IXYS

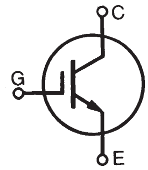
Preliminary Technical Information

High Voltage IGBT

For Capacitor Discharge Applications

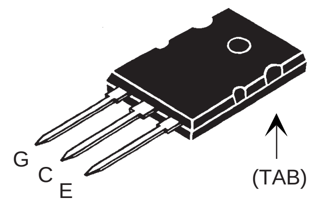
IXGK75N250
IXGX75N250

V_{CES} = 2500 V
I_{C25} = 180 A
$V_{CE(sat)} \leq$ 2.3 V

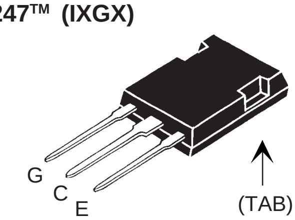


Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	2500	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ	2500	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	T_C = 25°C, chip capability	180	A
I_{C110}	T_C = 110°C	75	A
$I_{L(RMS)}$	External lead capability	75	A
I_{CM}	T_C = 25°C, V_{GE} = 20 V, 1 ms	600	A
SSOA (RBSOA)	V_{GE}= 15 V, T_{VJ} = 125°C, R_G = 3 Ω Clamped inductive load	I_{CM} = 300 @ 0.8 V_{CES}	A
P_C	T_C = 25°C	735	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6 mm (0.062 in.) from case for 10 s	300	°C
T_{SOLD}	Plastic body for 10 s	260	°C
F_c	Mounting force (PLUS247)	20..120/4.5..27	N/lb
M_d	Mounting torque (TO-264)	1.13/10	Nm/lb-in
Weight	PLUS247	6	g
	TO-264	10	g

TO-264 (IXGK)



PLUS247™ (IXGX)



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

Features

- High peak current capability
- Low saturation voltage
- MOS Gate turn-on -drive simplicity
- Rugged NPT structure
- Molding epoxies meet UL 94 V-0 flammability classification

Applications

- Capacitor discharge
- Pulser circuits

Advantages

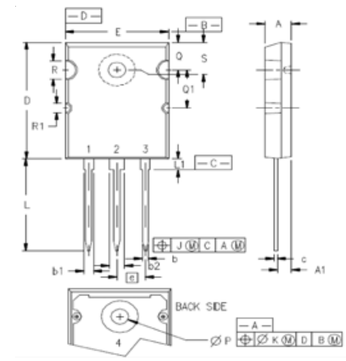
- High power density
- Space savings
- Easy to mount

Symbol	Test Conditions (T_J = 25°C unless otherwise specified)		Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 1 mA, V_{GE} = 0 V		2500			V
$V_{GE(th)}$	I_C = 1 mA, V_{CE} = V_{GE}		3.0		5.0	V
I_{CES}	V_{CE} = 0.8 • V_{CES}				200	µA
	V_{GE} = 0 V	T_J = 125°C			5	mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±200	nA
$V_{CE(sat)}$	I_C = 75 A, V_{GE} = 15 V				2.3	V
	I_C = 150 A				3.2	V

Symbol	Test Conditions	Min.	Typ.	Max.	
	Characteristic Values (T_J = 25°C unless otherwise specified)				
g_{fs}	I_C = 60 A; V_{CE} = 10 V, Note 1	40	68		S
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		10.2		nF
C_{oes}			325		pF
C_{res}			116		pF
Q_g	I_C = 75 A, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}		400		nC
Q_{ge}			50		nC
Q_{gc}			160		nC
$t_{d(on)}$	**Resistive load**		50		ns
t_{ri}	I_C = 150 A, V_{GE} = 15 V, Note 1		255		ns
$t_{d(off)}$	V_{CE} = 1250 V, R_G = 1 Ω		245		ns
t_{fi}			175		ns
R_{thJC}				0.17	°C/W
R_{thCS}			0.15		°C/W

Notes: 1. Pulse test, t ≤ 300 μs, duty cycle, d ≤ 2 %
2. Additional provisions for lead-to-lead voltage isolation are required at V_{CE} > 1200V

