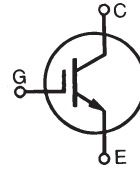


# HiPerFAST™ IGBT IXGR 120N60B

## ISOPLUS247™

(Electrically Isolated Back Surface)

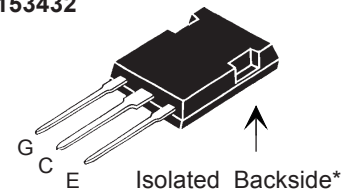
$V_{CES} = 600 \text{ V}$   
 $I_{C25} = 156 \text{ A}$   
 $V_{CE(sat)} = 2.1 \text{ V}$



Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	600	V
$V_{CGR}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1 \text{ M}\Omega$	600	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ\text{C}$	156	A
$I_{C110}$	$T_C = 110^\circ\text{C}$	102	A
$I_{L(RMS)}$	External lead limit	76	A
$I_{CM}$	$T_C = 25^\circ\text{C}, 1 \text{ ms}$	300	A
<b>SSOA (RBSOA)</b>	$V_{GE} = 15 \text{ V}, T_{VJ} = 125^\circ\text{C}, R_G = 2.4 \Omega$ Clamped inductive load	$I_{CM} = 200$ @ $0.8 V_{CES}$	A
$P_C$	$T_C = 25^\circ\text{C}$	520	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	$^\circ\text{C}$
$V_{ISOL}$	50/60 Hz, RMS, t = 1minute leads-to-tab	2500	V
<b>Weight</b>		5	g

### ISOPLUS 247

E153432



G = Gate, C = Collector  
E = Emitter

\* Patent pending

### Features

- DCB Isolated mounting tab
- Meets TO-247AD package Outline
- High current handling capability
- Latest generation HDMOS™ process
- MOS Gate turn-on - drive simplicity

### Applications

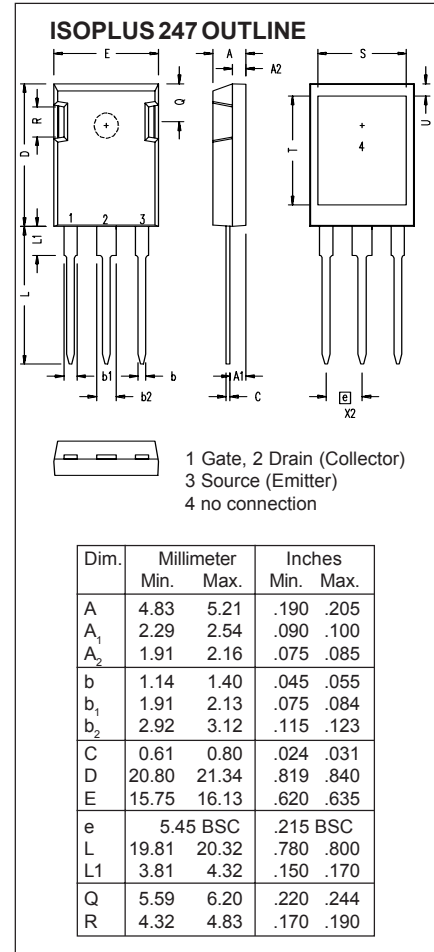
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies
- AC motor speed control
- DC servo and robot drives
- DC choppers

### Advantages

- Easy assembly
- High power density
- Very fast switching speeds for high frequency applications

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$BV_{CES}$	$I_C = 1 \text{ mA}, V_{GE} = 0 \text{ V}$	600		V
$V_{GE(th)}$	$I_C = 1 \text{ mA}, V_{CE} = V_{GE}$	2.5		5.5 V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0 \text{ V}$			$T_J = 25^\circ\text{C}$ $T_J = 150^\circ\text{C}$ 200 $\mu\text{A}$ 2 mA
$I_{GES}$	$V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$			$\pm 400 \text{ nA}$
$V_{CE(sat)}$	$I_C = 100 \text{ A}, V_{GE} = 15 \text{ V}$ (see note 1)			2.1 V

