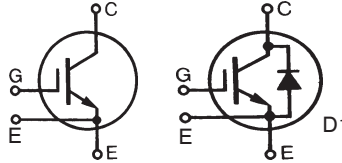


HiPerFAST™ IGBT with Diode C2-Class High Speed IGBTs

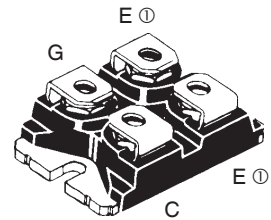
**IXGN 60N60C2
IXGN60N60C2D1**

V_{CES} = 600 V
I_{C25} = 75 A
V_{CE(sat)} = 2.5 V
t_{fi(typ)} = 35 ns



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} = 1 MW	600 V
V _{GES}	Continuous	±20 V
V _{GEM}	Transient	±30 V
I _{C25}	T _C = 25°C (limited by leads)	100 A
I _{C110}	T _C = 110°C	60 A
I _{CM}	T _C = 25°C, 1 ms	300 A
SSOA (RBSOA)	V _{GE} = 15 V, T _{VJ} = 125°C, R _G = 10 W Clamped inductive load @ V _{CE} ≤ 600 V	I _{CM} = 100 A
P _C	T _C = 25°C	480 W
T _J		-55 ... +150 °C
T _{JM}		150 °C
T _{stg}		-55 ... +150 °C
V _{ISOL}	50/60 Hz I _{ISOL} ≤ 1 mA	t = 1 min t = 1 s 2500 V~ 3000 V~
M _d	Mounting torque Terminal connection torque (M4)	1.15/13 Nm/lb.in. 1.5/13 Nm/lb.in.
Weight		30 g

SOT-227B, miniBLOC



G = Gate, C = Collector, E = Emitter
 ① either emitter terminal can be used as Main or Kelvin Emitter

Features

- International standard package miniBLOC
- Aluminium nitride isolation - high power dissipation
- Isolation voltage 3000 V~
- Very high current IGBT
- Low V_{CE(sat)} for minimum on-state conduction losses
- MOS Gate turn-on - drive simplicity
- Low collector-to-case capacitance (< 50 pF)
- Low package inductance (< 5 nH) - easy to drive and to protect

Applications

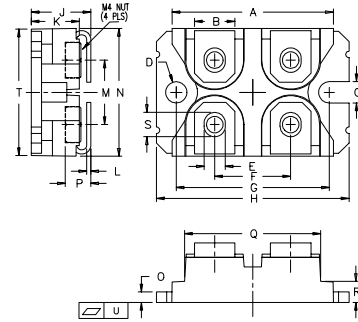
- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies

Advantages

- Easy to mount with 2 screws
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values (T _J = 25°C, unless otherwise specified)		
		Min.	Typ.	Max.
V _{GE(th)}	I _C = 250 mA, V _{CE} = V _{GE}	3.0		5.0 V
I _{CES}	V _{CE} = V _{CES} V _{GE} = 0 V		T _J = 25°C T _J = 125°C	650 mA 5 mA
I _{GES}	V _{CE} = 0 V, V _{GE} = ±20 V			±100 nA
V _{CE(sat)}	I _C = 50 A, V _{GE} = 15 V Note 1		T _J = 25°C T _J = 125°C	2.1 V 1.8 V

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)			
		Min.	Typ.	Max.	
g_{fs}	$I_C = 50\text{ A}$; $V_{CE} = 10\text{ V}$, Note 1	40	58	S	
C_{ies}	$V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$, $f = 1\text{ MHz}$		3900	pF	
C_{oes}			280	pF	
C_{res}			97	pF	
Q_g	$I_C = 50\text{ A}$, $V_{GE} = 15\text{ V}$, $V_{CE} = 0.5 V_{CES}$		146	nC	
Q_{ge}			28	nC	
Q_{gc}			50	nC	
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 50\text{ A}$, $V_{GE} = 15\text{ V}$ $V_{CE} = 400\text{ V}$, $R_G = R_{off} = 2.0\ \Omega$		18	ns	
t_{ri}			25	ns	
$t_{d(off)}$			95	150	ns
t_{fi}			35		ns
E_{off}			0.48	0.8	mJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = 50\text{ A}$, $V_{GE} = 15\text{ V}$ $V_{CE} = 400\text{ V}$, $R_G = R_{off} = 2.0\ \Omega$		18	ns	
t_{ri}			25	ns	
E_{on}			0.9		mJ
$t_{d(off)}$			130		ns
t_{fi}			80		ns
E_{off}		1.2		mJ	
R_{thJC}			0.05	0.26 K/W	
R_{thCK}				K/W	