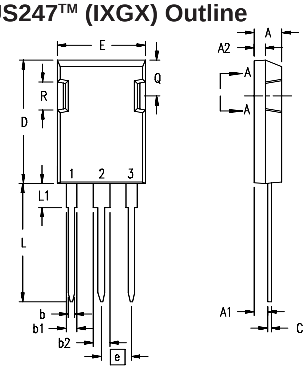
TO-264 (IXGK) Outline



1 – GATE
2, 4 – DRAIN (COLLECTOR)
3 – SOURCE (EMITTER)

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.209	4.70	5.31
A1	.102	.118	2.59	3.00
b	.037	.055	0.94	1.40
b1	.087	.102	2.21	2.59
b2	.110	.126	2.79	3.20
c	.017	.029	0.43	0.74
D	1.007	1.047	25.58	26.59
E	.760	.799	19.30	20.29
e	.215BSC		5.46 BSC	
J	.000	.010	0.00	0.25
K	.000	.010	0.00	0.25
L	.779	.842	19.79	21.39
L1	.087	.102	2.21	2.59
ØP	.122	.138	3.10	3.51
Q	.240	.256	6.10	6.50
Q1	.330	.346	8.38	8.79
ØR	.155	.187	3.94	4.75
ØR1	.085	.093	2.16	2.36
S	.243	.253	6.17	6.43

PLUS247™ (IXGX) Outline



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

Dim.	Millimeter		Inches	
	Min.	Max.	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

PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

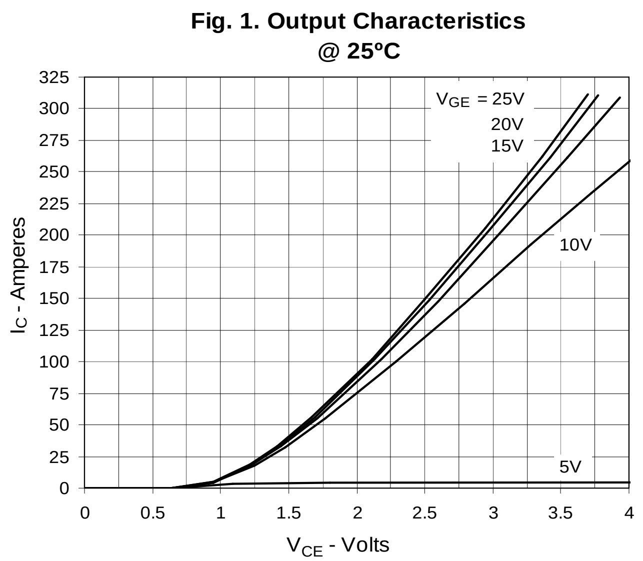


Fig. 1. Output Characteristics
@ 25ºC
VGE = 25V
20V
15V
10V
5V
IC - Amperes
VCE - Volts

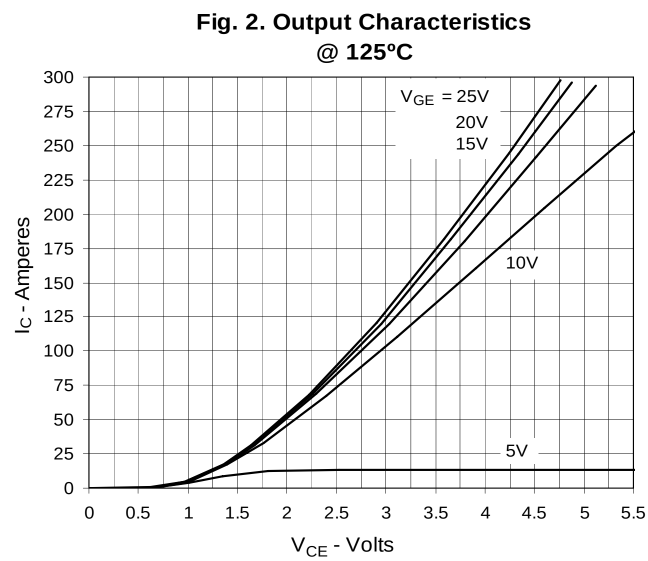


Fig. 2. Output Characteristics
@ 125ºC
VGE = 25V
20V
15V
10V
5V
IC - Amperes
VCE - Volts

