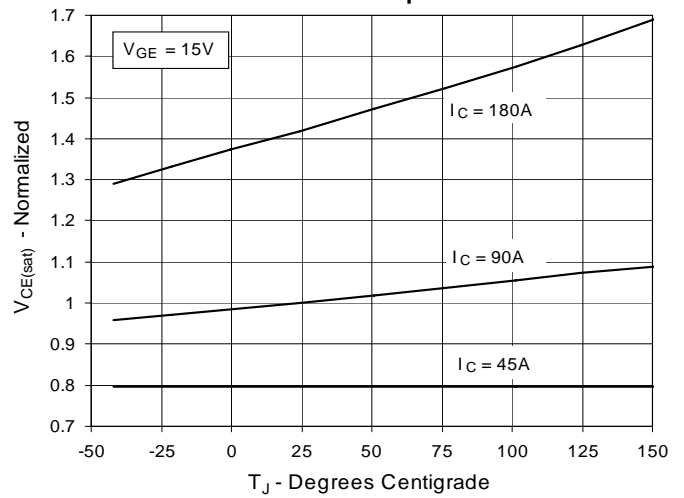
**Fig. 2. Extended Output Characteristics @ 25°C**



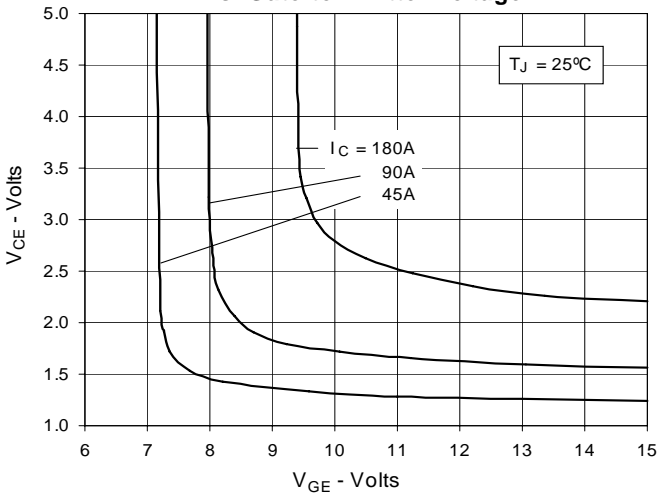
**Fig. 3. Output Characteristics @ 125°C**



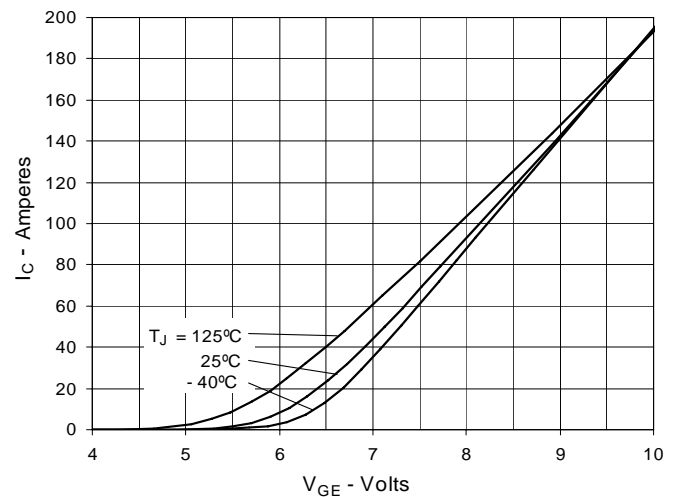
**Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature**

