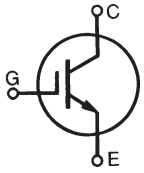
IXYS

HiPerFAST™ IGBTs

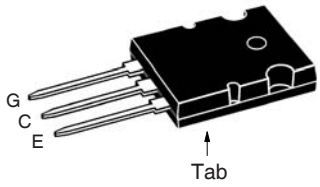
IXGK120N60B*
IXGX120N60B

*Obsolete Part Number

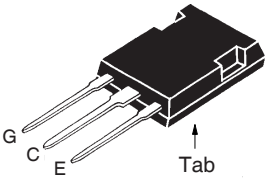
V_{CES} = 600V
I_{C90} = 120A
$V_{CE(sat)}$ ≤ 2.1V



TO-264 (IXGK)



PLUS247 (IXGX)



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

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_{GE} = 1MΩ	600	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C (Chip Capability)	200	A
I_{C90}	T_C = 90°C	120	A
I_{LRMS}	Terminal Current Limit	76	A
I_{CM}	T_C = 25°C, 1ms	300	A
SSOA (RBSOA)	V_{GE}= 15V, T_{VJ} = 125°C, R_G = 2.4Ω Clamped Inductive Load	I_{CM} = 200 @ 0.8 • V_{CES}	A V
P_C	T_C = 25°C	660	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6 mm (0.062 in.) from Case for 10	260	°C
M_d	Mounting Torque (IXGK)	1.13/10	Nm/lb.in.
F_C	Mounting Force (IXGX)	20..120/4.5..27	N/lb.
Weight	TO-264	10	g
	PLUS247	6	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 1mA, V_{GE} = 0V	600			V
$V_{GE(th)}$	I_C = 4mA, V_{CE} = V_{GE}	2.5		5.5	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			200	µA
	T_J = 125°C			2	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V			±400	nA
$V_{CE(sat)}$	I_C = I_{C90}, V_{GE} = 15V, Note 1			2.1	V

Features

- Very High Current, Fast Switching IGBT
- Low $V_{CE(sat)}$
  - for Minimum On-State Conduction Losses
- MOS Gate turn-on
  - Drive Simplicity

Advantages

- PLUS 247™ Package for Clip or Spring Mounting
- Space Savings
- High Power Density

Applications

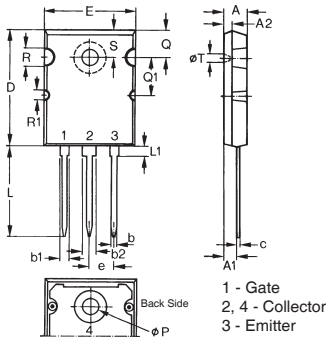
- AC Motor Speed Drives
- DC Servo and Robot Drives
- DC Choppers
- Uninterruptible Power Supplies (UPS)
- Switch-Mode and Resonant-Mode Power Supplies

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	I_C = 60A, V_{CE} = 10V, Note 1	50	75		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		11		nF
C_{oes}			680		pF
C_{res}			190		pF
Q_g	I_C = I_{C90}, V_{GE} = 15V, 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**		60		ns
t_{ri}	I_C = 100A, V_{GE} = 15V		45		ns
E_{on}	V_{CE} = 0.8 • V_{CES}, R_G = 2.4Ω		2.4		mJ
$t_{d(off)}$	Note 2		200	360	ns
t_{fi}			160	280	ns
E_{off}			5.5	9.6	mJ
$t_{d(on)}$	**Inductive Load, T_J = 125°C**		60		ns
t_{ri}	I_C = 100A, V_{GE} = 15V		60		ns
E_{on}	V_{CE} = 0.8 • V_{CES}, R_G = 2.4Ω		4.8		mJ
$t_{d(off)}$	Note 2		290		ns
t_{fi}			250		ns
E_{off}			8.7		mJ
R_{thJC}				0.19	°C/W
R_{thCS}			0.15		°C/W

Notes:

1. Pulse test, t ≤ 300µs, duty cycle, d ≤ 2%.
2. Switching times & energy losses may increase for higher V_{CE}(Clamp), T_J or R_G.