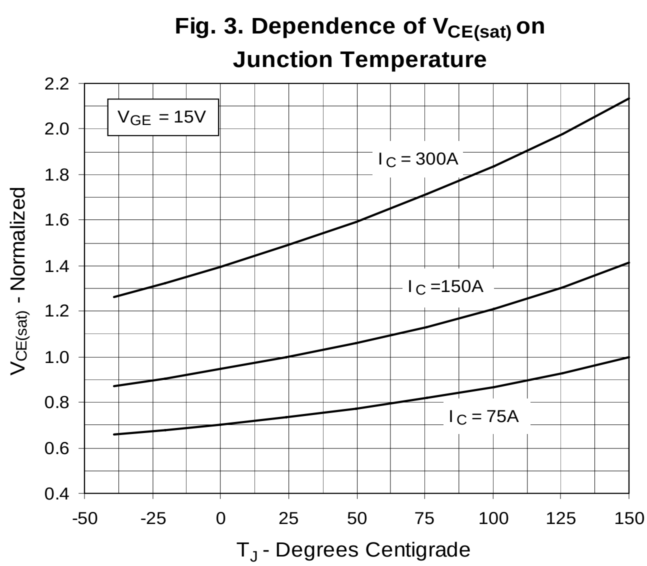


Fig. 3. Dependence of VCE(sat) on
Junction Temperature
VGE = 15V
I C = 300A
I C =150A
I C = 75A
VCE(sat) - Normalized
TJ - Degrees Centigrade

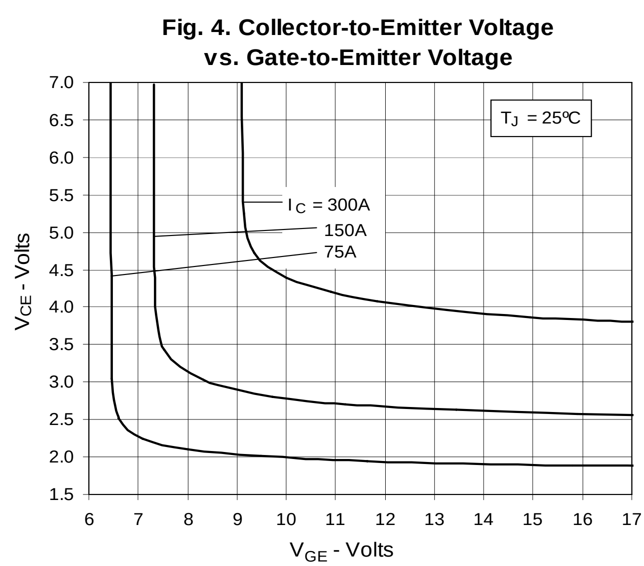


Fig. 4. Collector-to-Emitter Voltage
vs. Gate-to-Emitter Voltage
TJ = 25ºC
I C = 300A
150A
75A
VCE - Volts
VGE - Volts

