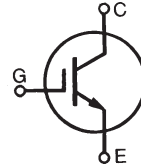


# HiPerFAST™ IGBT

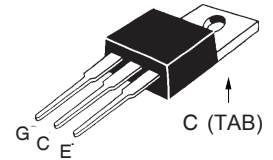
## C2- Class High Speed IGBTs

# IXGP 30N60C2

$V_{CES} = 600 \text{ V}$   
 $I_{C25} = 70 \text{ A}$   
 $V_{CE(sat)} = 2.7 \text{ V}$   
 $t_{fi typ} = 32 \text{ ns}$



### TO-220 (IXGP)



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

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
$I_{C25}$	$T_C = 25^\circ\text{C}$ (limited by leads)	70	A
$I_{C110}$	$T_C = 110^\circ\text{C}$	30	A
$I_{CM}$	$T_C = 25^\circ\text{C}$ , 1 ms	150	A
<b>SSOA</b> <b>(RBSOA)</b>	$V_{GE} = 15 \text{ V}$ , $T_{VJ} = 125^\circ\text{C}$ , $R_G = 10 \Omega$ Clamped inductive load @ $\leq 600 \text{ V}$	$I_{CM} = 60$	A
$P_C$	$T_C = 25^\circ\text{C}$	190	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	$^\circ\text{C}$
$M_d$	Mounting torque	1.13/10Nm/lb.in.	
<b>Weight</b>		4	g

### Features

- Very high frequency IGBT
- Square RBSOA
- High current handling capability
- MOS Gate turn-on  
- drive simplicity

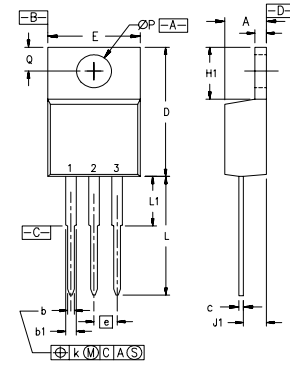
### Applications

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

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{GE(th)}$	$I_C = 250 \mu\text{A}$ , $V_{CE} = V_{GE}$	2.5		5.0 V
$I_{CES}$	$V_{CE} = V_{CES}$ $V_{GE} = 0 \text{ V}$			50 $\mu\text{A}$ 1 mA
$I_{GES}$	$V_{CE} = 0 \text{ V}$ , $V_{GE} = \pm 20 \text{ V}$			$\pm 100 \text{ nA}$
$V_{CE(sat)}$	$I_C = 24 \text{ A}$ , $V_{GE} = 15 \text{ V}$			2.7 V

Symbol	Test Conditions	Characteristic Values (T <sub>J</sub> = 25°C, unless otherwise specified)			
		min.	typ.	max.	
$g_{fs}$	$I_C = 24\text{ A}; V_{CE} = 10\text{ V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $\leq 2\%$	18	28	S	
$C_{ies}$	$V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$		1430	pF	
$C_{oes}$			110	pF	
$C_{res}$			40	pF	
$Q_g$	$I_C = 24\text{ A}, V_{GE} = 15\text{ V}, V_{CE} = 300\text{ V}$		70	nC	
$Q_{ge}$			10	nC	
$Q_{gc}$			23	nC	
$t_{d(on)}$	<b>Inductive load, T<sub>J</sub> = 25°C</b> $I_C = 24\text{ A}, V_{GE} = 15\text{ V}$ $V_{CE} = 400\text{ V}, R_G = 5\ \Omega$		13	ns	
$t_{ri}$			15	ns	
$t_{d(off)}$			70	140	ns
$t_{fi}$			60	ns	
$E_{off}$			0.19	0.30	mJ
$t_{d(on)}$	<b>Inductive load, T<sub>J</sub> = 125°C</b> $I_C = 24\text{ A}, V_{GE} = 15\text{ V}$ $V_{CE} = 400\text{ V}, R_G = 5\ \Omega$		13	ns	
$t_{ri}$			17	ns	
$E_{on}$			0.22	mJ	
$t_{d(off)}$			120	ns	
$t_{fi}$			130	ns	
$E_{off}$			0.59	mJ	
$R_{thJC}$				0.65	KW
$R_{thCH}$				0.25	KW