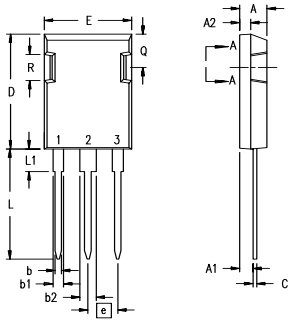
TO-264 AA (IXGK) Outline



1 - Gate
2, 4 - Collector
3 - Emitter

Dim.	Millimeter Min.	Max.	Inches Min.	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

PLUS247™ (IXGX) Outline



Terminals: 1 - Gate
2 - Collector
3 - Emitter

Dim.	Millimeter Min.	Max.	Inches Min.	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

Fig. 1. Output Characteristics @ 25 ºC

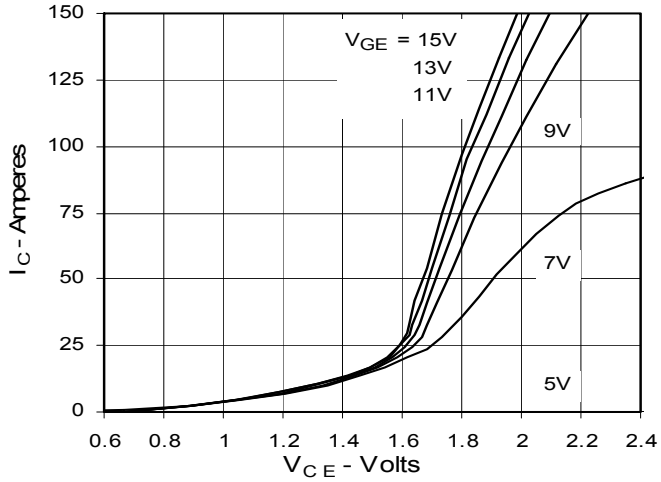


Fig. 2. Extended Output Characteristics @ 25 ºC

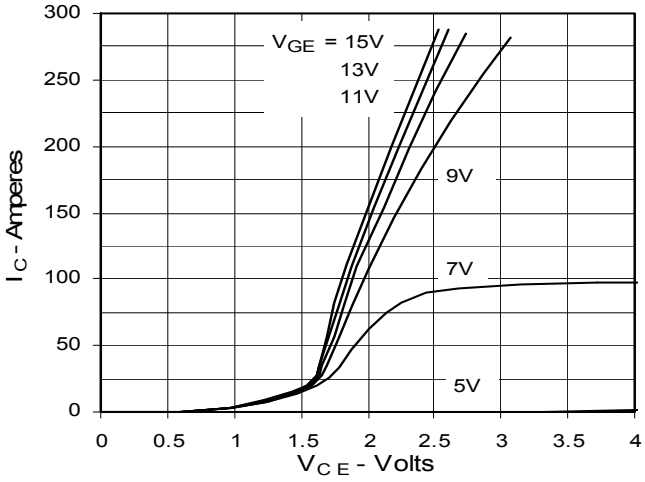


Fig. 3. Output Characteristics @ 125 ºC

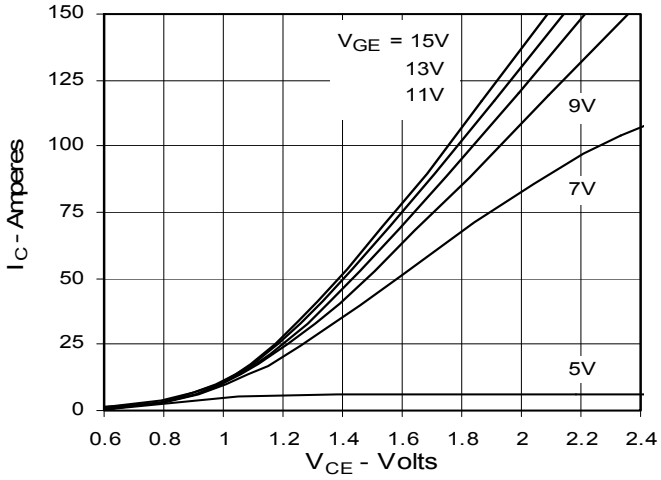


Fig. 4. Dependence of $V_{CE(sat)}$ on Temperature

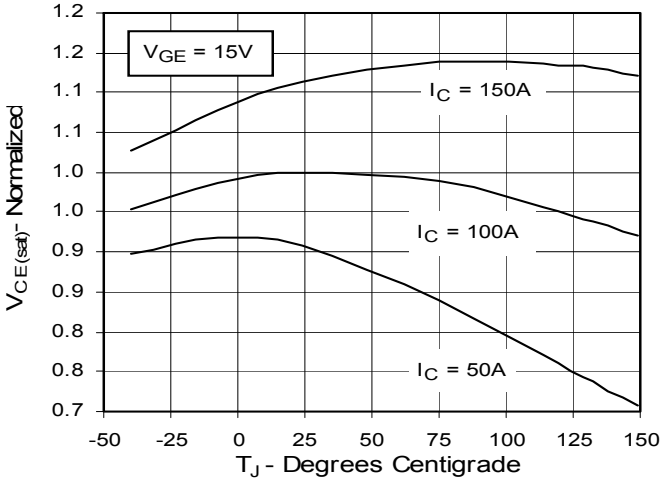