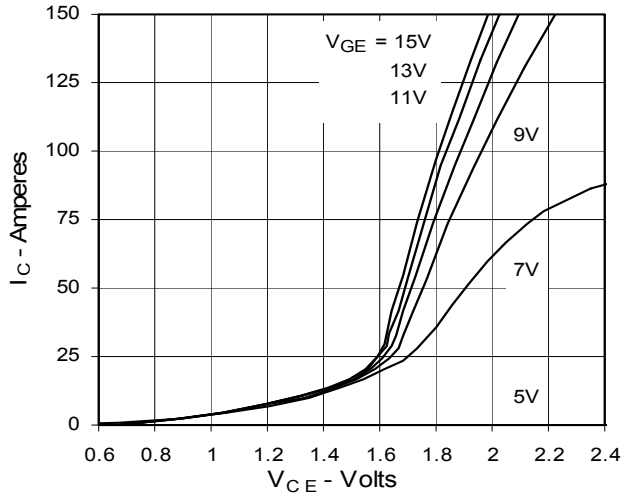
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)			
		min.	typ.	max.	
$g_{fs}$	$I_C = 60\text{A}$ ; $V_{CE} = 10\text{V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $\leq 2\%$	50	75	S	
$C_{ies}$	$V_{CE} = 25\text{V}$ , $V_{GE} = 0\text{V}$ , $f = 1\text{MHz}$		11000	pF	
$C_{oes}$			680	pF	
$C_{res}$			190	pF	
$Q_g$	$I_C = 100\text{A}$ , $V_{GE} = 15\text{V}$ , $V_{CE} = 0.5 V_{CES}$		350	nC	
$Q_{ge}$			72	nC	
$Q_{gc}$			131	nC	
$t_{d(on)}$	<b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b> $I_C = 100\text{A}$ , $V_{GE} = 15\text{V}$ $V_{CE} = 0.8 \cdot V_{CES}$ , $R_G = R_{off} = 2.4\ \Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$		60	ns	
$t_{ri}$			45	ns	
$E_{on}$			2.4	mJ	
$t_{d(off)}$			200	360	ns
$t_{fi}$			160	280	ns
$E_{off}$			5.5	9.6	mJ
$t_{d(on)}$	<b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b> $I_C = 100\text{A}$ , $V_{GE} = 15\text{V}$ $V_{CE} = 0.8 \cdot V_{CES}$ , $R_G = R_{off} = 2.4\ \Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$		60	ns	
$t_{ri}$			60	ns	
$E_{on}$			4.8	mJ	
$t_{d(off)}$			290	ns	
$t_{fi}$			250	ns	
$E_{off}$			8.7	mJ	
$R_{thJC}$			0.3	K/W	
$R_{thCK}$		0.15		K/W	



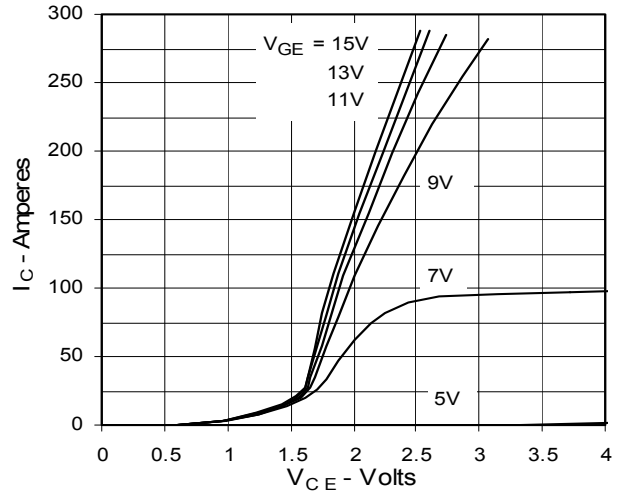
IXYS reserves the right to change limits, test conditions, and dimensions.

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	6,404,065B1	6,683,344	6,727,585
	4,850,072	5,017,508	5,063,307	5,381,025	6,259,123B1	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	

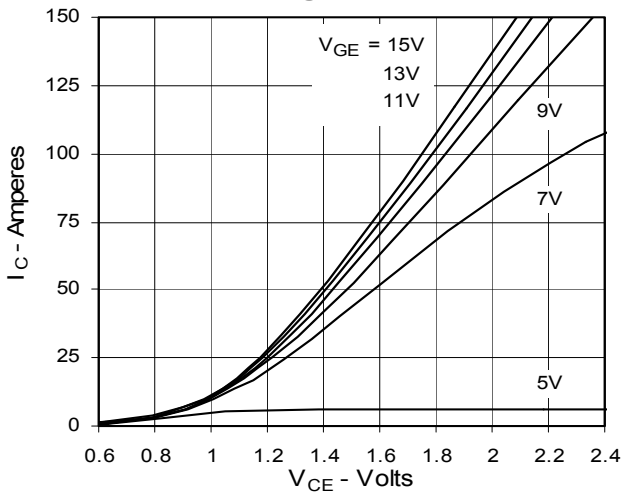
**Fig. 1. Output Characteristics**  
@ 25 °C



