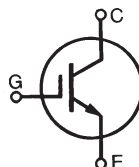


HiPerFAST™ High Speed IGBT C2-Class

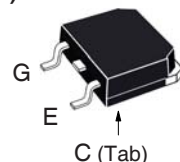
IXGH50N60C2
IXGT50N60C2



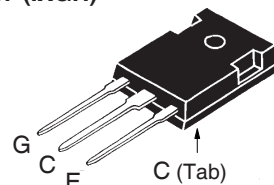
$$\begin{aligned} V_{CES} &= 600V \\ I_{C110} &= 50A \\ V_{CE(sat)} &\leq 2.7V \\ t_{fi(typ)} &= 48ns \end{aligned}$$

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C}$ to 150°C	600	V
V_{CGR}	$T_J = 25^\circ\text{C}$ to 150°C , $R_{GE} = 1M\Omega$	600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$ (Limited by Leads)	75	A
I_{C110}	$T_C = 110^\circ\text{C}$	50	A
I_{CM}	$T_C = 25^\circ\text{C}$, 1ms	300	A
SSOA (RBSOA)	$V_{GE} = 15V$, $T_{VJ} = 125^\circ\text{C}$, $R_G = 10\Omega$ Clamped Inductive Load	$I_{CM} = 80$ @ $V_{CE} \leq V_{CES}$	A
P_C	$T_C = 25^\circ\text{C}$	400	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	300	$^\circ\text{C}$
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	$^\circ\text{C}$
M_d	Mounting Torque	1.13/10	Nm/lb.in
Weight	TO-268	4	g
	TO-247	6	g

TO-268 (IXGT)



TO-247 (IXGH)



G = Gate C = Collector
E = Emitter Tab = Collector

Features

- Very High Frequency IGBT
- Square RBSOA
- High Current Handling Capability
- International Standard Packages

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

- Switch-Mode and Resonant-Mode Power Supplies
- Uninterruptible Power Supplies (UPS)
- PFC Circuits
- AC Motor Drives
- DC Servo & Robot Drives
- DC Choppers

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu\text{A}$, $V_{GE} = 0V$	600		V
$V_{GE(th)}$	$I_C = 250\mu\text{A}$, $V_{CE} = V_{GE}$	3.0		5.5 V
I_{CES}	$V_{CE} = V_{CES}$, $V_{GE} = 0V$ $T_J = 125^\circ\text{C}$			50 μA 1 mA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 100 nA
$V_{CE(sat)}$	$I_C = 40A$, $V_{GE} = 15V$, Note 1 $T_J = 125^\circ\text{C}$		1.8	2.7 V V

Symbol Test Conditions

($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)

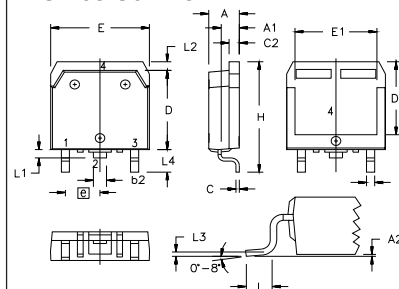
Characteristic Values

		Min.	Typ.	Max.	
g_{fs}	$I_C = 40\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$	40	51		S
C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		3700		pF
C_{oes}			230		pF
C_{res}			50		pF
$Q_{g(on)}$	$I_C = 40\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$		138		nC
Q_{ge}			25		nC
Q_{gc}			40		nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 40\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 0.8 \cdot V_{CES}, R_G = 2\Omega$ Note 2		18		ns
t_{ri}			25		ns
$t_{d(off)}$			115	150	ns
t_{fi}			48		ns
E_{off}			0.38	0.70	mJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = 40\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 0.8 \cdot V_{CES}, R_G = 2\Omega$ Note 2		18		ns
t_{ri}			25		ns
E_{on}			1.4		mJ
$t_{d(off)}$			170		ns
t_{fi}			60		ns
E_{off}			0.74		mJ
R_{thJC}	TO-247			0.31	$^\circ\text{C/W}$
R_{thCS}			0.21		$^\circ\text{C/W}$

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 .