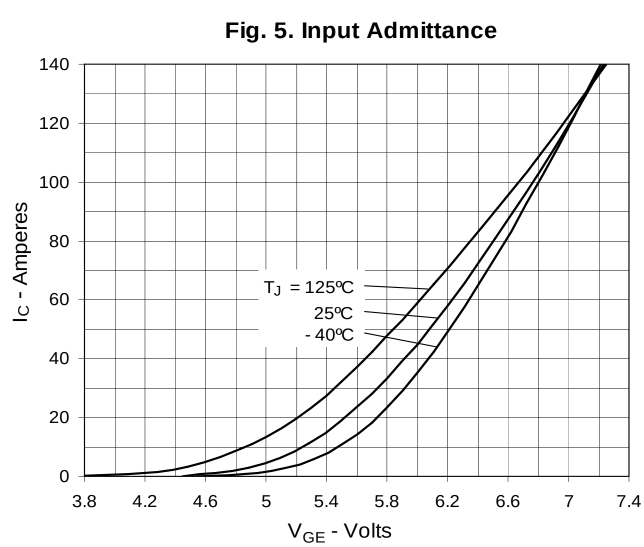


Fig. 5. Input Admittance
TJ = 125ºC
25ºC
- 40ºC
IC - Amperes
VGE - Volts

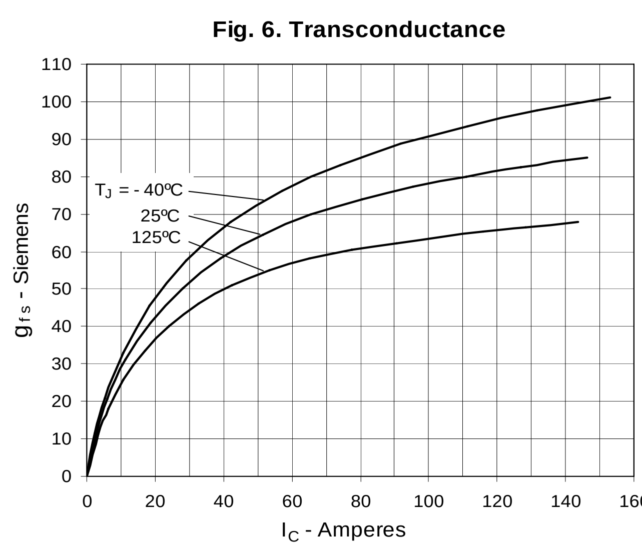


Fig. 6. Transconductance
TJ = - 40ºC
25ºC
125ºC
gf s - Siemens
IC - Amperes

Fig. 7. Resistive Turn-on Rise Time vs. Junction Temperature

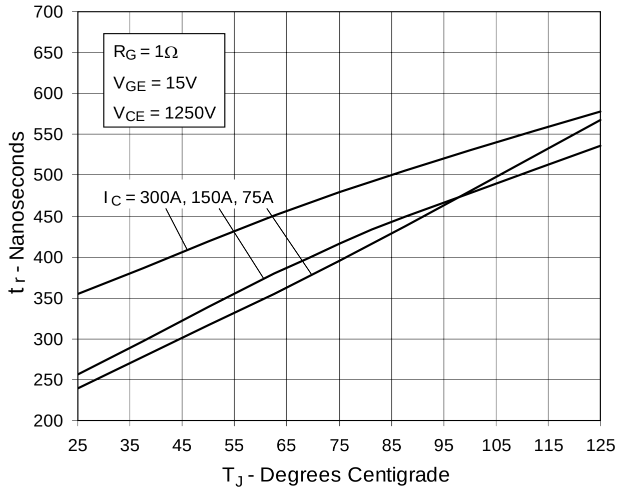


Fig. 8. Resistive Turn-on Rise Time vs. Collector Current

