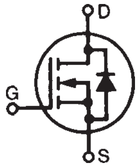
IXYS

HiPerFAST™ IGBT

IXGK 120N60B
IXGX 120N60B

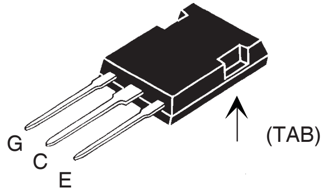
V_{CES} = 600 V
I_{C25} = 200 A
$V_{CE(sat)}$ = 2.1 V



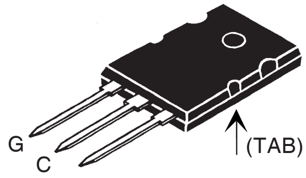
Symbol	Test Conditions		Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C		600	V
V_{CGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ		600	V
V_{CES}	Continuous		±20	V
V_{GEM}	Transient		±30	V
I_{C25}	T_C = 25°C		200	A
I_{C90}	T_C = 90°C		120	A
$I_{L(RMS)}$	External lead limit		76	A
I_{CM}	T_C = 25°C, 1 ms		300	A
SSOA **(RBSOA)**	V_{GE} = 15 V, T_{VJ} = 125°C, R_G = 2.4 Ω Clamped inductive load		I_{CM} = 200 @ 0.8 V_{CES}	A
P_C	T_C = 25°C		660	W
T_J			-55 ... +150	°C
T_{JM}			150	°C
T_{stg}			-55 ... +150	°C
T_L	1.6 mm (0.063 in.) from case for 10 s		300	°C
M_d	Mounting torque	TO-264	0.4/6	Nm/lb.in.
Weight		PLUS 247	6	g
		TO-264	10	g

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified)			
			min.	typ.	max.	
BV_{CES}	I_C = 1 mA, V_{GE} = 0 V		600			V
$V_{GE(th)}$	I_C = 1 mA, V_{CE} = V_{GE}		2.5		5.5	V
I_{CES}	V_{CE} = V_{CES} V_{GE} = 0 V	T_J = 25°C			200	µA
		T_J = 125°C			2	mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±400	nA
$V_{CE(sat)}$	I_C = I_{C90}, V_{GE} = 15 V				2.1	V

PLUS 247™
(IXGX)



TO-264 AA
(IXGK)



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

Features

- International standard packages
- Very high current, fast switching IGBT
- Low $V_{CE(sat)}$
  - for minimum on-state conduction losses
- MOS Gate turn-on
  - drive simplicity

Applications

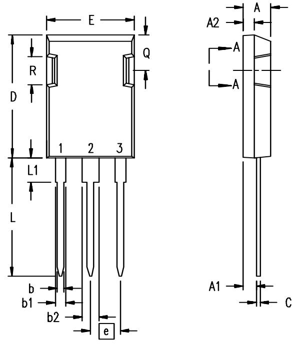
- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies

Advantages

- PLUS 247™ package for clip or spring mounting
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
g_{fs}	I_C = 60 A; V_{CE} = 10 V, Pulse test, t ≤ 300 µs, duty cycle ≤ 2 %	50	75		S
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		11000		pF
C_{oes}			680		pF
C_{res}			190		pF
Q_g	$I_C = I_{C90}$, V_{GE} = 15 V, $V_{CE} = 0.5\ V_{CES}$		350		nC
Q_{ge}			72		nC
Q_{gc}			131		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C** I_C = 100A, V_{GE} = 15 V $V_{CE} = 0.8\ V_{CES}$, $R_G = R_{off}$ = 2.4 Ω Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 • 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
$t_{d(on)}$	**Inductive load, T_J =125°C** I_C = 100A, V_{GE} = 15 V $V_{CE} = 0.8\ V_{CES}$, $R_G = R_{off}$ = 2.4 Ω Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 • 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}				0.19	K/W
R_{thCK}			0.15		K/W

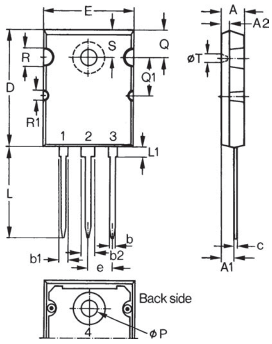
PLUS 247™ Outline



Terminals:
1 - Gate
2 - Drain (Collector)
3 - Source (Emitter)
4 - Drain (Collector)