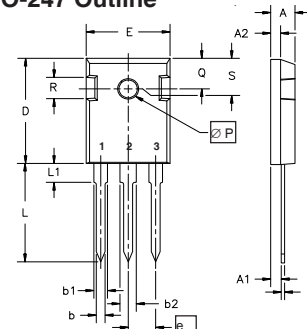
TO-268 Outline



Terminals: 1 - Gate
3 - Emitter
2,4 - Collector

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

TO-247 Outline



Terminals: 1 - Gate
3 - Emitter
2 - Collector

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A ₁	2.2	2.54	.087	.102
A ₂	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b ₁	1.65	2.13	.065	.084
b ₂	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
ØP	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15	BSC	242	BSC

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
4,860,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,6		

Fig. 1. Output Characteristics

@ $T_J = 25^\circ\text{C}$

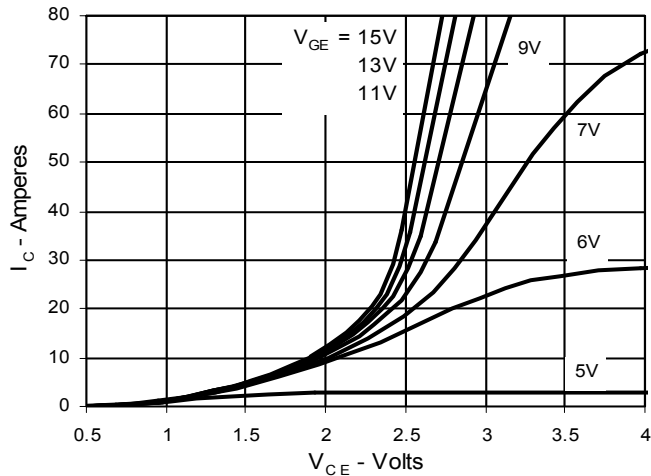


Fig. 2. Extended Output Characteristics

@ $T_J = 25^\circ\text{C}$

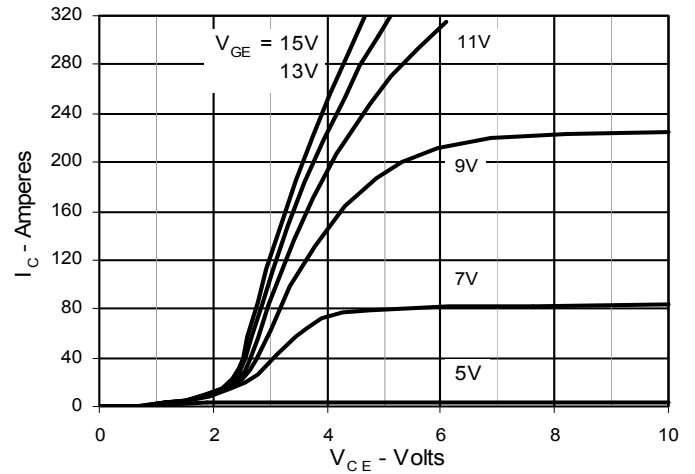


Fig. 3. Output Characteristics