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter voltage

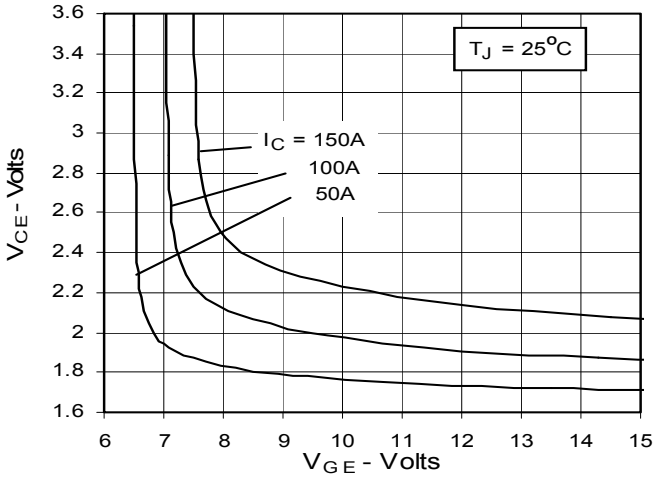


Fig. 6. Input Admittance

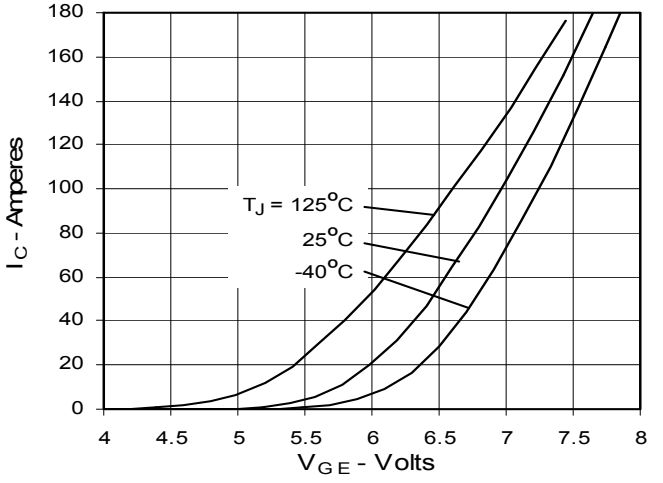


Fig. 7. Transconductance

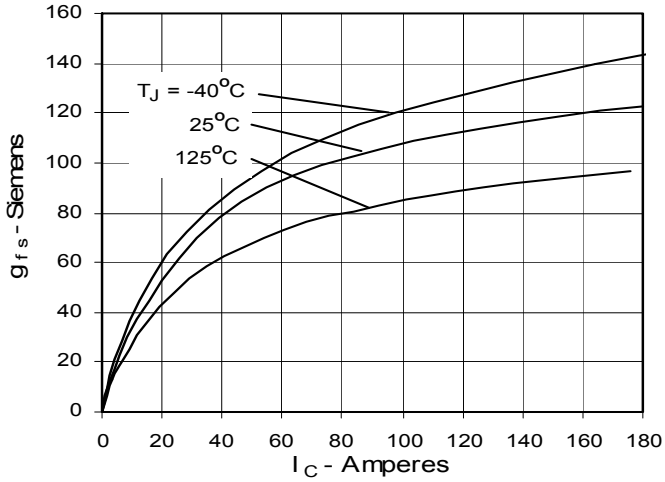


Fig. 8. Dependence of Turn-off Energy Loss on R_G

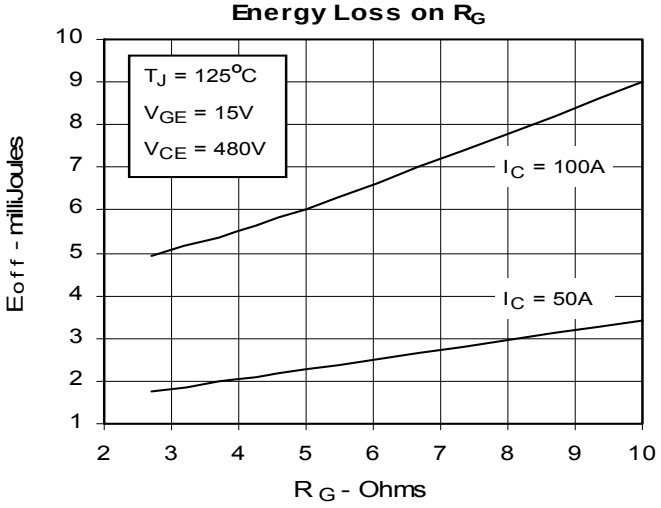


Fig. 9. Dependence of Turn-Off Energy Loss on I_C