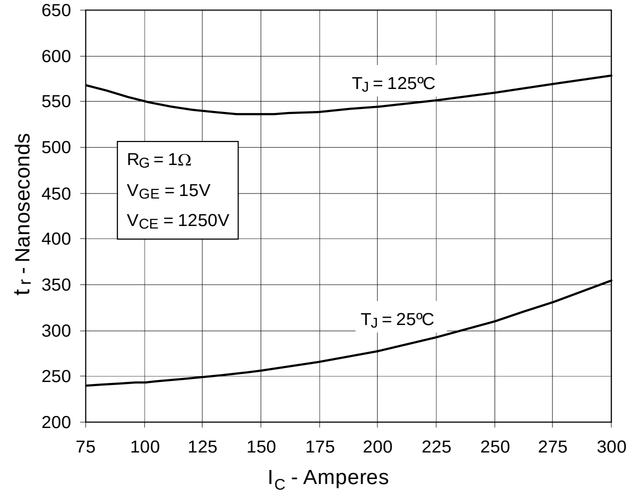


Fig. 9. Resistive Turn-on Switching Times vs. Gate Resistance

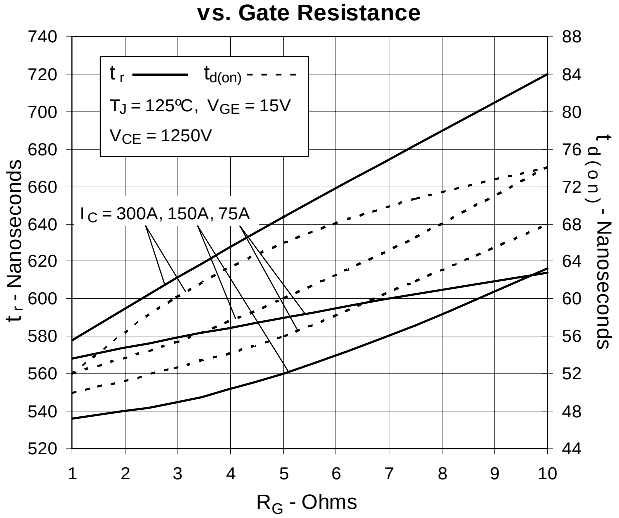


Fig. 10. Resistive Turn-off Switching Times vs. Junction Temperature

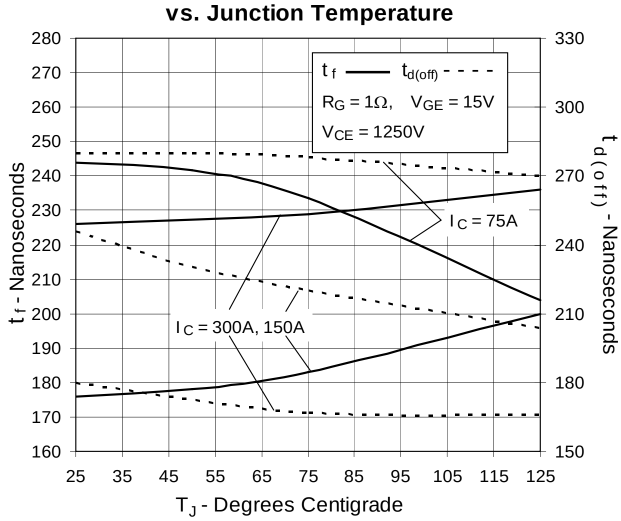


Fig. 11. Resistive Turn-off Switching Times vs. Collector Current

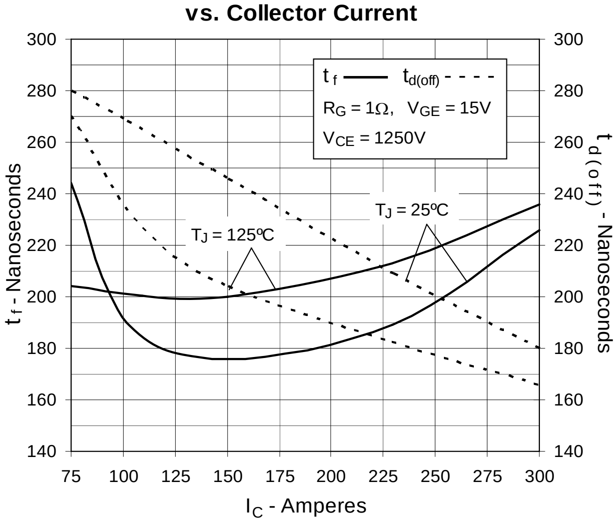