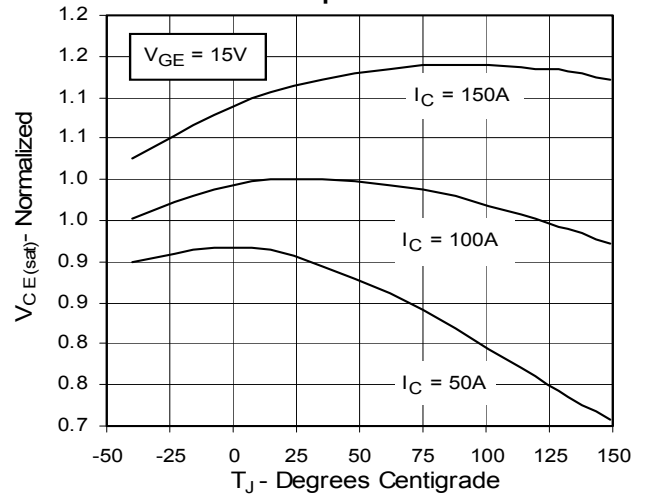
**Fig. 2. Extended Output Characteristics**  
@ 25 °C



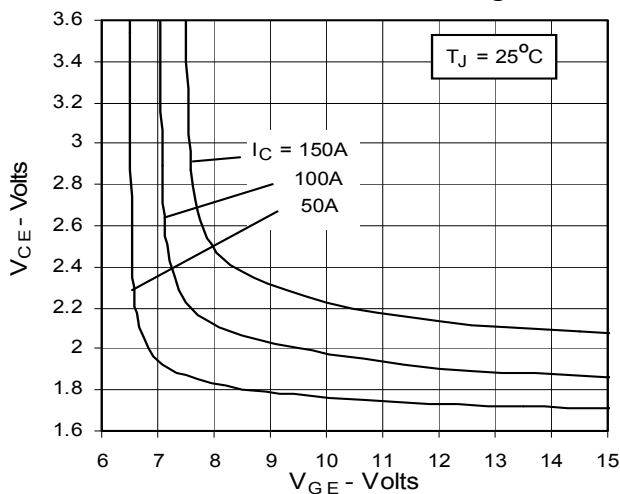
**Fig. 3. Output Characteristics**  
@ 125 °C



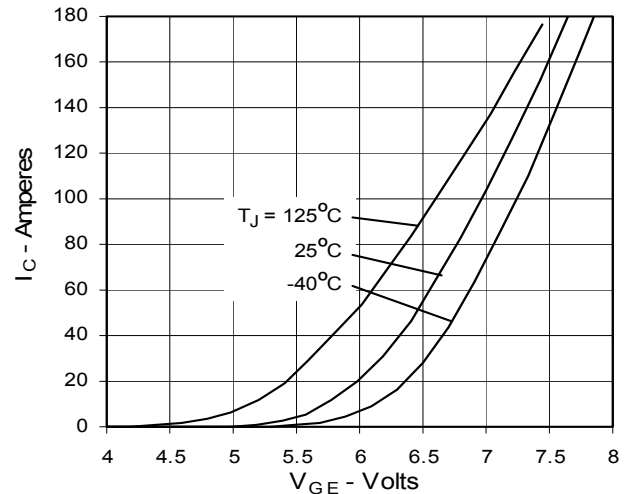
**Fig. 4. Dependence of  $V_{CE(sat)}$  on Temperature**