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	4.83	5.21	.190	.205
A_1	2.29	2.54	.090	.100
A_2	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b_1	1.91	2.13	.075	.084
b_2	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	0.244
R	4.32	4.83	.170	.190

TO-264 AA Outline



Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	4.82	5.13	.190	.202
A1	2.54	2.89	.100	.114
A2	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b1	2.39	2.69	.094	.106
b2	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e	5.46 BSC		.215 BSC	
J	0.00	0.25	.000	.010
K	0.00	0.25	.000	.010
L	20.32	20.83	.800	.820
L1	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q1	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R1	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248
T	1.57	1.83	.062	.072

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

Fig. 1. Output Characteristics @ 25 ºC

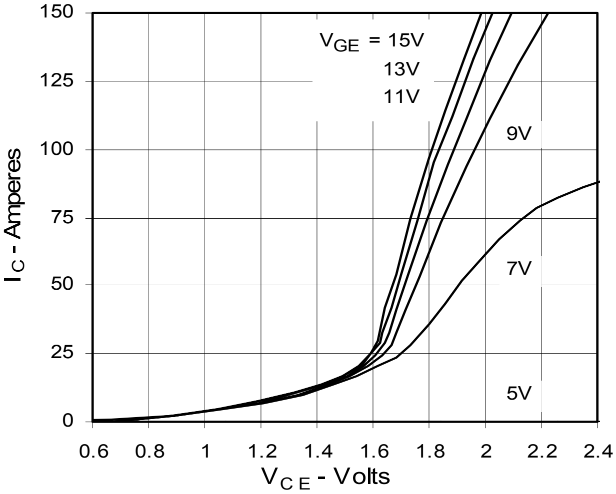


Fig. 2. Extended Output Characteristics @ 25 ºC

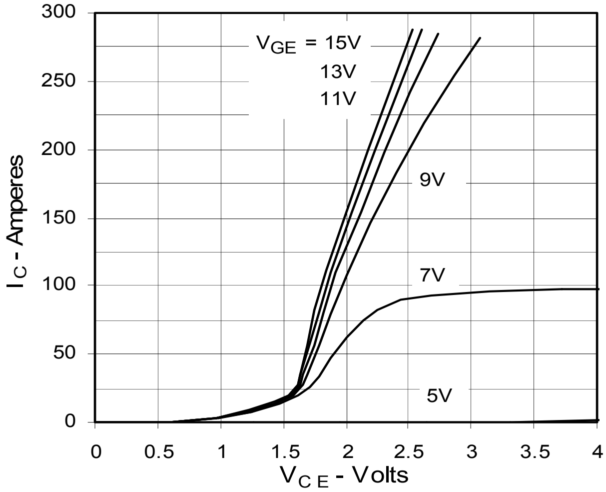


Fig. 3. Output Characteristics @ 125 ºC

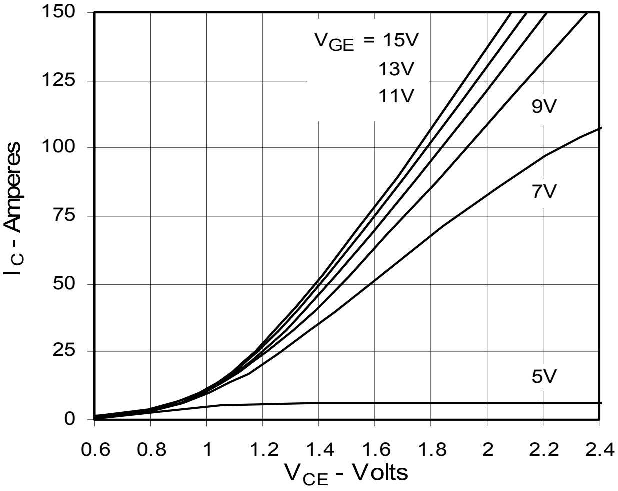


Fig. 4. Dependence of $V_{CE(sat)}$ on Temperature

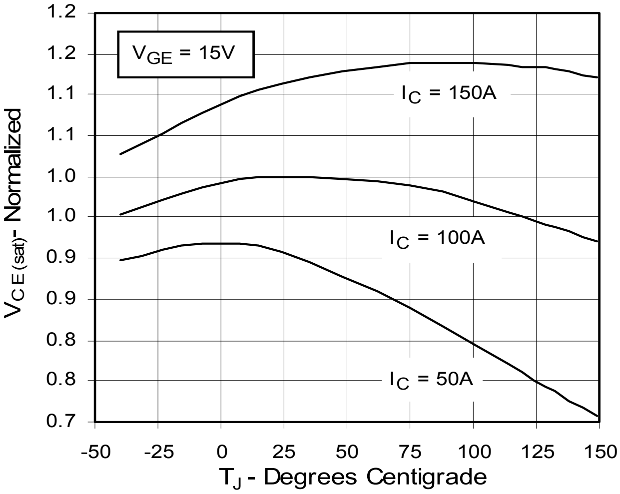


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter voltage