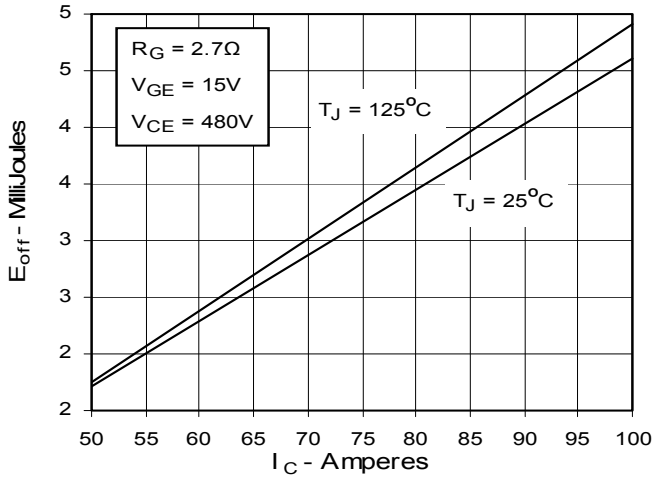


Fig. 10. Dependence of Turn-off Energy Loss on Temperature

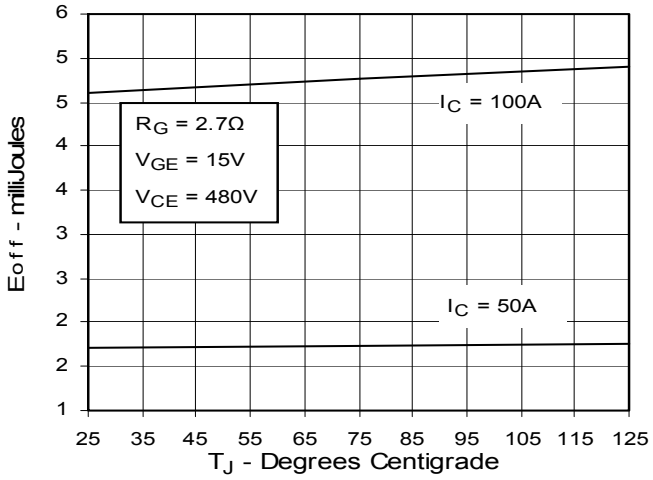


Fig. 11. Dependence of Turn-off Switching Time on R_G

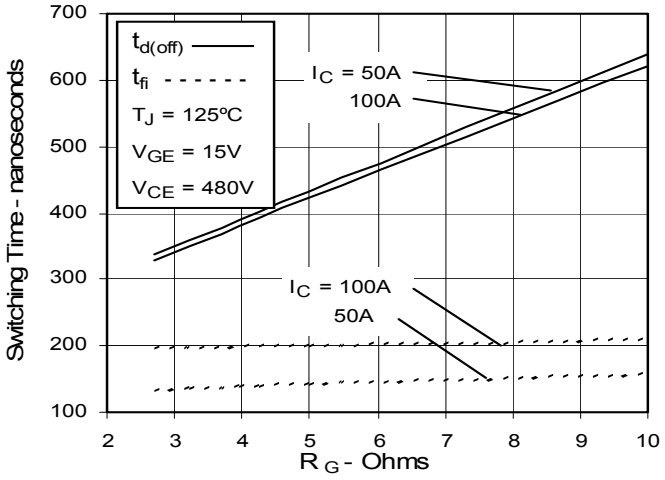


Fig. 12. Dependence of Turn-off Switching Time on I_C

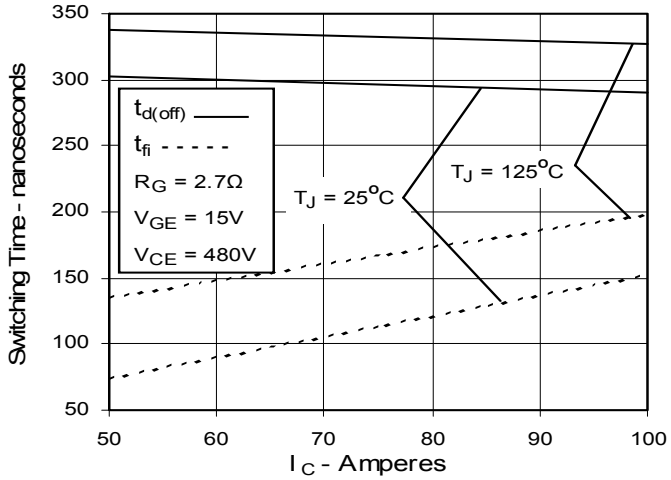