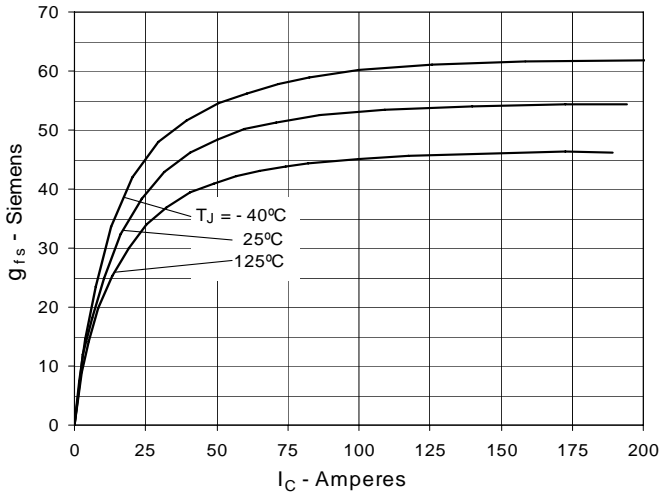
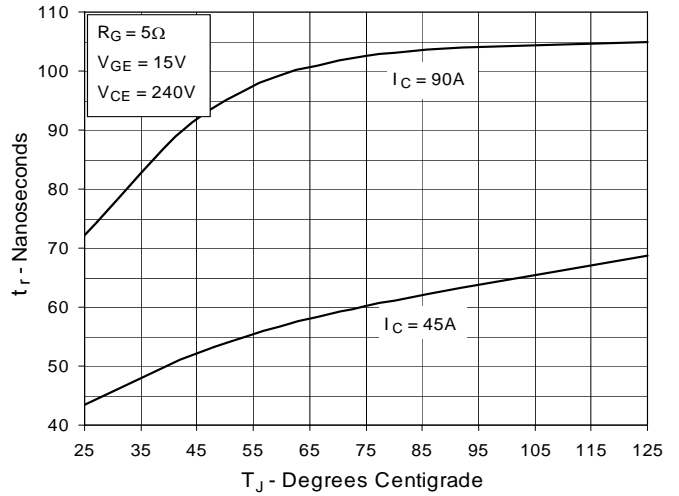
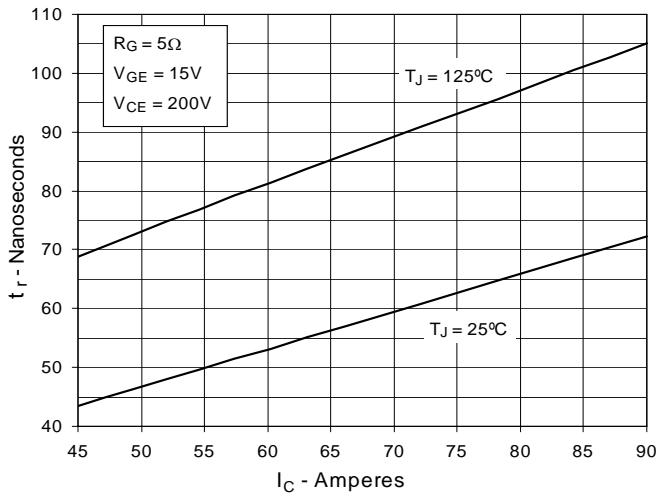
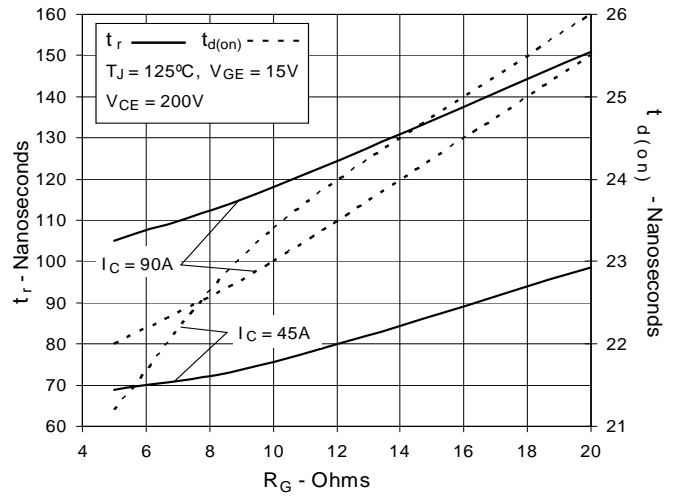
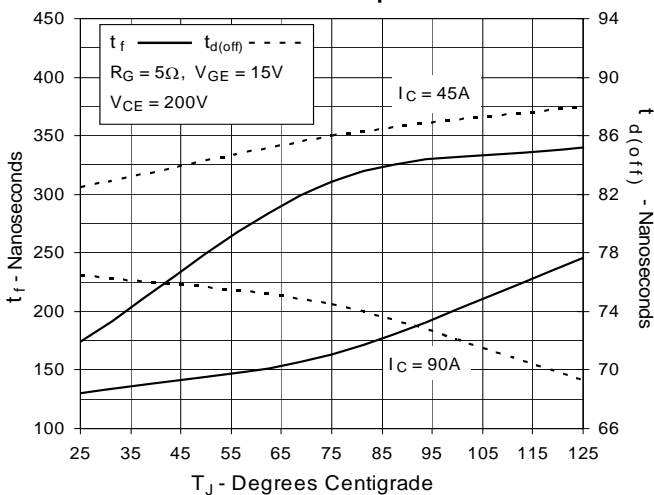
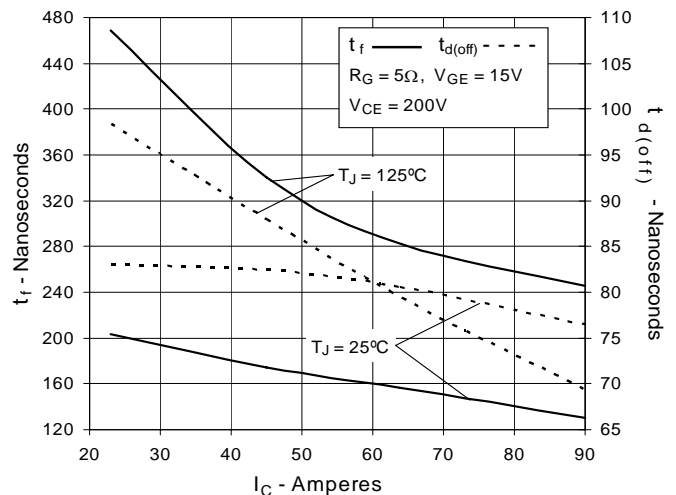


**Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage**

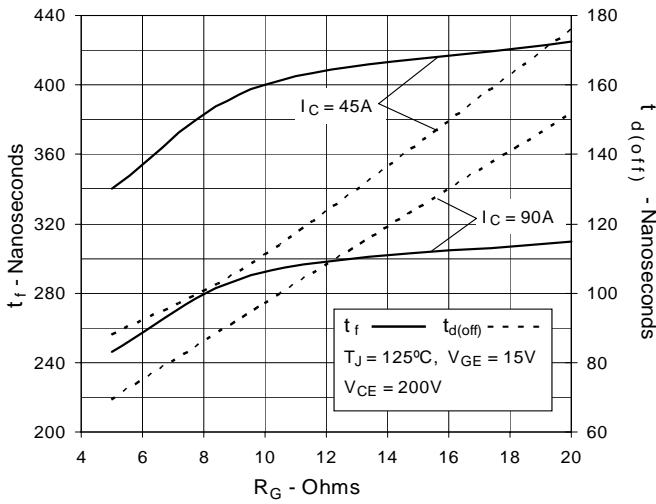


**Fig. 6. Input Admittance**

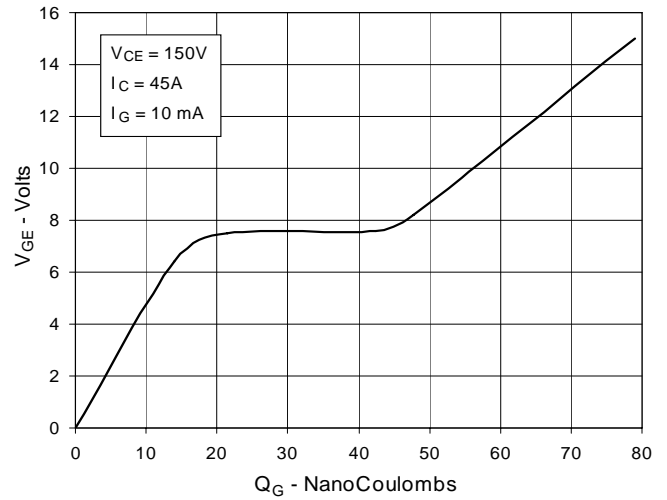


**Fig. 7. Transconductance**

**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 Switching Times vs. Gate Resistance**

**Fig. 11. Resistive Turn-Off Switching Times vs. Junction Temperature**

**Fig. 12. Resistive Turn-Off Switching Times vs. Collector Current**


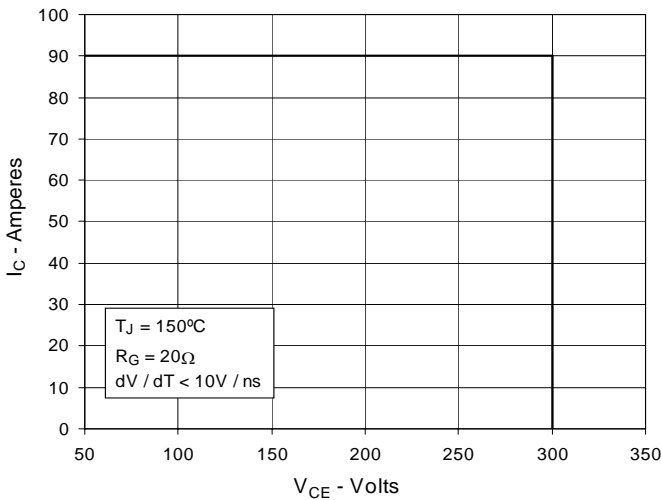
**Fig. 13. Resistive Turn-Off Switching Times vs. Gate Resistance**



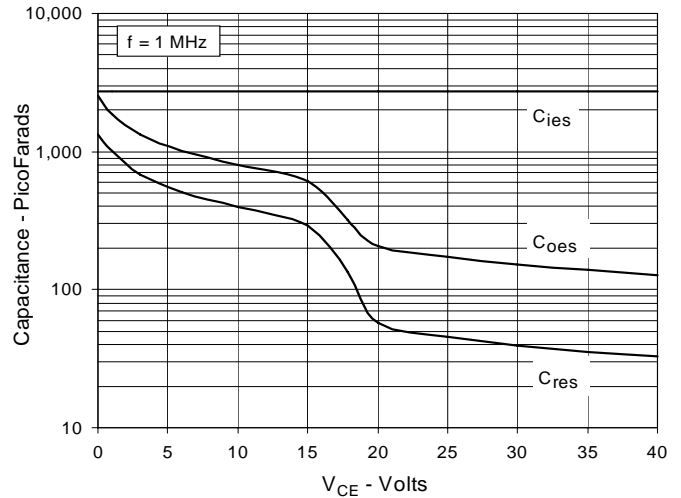
**Fig. 14. Gate Charge**



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



**Fig. 16. Capacitance**



**Fig. 17. Maximum Transient Thermal Resistance**