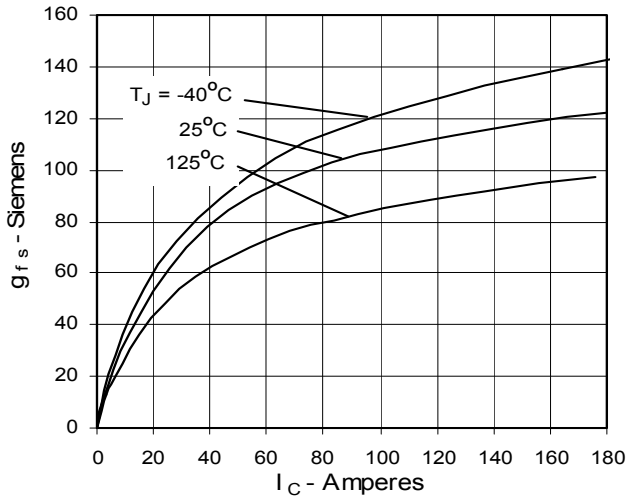
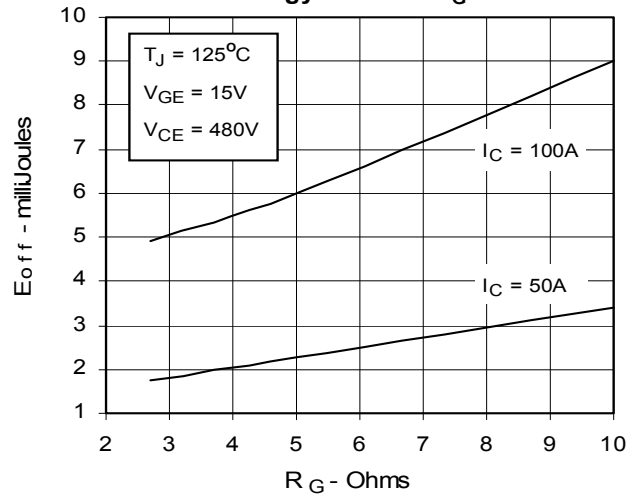
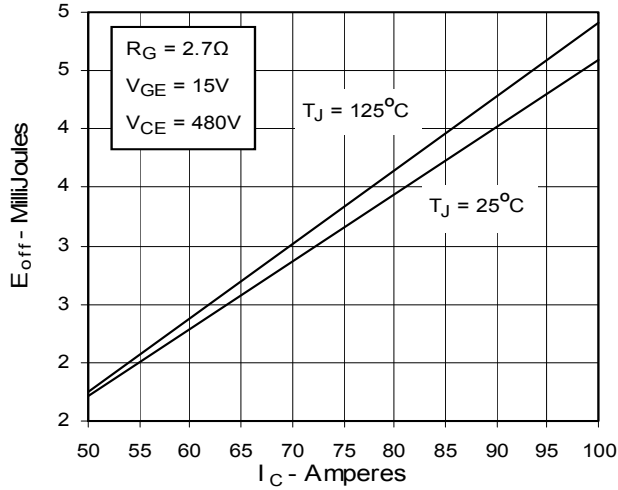
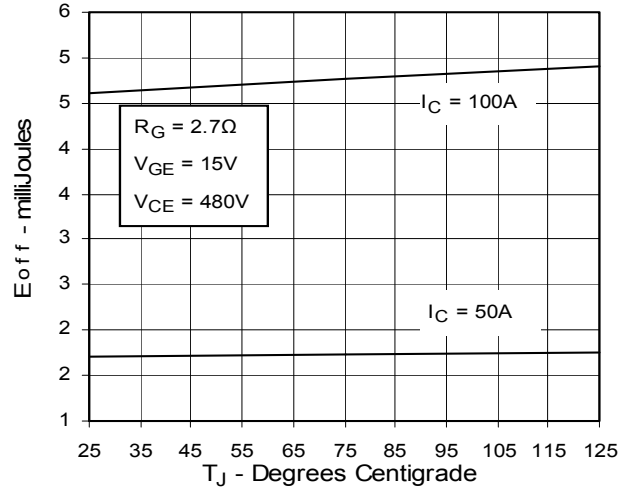
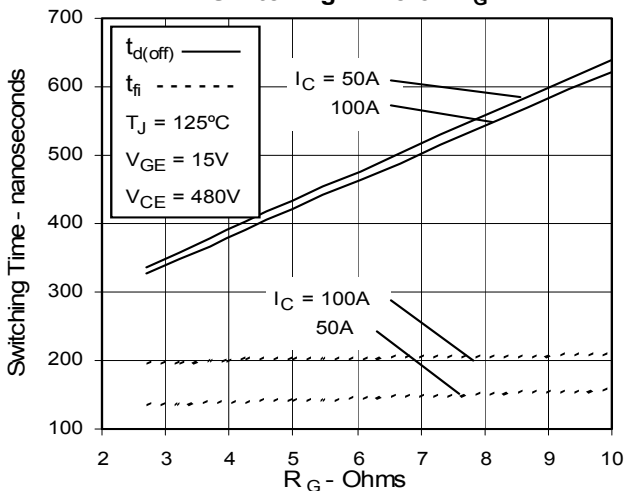
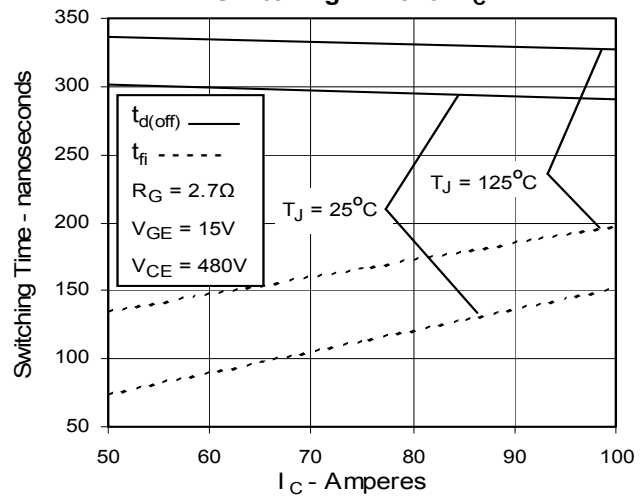


**Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter voltage**

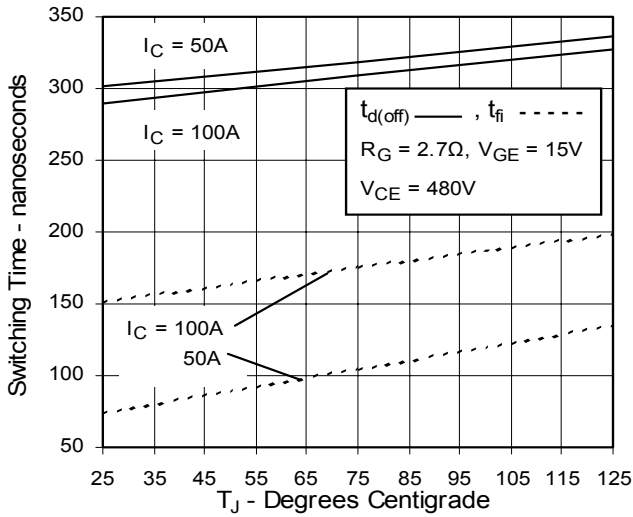


**Fig. 6. Input Admittance**

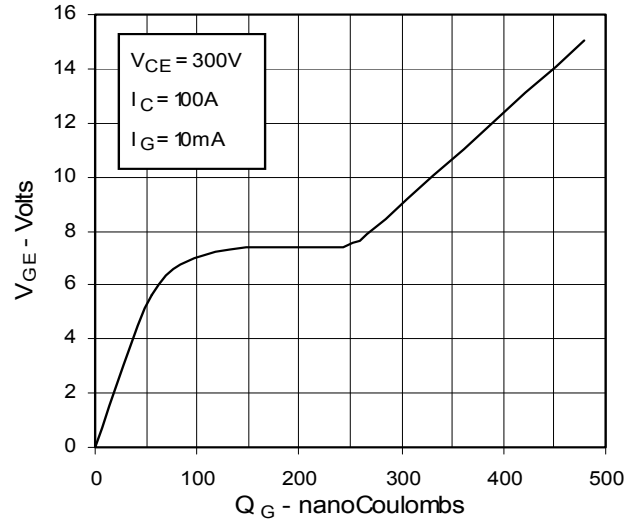


**Fig. 7. Transconductance**

**Fig. 8. Dependence of Turn-off Energy Loss on  $R_G$** 

**Fig. 9. Dependence of Turn-Off Energy Loss on  $I_C$** 

**Fig. 10. Dependence of Turn-off Energy Loss on Temperature**

**Fig. 11. Dependence of Turn-off Switching Time on  $R_G$** 

**Fig. 