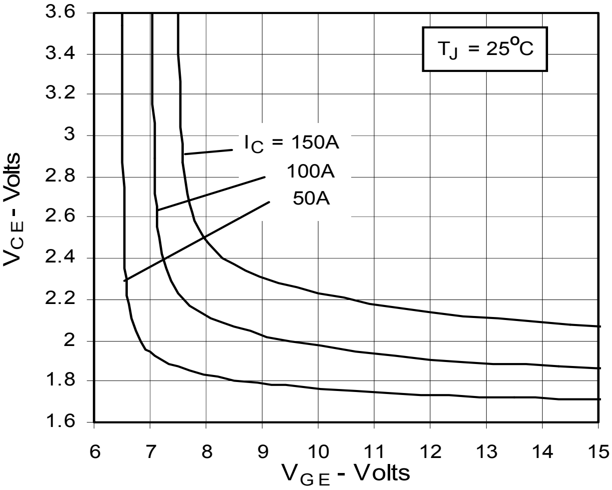


Fig. 6. Input Admittance

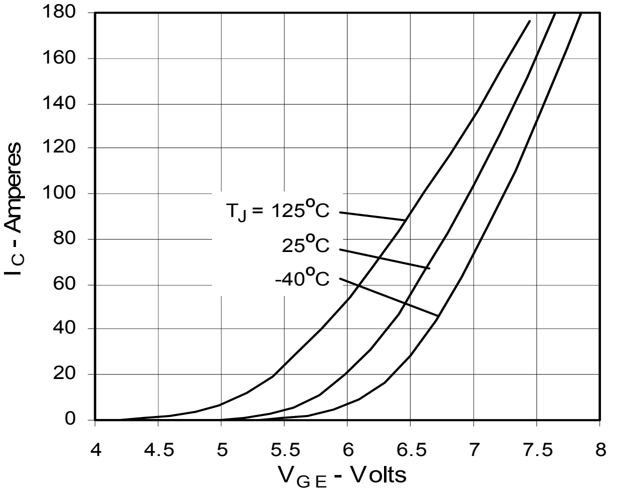


Fig. 7. Transconductance

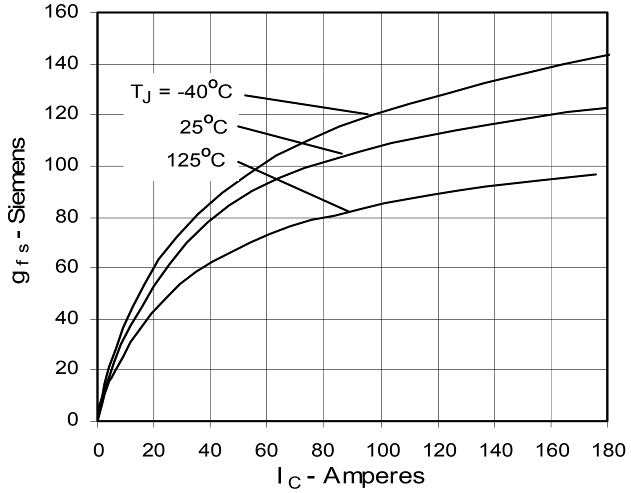


Fig. 8. Dependence of Turn-off Energy Loss on R_G

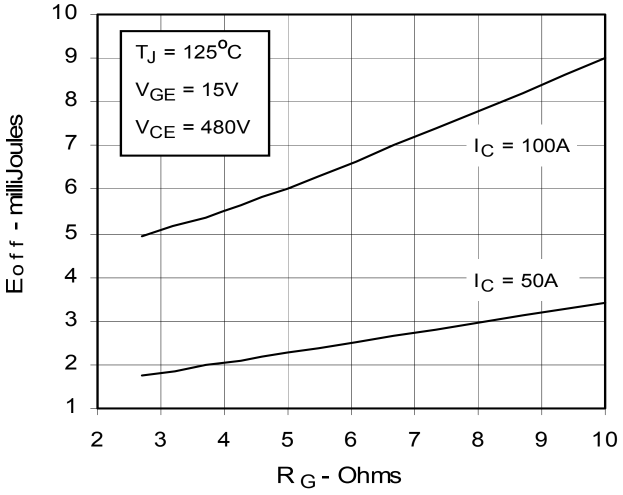


Fig. 9. Dependence of Turn-Off Energy Loss on I_C

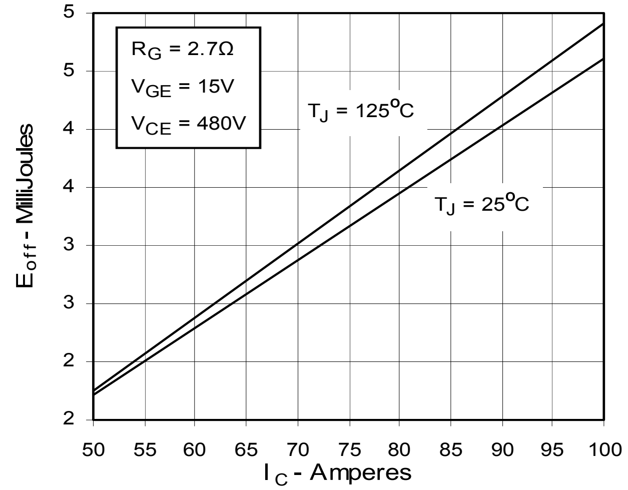


Fig. 10. Dependence of Turn-off Energy Loss on Temperature

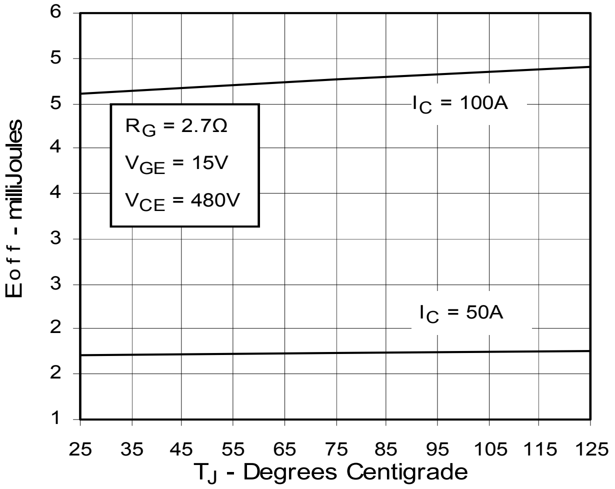


Fig. 11. Dependence of Turn-off Switching Time on R_G

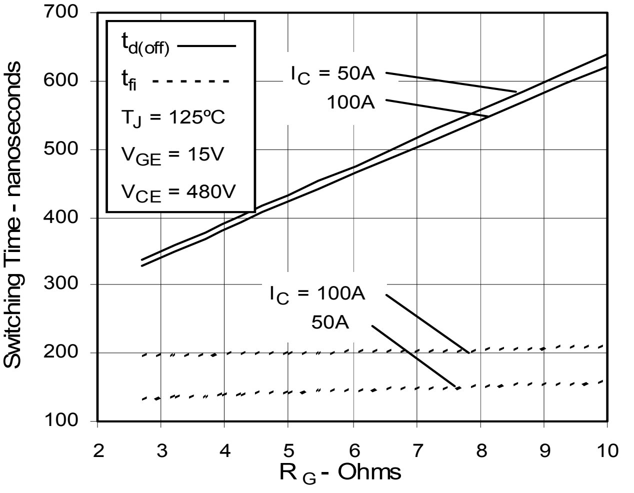
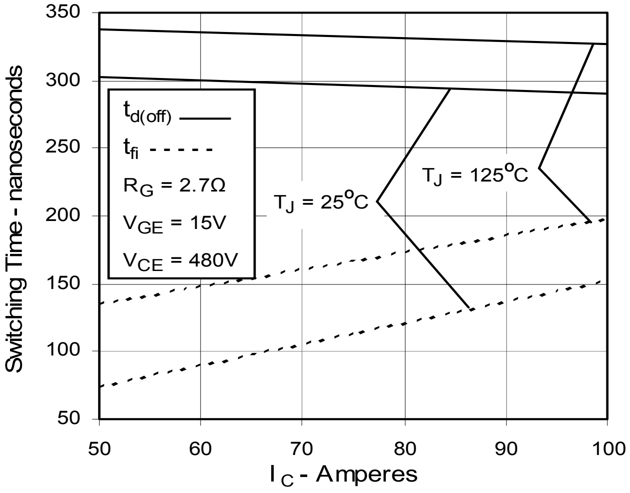