## TO-220 Outline

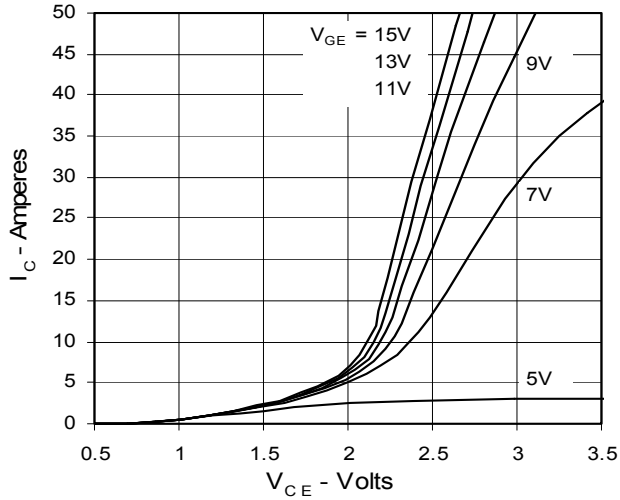
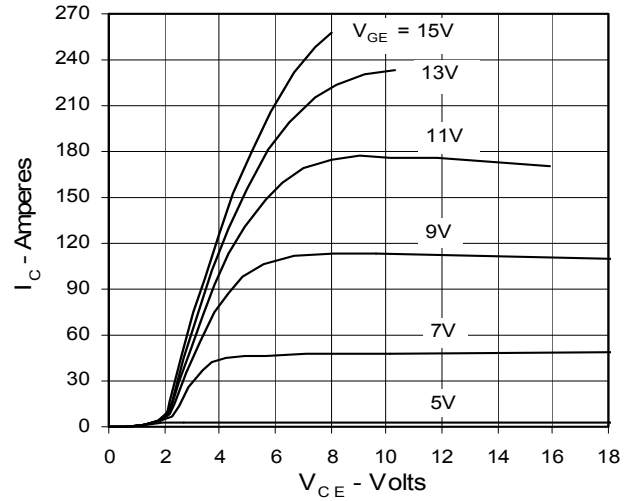
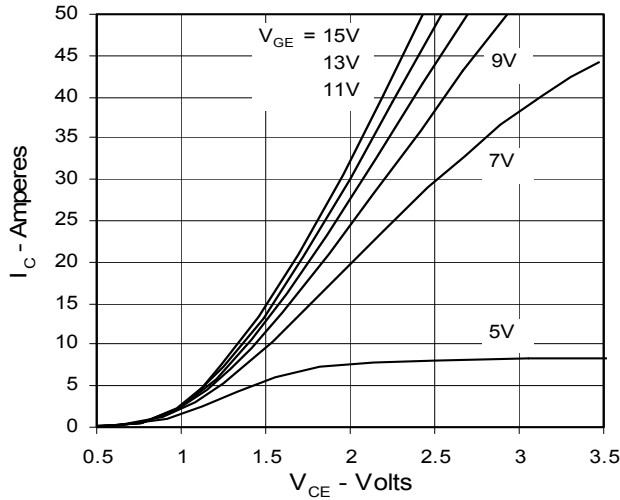
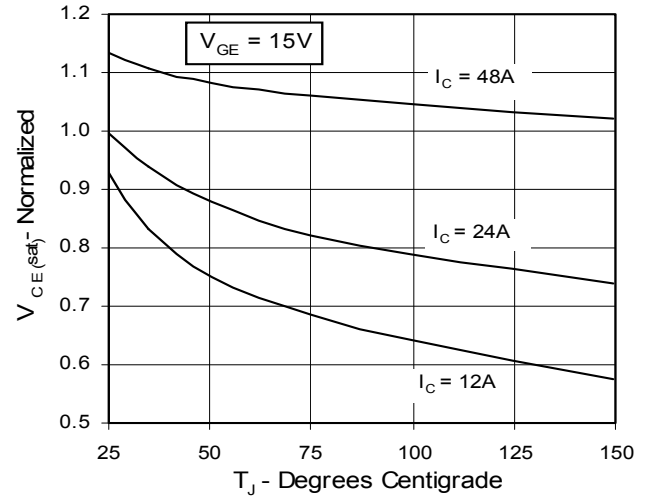
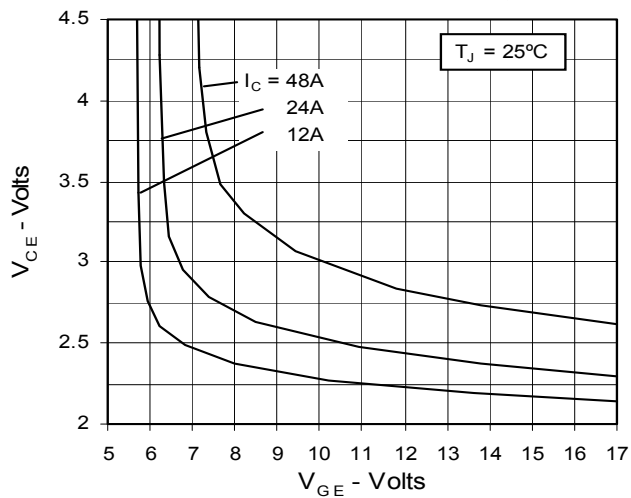
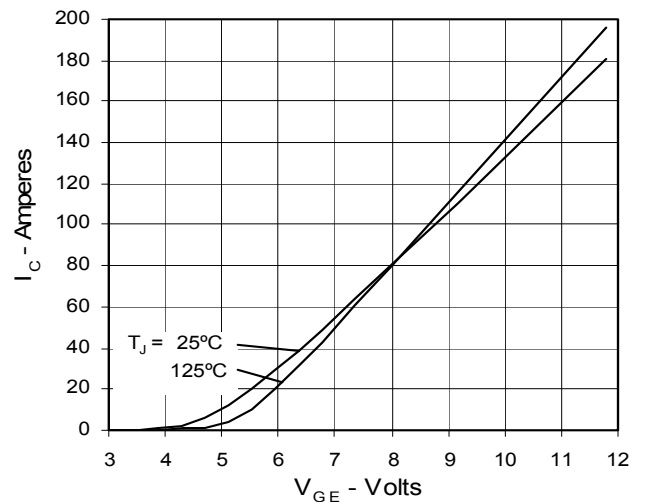