@ $T_J = 125^\circ\text{C}$

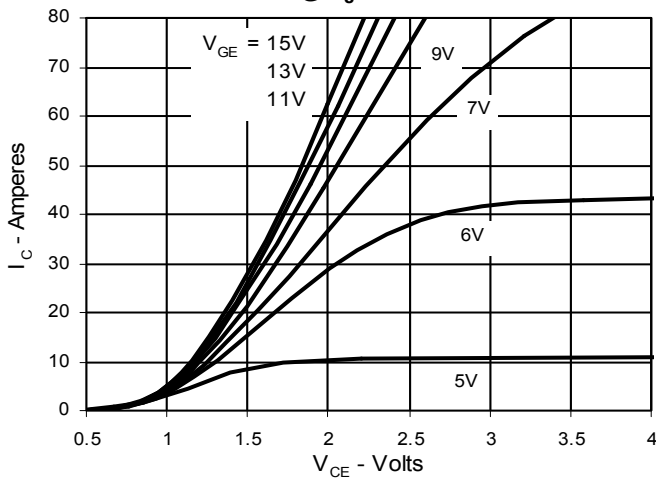


Fig. 4. Dependence of $V_{CE(sat)}$ on Temperature

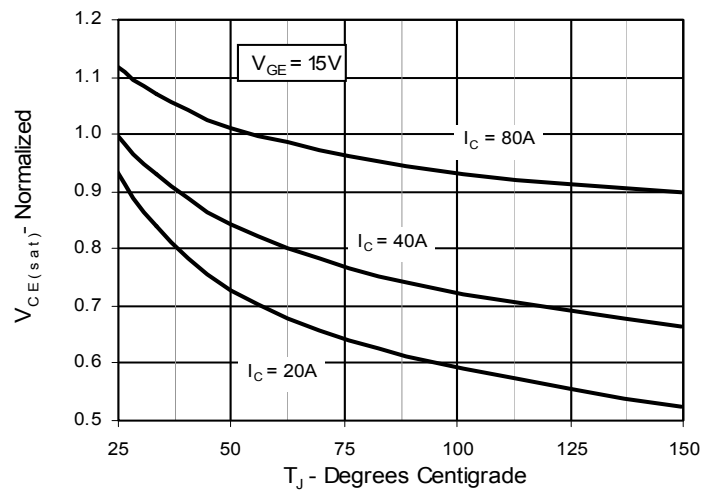


Fig. 5. Collector-to-Emitter Voltage
vs. Gate-to-Emitter voltage

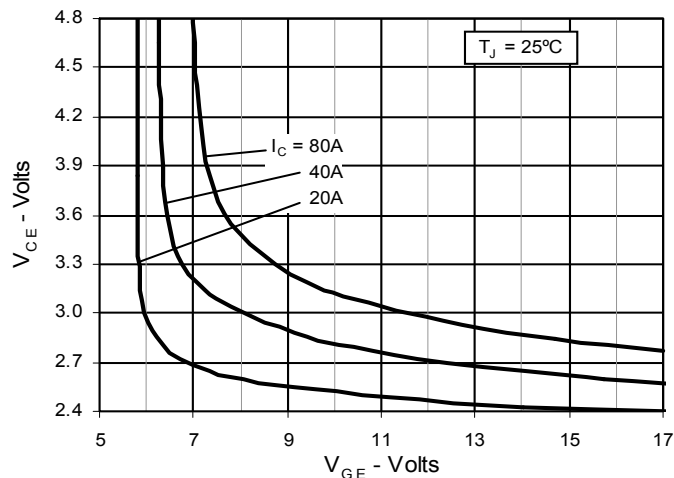


Fig. 6. Input Admittance

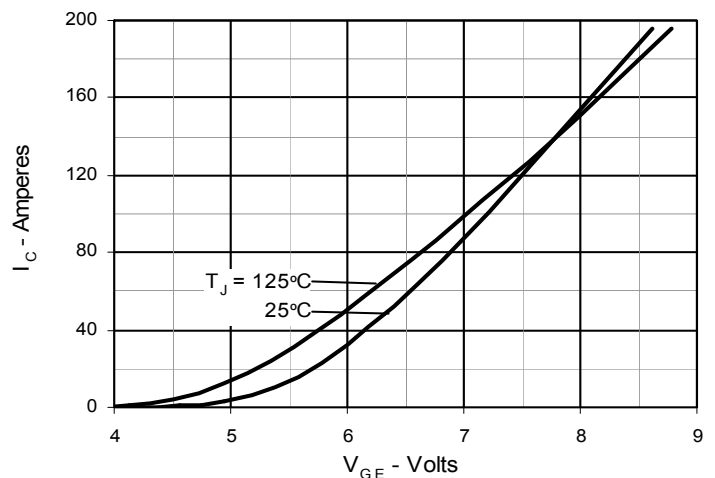


Fig. 7. Transconductance

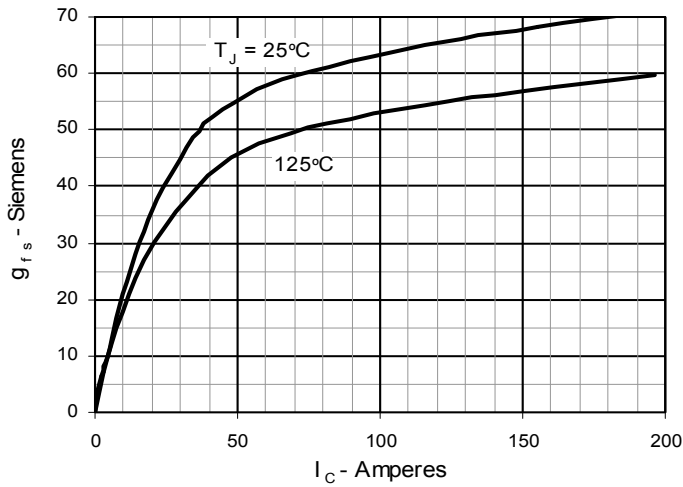


Fig. 8. Dependence of Turn-Off Energy on R_G