Fig. 12. Dependence of Turn-off Switching Time on I_C



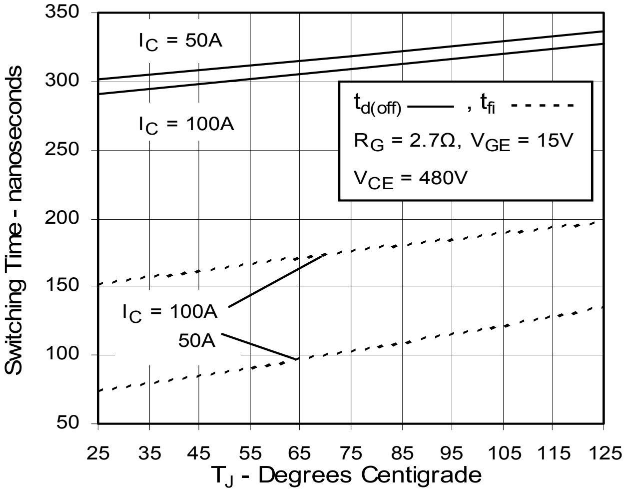


Fig. 13. Dependence of Turn-off Switching Time on Temperature

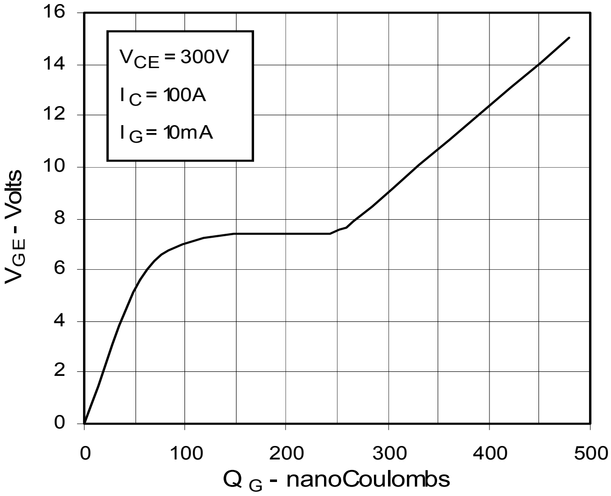


Fig. 14. Gate Charge