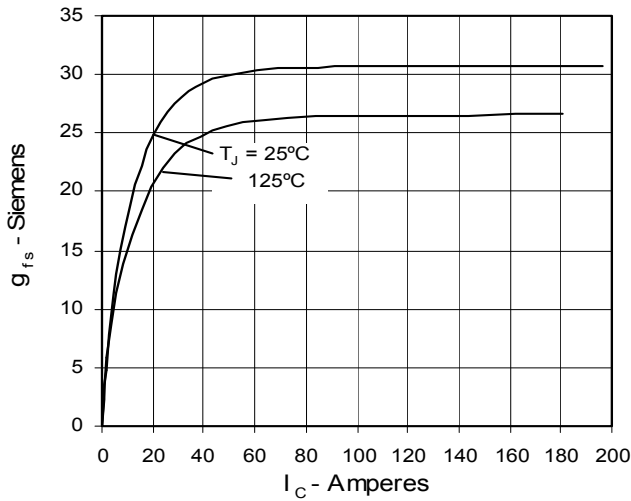
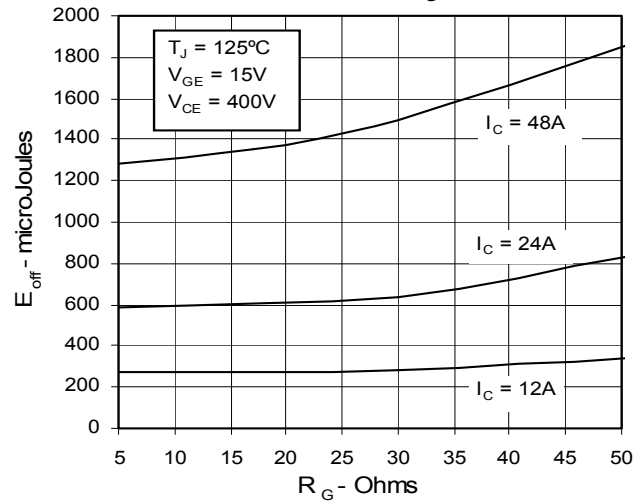
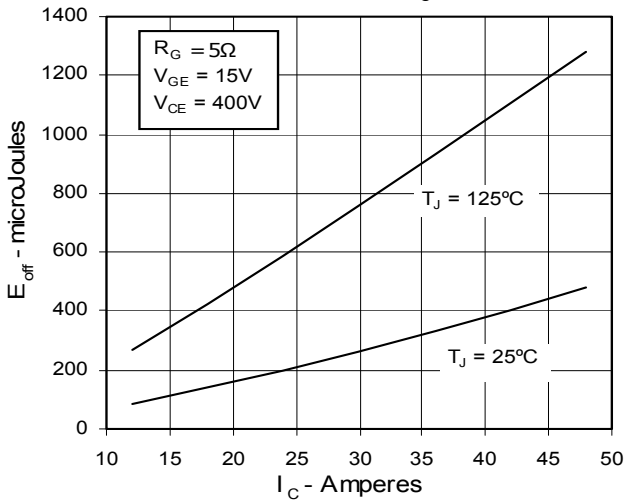
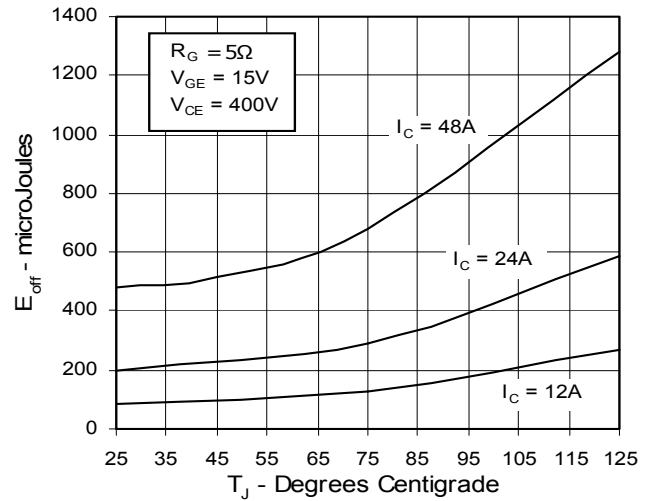