Fig. 12. Resistive Turn-off Switching Times vs. Gate Resistance

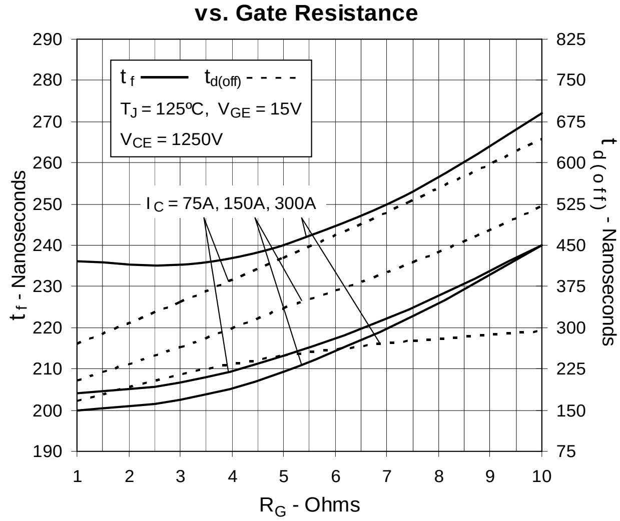


Fig. 13. Gate Charge

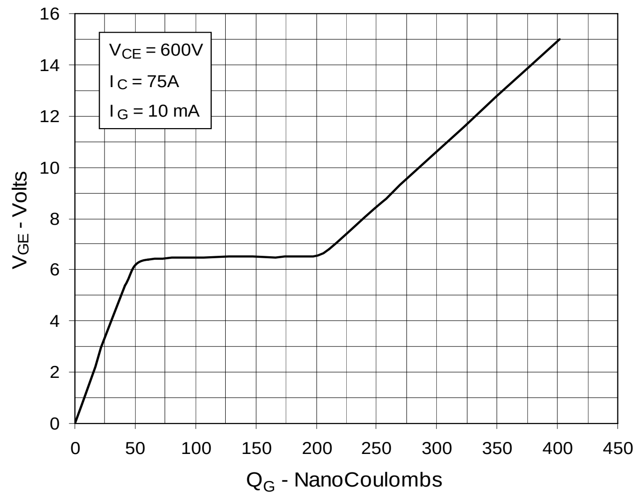


Fig. 14. Capacitance

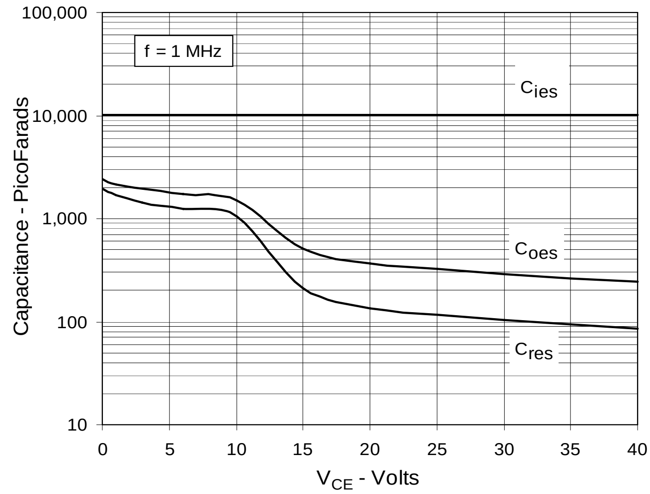


Fig. 15. Reverse-Bias Safe Operating Area

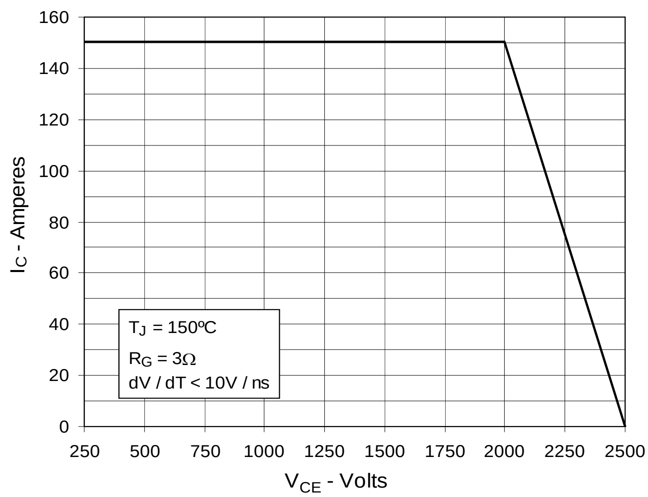


Fig. 16. Maximum Transient Thermal Impedance