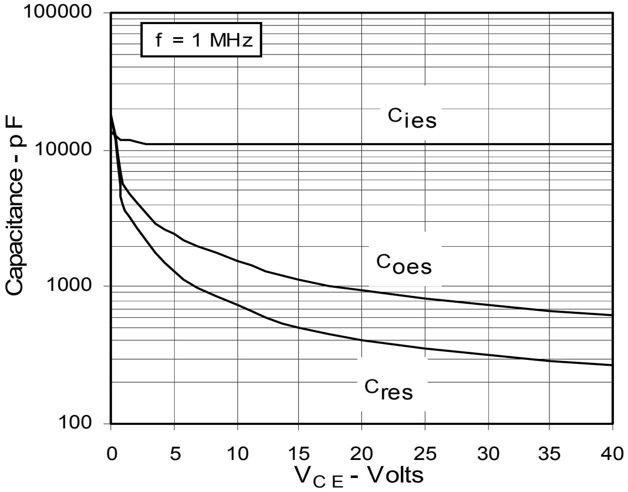


Fig. 15. Capacitance

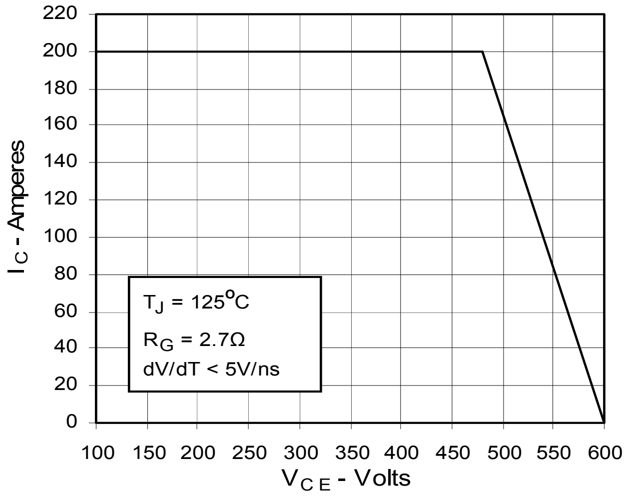


Fig. 16. Reverse-Bias Safe Operating Area

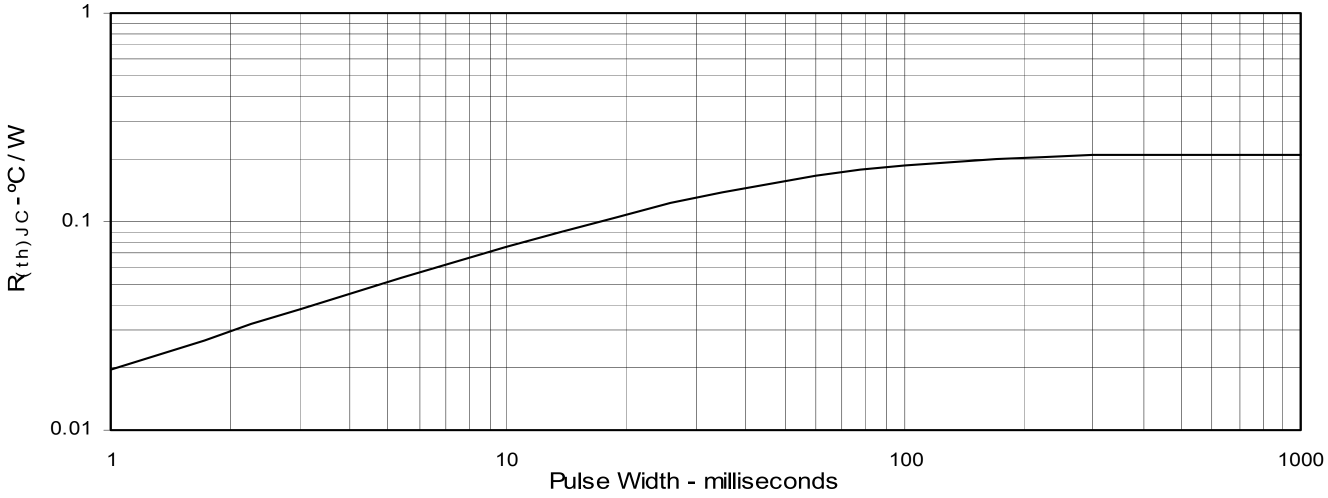


Fig. 17. Maximum Transient Thermal Resistance