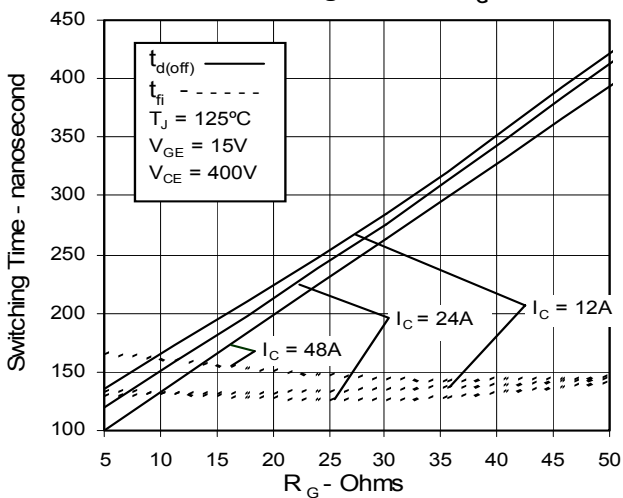
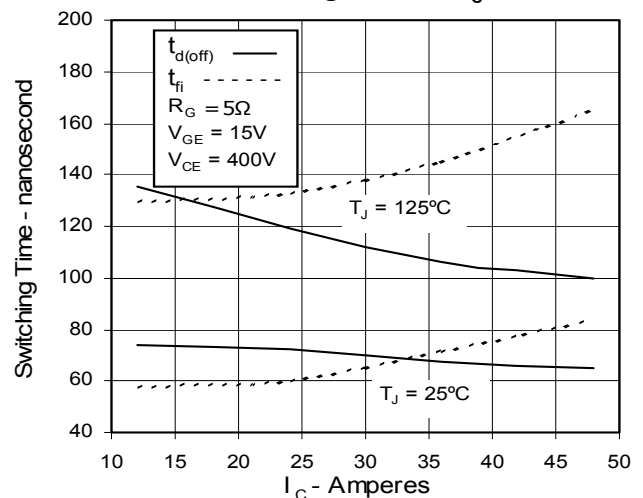
Pins: 1 - Gate 2 - Drain  
3 - Source 4 - Drain