Fig. 13. Dependence of Turn-off Switching Time on Temperature

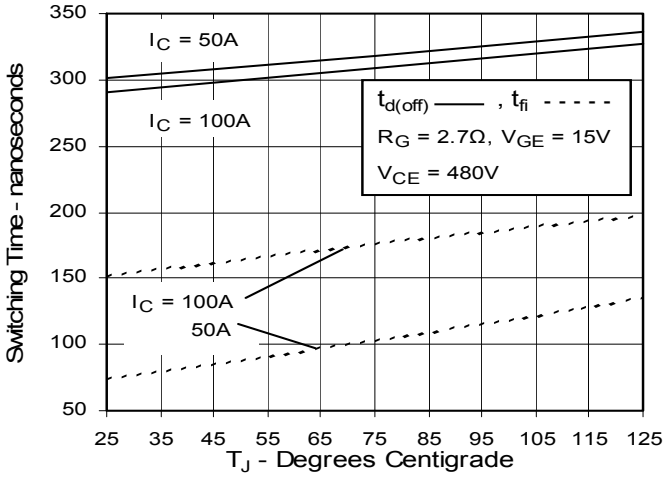


Fig. 14. Gate Charge

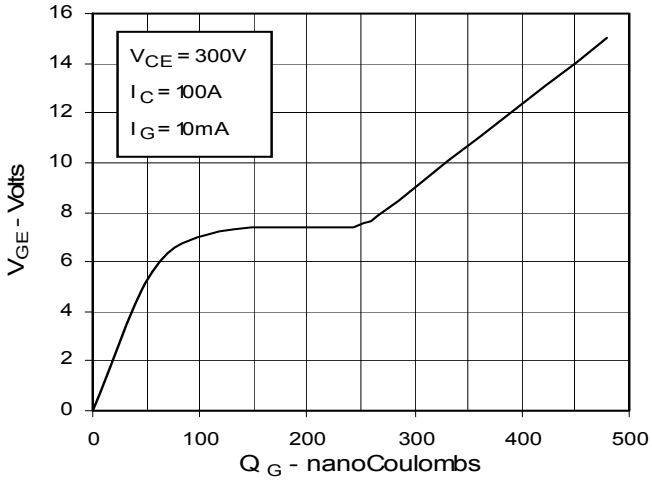


Fig. 15. Capacitance

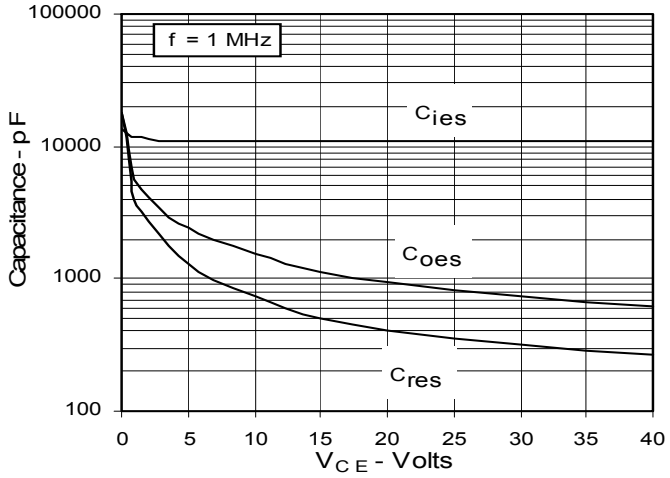


Fig. 16. Reverse-Bias Safe Operating Area

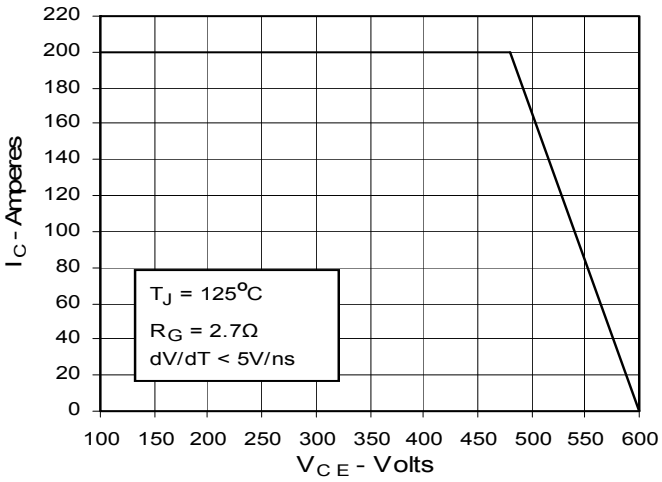


Fig. 17. Maximum Transient Thermal Resistance