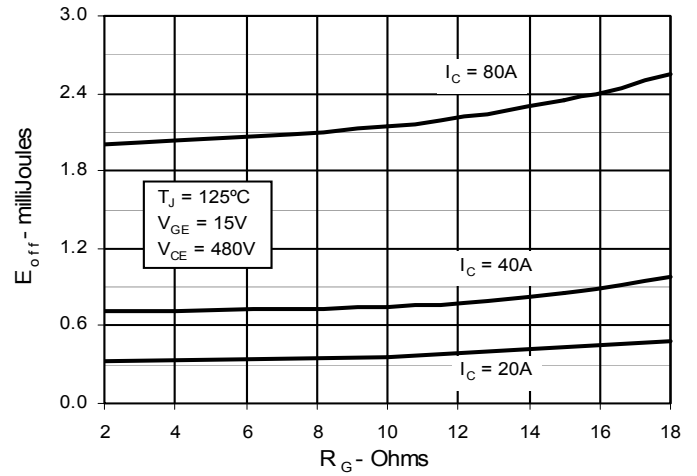


Fig. 9. Dependence of Turn-Off Energy on I_C

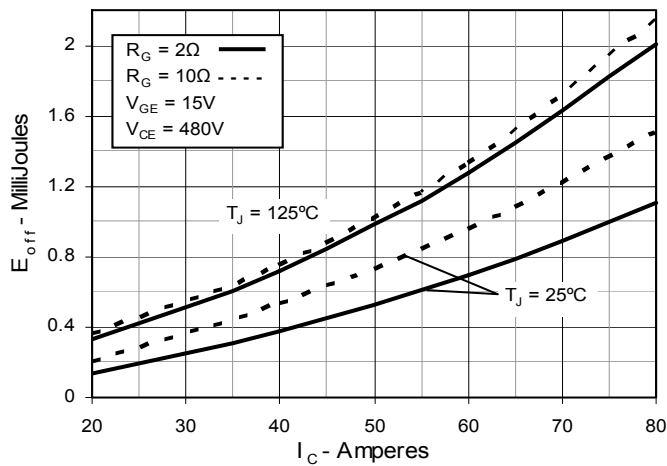


Fig. 10. Dependence of Turn-Off Energy on Temperature

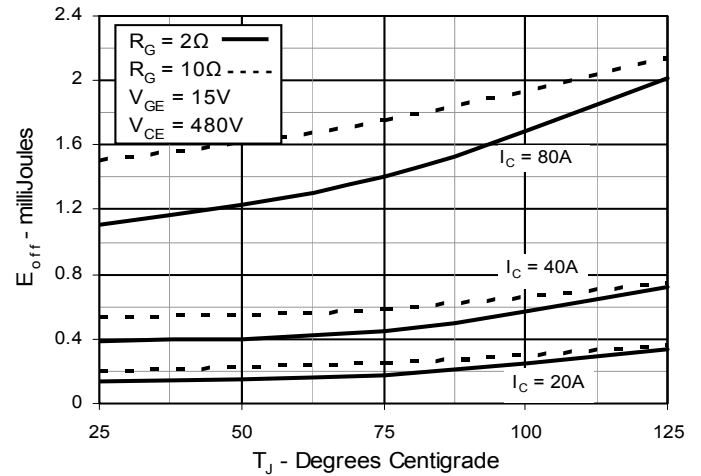


Fig. 11. Dependence of Turn-Off Switching Time on R_G

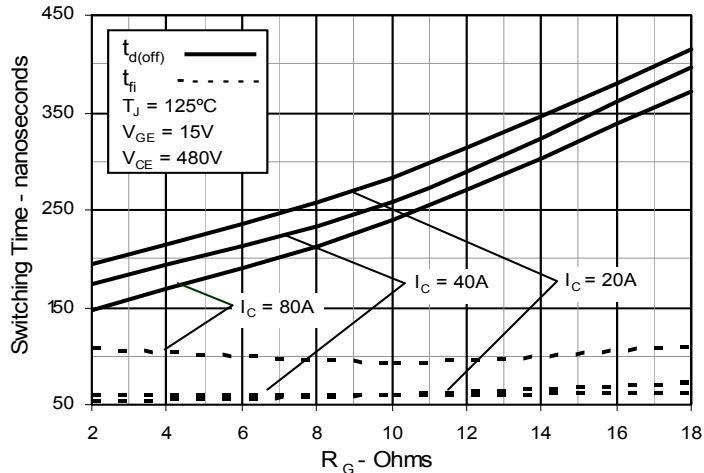


Fig. 12. Dependence of Turn-Off Switching Time on I_C

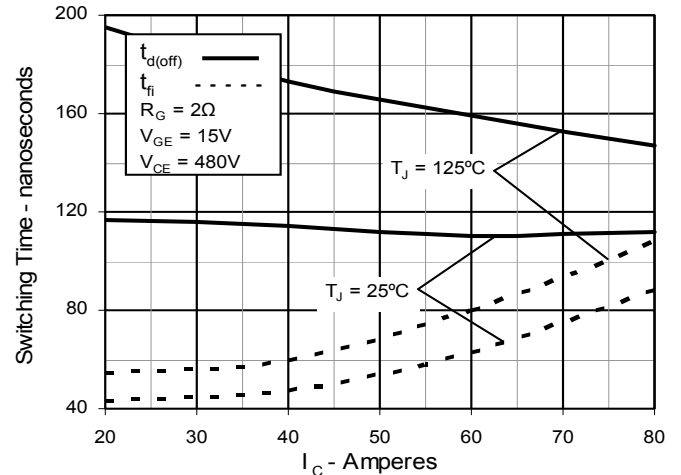