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.170	.190	4.32	4.83
b	.025	.040	0.64	1.02
b1	.045	.065	1.15	1.65
c	.014	.022	0.35	0.56
D	.580	.630	14.73	16.00
E	.390	.420	9.91	10.66
e	.100	BSC	2.54	BSC
F	.045	.055	1.14	1.40
H1	.230	.270	5.85	6.85
J1	.090	.110	2.29	2.79
k	0	.015	0	0.38
L	.500	.550	12.70	13.97
L1	.110	.230	2.79	5.84
ØP	.139	.161	3.53	4.08
Q	.100	.125	2.54	3.18

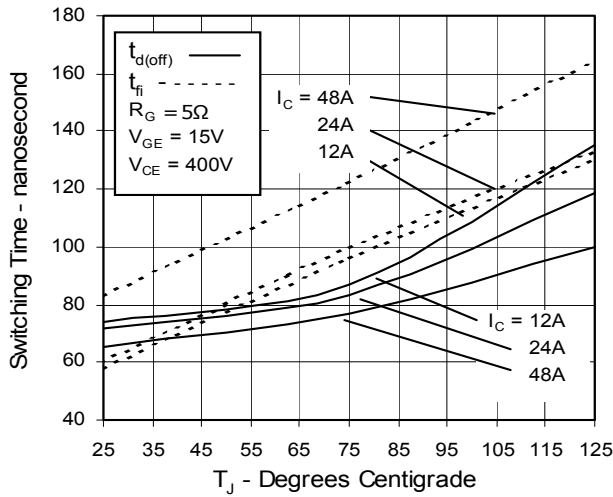
IXYS reserves the right to change limits, test conditions, and dimensions.

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
	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
	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

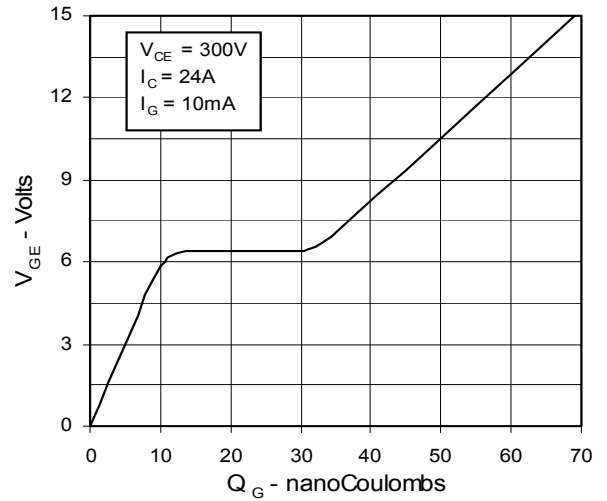
**Fig. 1. Output Characteristics  
@ 25 Deg. C**