12. Dependence of Turn-off Switching Time on  $I_C$** 


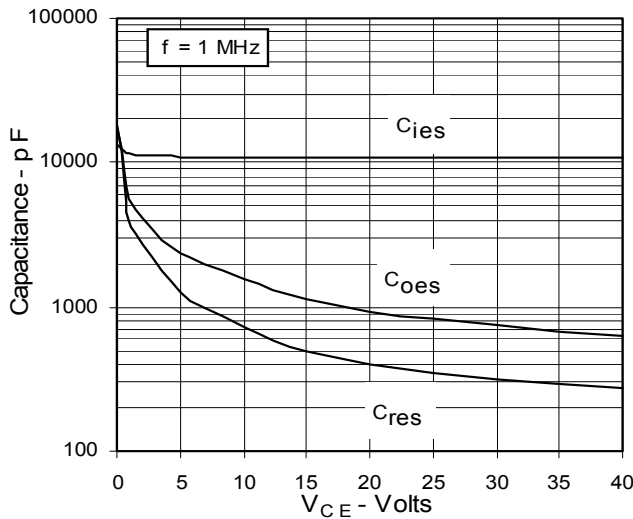
**Fig. 13. Dependence of Turn-off Switching Time on Temperature**



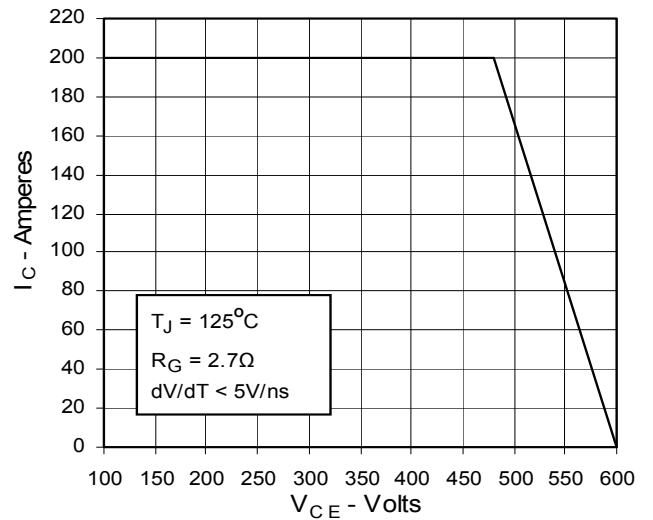
**Fig. 14. Gate Charge**



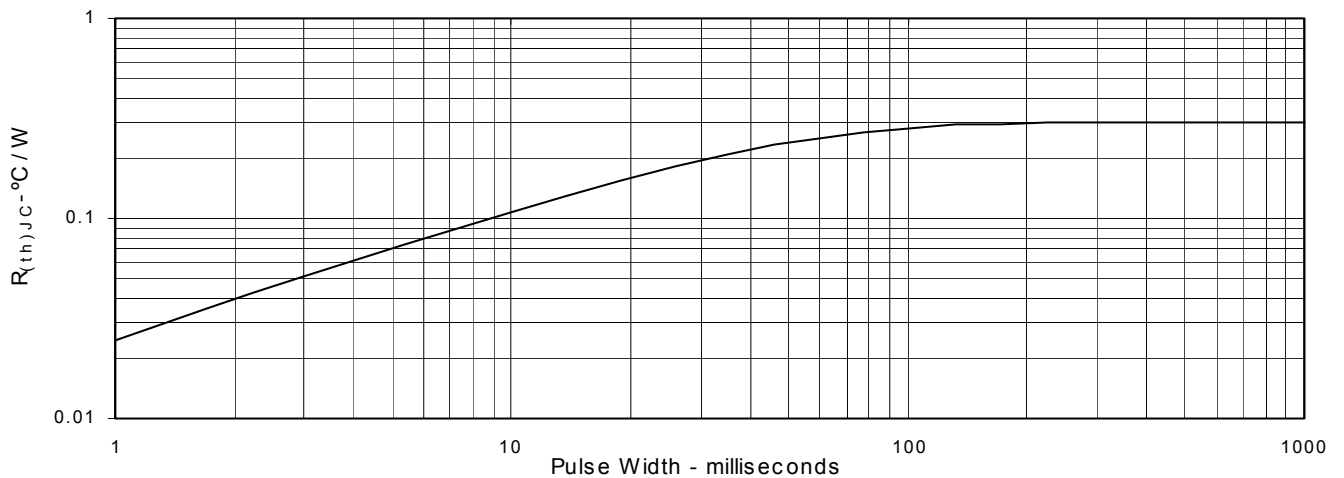
**Fig. 15. Capacitance**



**Fig. 16. Reverse-Bias Safe Operating Area**



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





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