Fig. 13. Dependence of Turn-Off Switching Time on Temperature

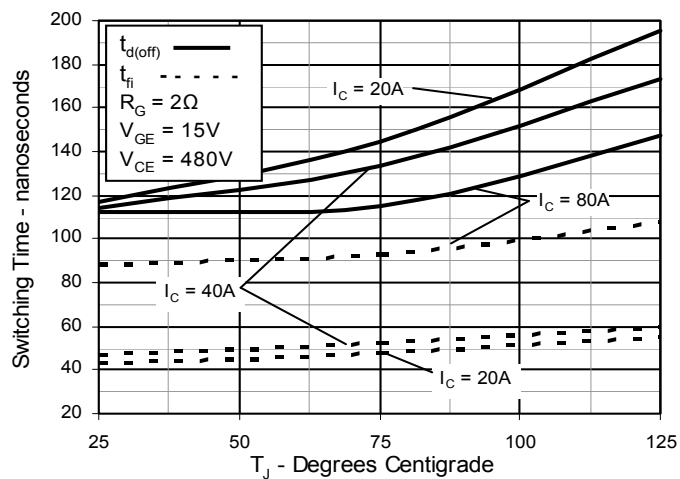


Fig. 14. Reverse-Bias Safe Operating Area

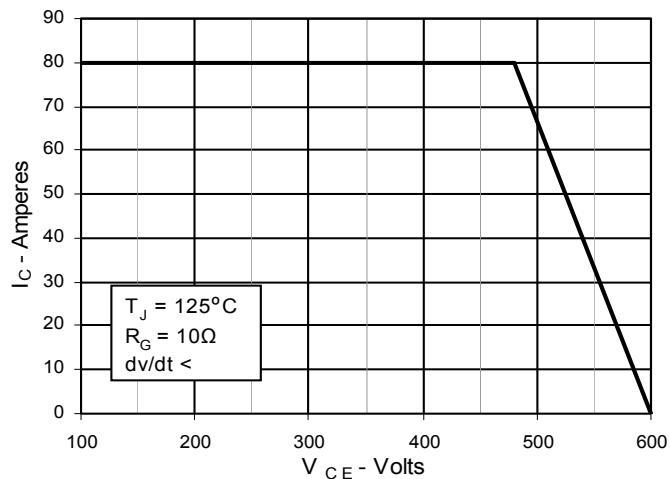


Fig. 15. Gate Charge

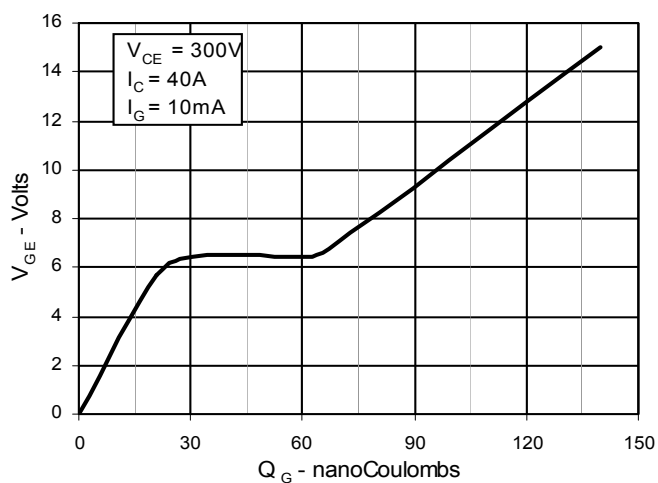


Fig. 16. Capacitance

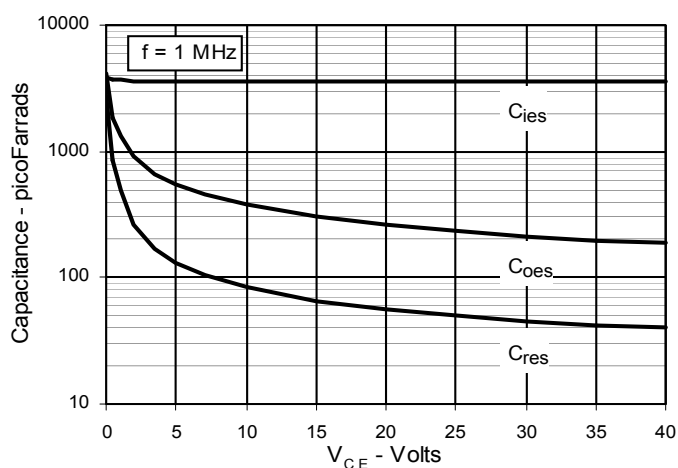
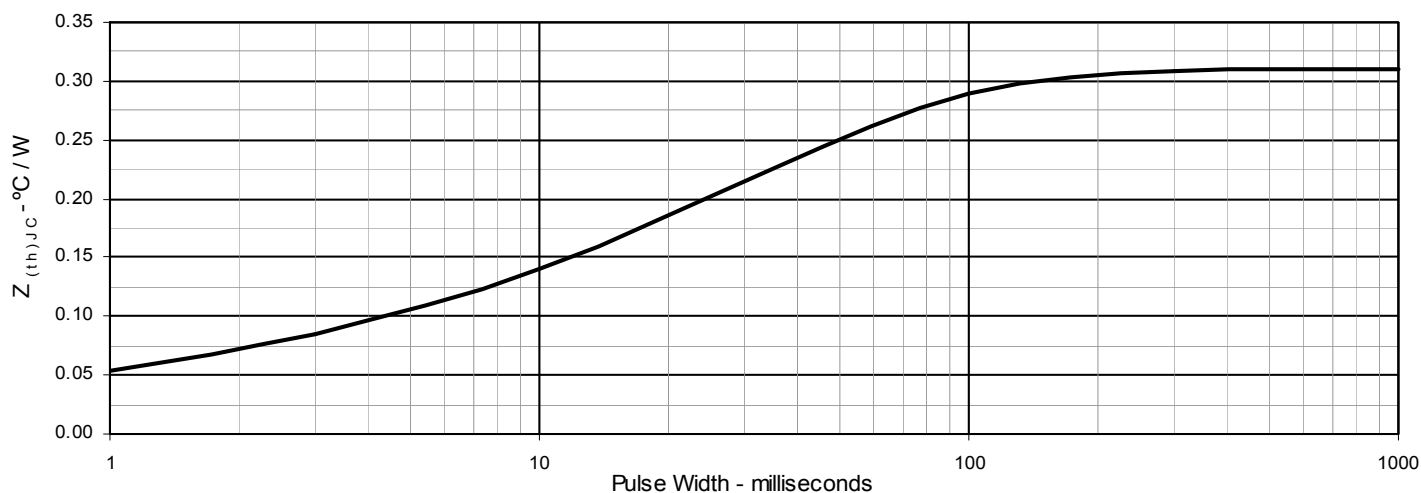


Fig. 17. Maximum Transient Thermal Resistance



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