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

**Fig. 3. Output Characteristics  
@ 125 Deg. 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 on  $R_G$** 

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

**Fig. 10. Dependence of Turn-Off Energy on Temperature**

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

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


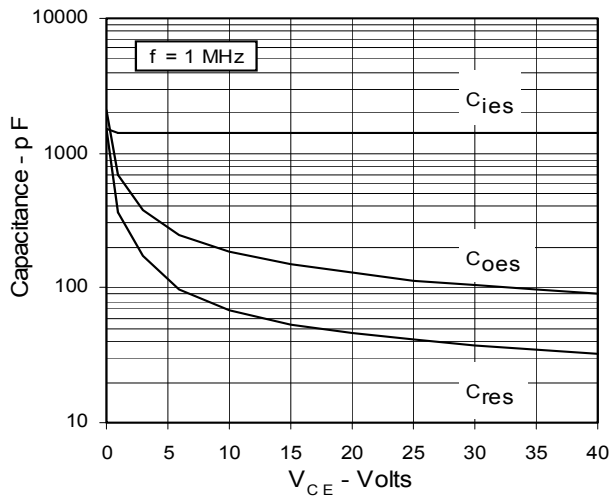
**Fig. 13. Dependence of Turn-Off Switching Time on Temperature**



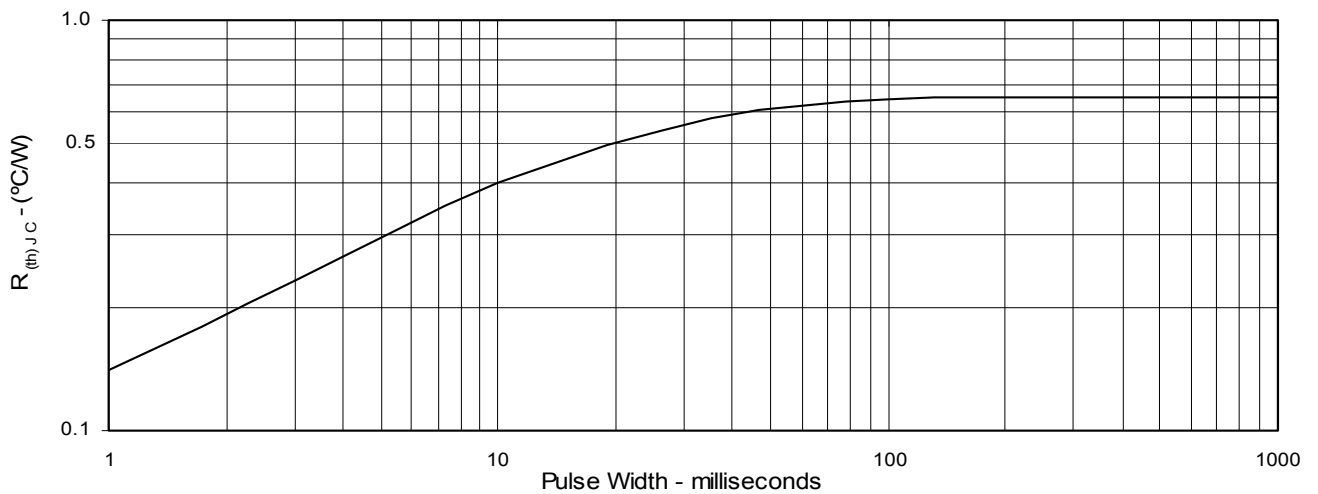
**Fig. 14. Gate Charge**



**Fig. 15. Capacitance**



**Fig. 16. Maximum Transient Thermal Resistance**





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