SOT-227B miniBLOC


SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.240	1.255	31.50	31.88
B	.307	.323	7.80	8.20
C	.161	.169	4.09	4.29
D	.161	.169	4.09	4.29
E	.161	.169	4.09	4.29
F	.587	.595	14.91	15.11
G	1.186	1.193	30.12	30.30
H	1.496	1.505	38.00	38.23
J	.460	.481	11.68	12.22
K	.351	.378	8.92	9.60
L	.030	.033	0.76	0.84
M	.496	.506	12.60	12.85
N	.990	1.001	25.15	25.42
O	.078	.084	1.98	2.13
P	.195	.235	4.95	5.97
Q	1.045	1.059	26.54	26.90
R	.155	.174	3.94	4.42
S	.186	.191	4.72	4.85
T	.968	.987	24.59	25.07
U	-.002	.004	-0.05	0.1

Reverse Diode (FRED)

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
V_F	$I_F = 60\text{ A}$, $V_{GE} = 0\text{ V}$, Note 1			2.1 V
				$T_J = 150^\circ\text{C}$ 1.4
I_{RM}	$I_F = 60\text{ A}$, $V_{GE} = 0\text{ V}$, $-di_F/dt = 100\text{ A}/\mu\text{s}$, $T_J = 100^\circ\text{C}$ $V_R = 100\text{ V}$			8.3 A
t_{rr}	$I_F = 1\text{ A}$; $-di/dt = 200\text{ A/ms}$; $V_R = 30\text{ V}$		35	ns
R_{thJC}				0.85 K/W

Note 1: Pulse test, $t \leq 300\text{ ms}$, duty cycle $\leq 2\%$

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

Fig. 1. Output Characteristics
@ 25 Deg. C

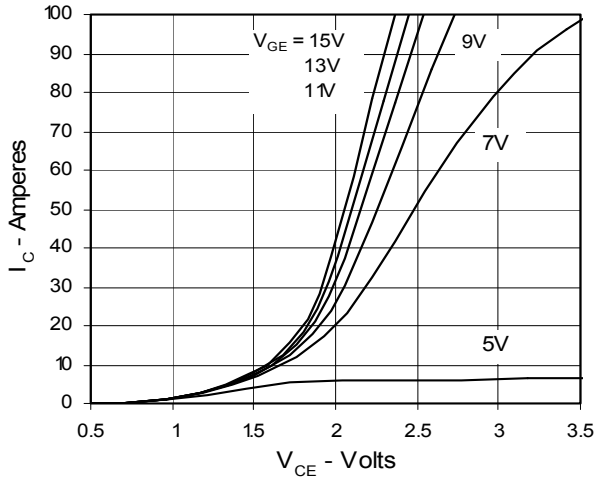


Fig. 2. Extended Output Characteristics
@ 25 deg. C

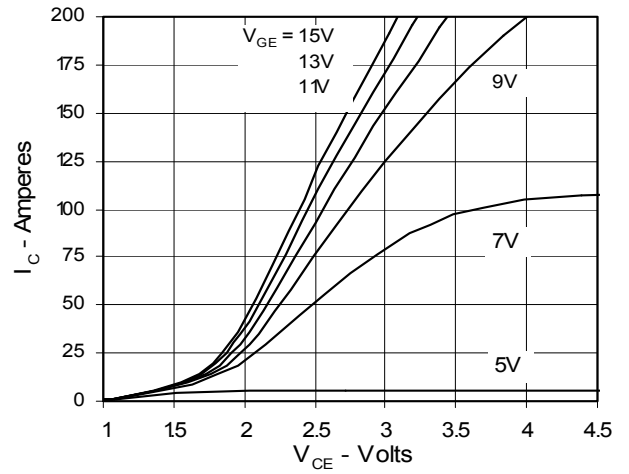


Fig. 3. Output Characteristics
@ 125 Deg. C

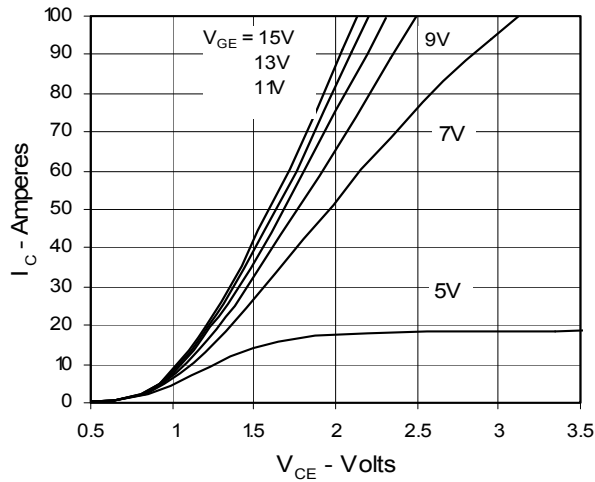


Fig. 4. Temperature Dependence of $V_{CE(sat)}$

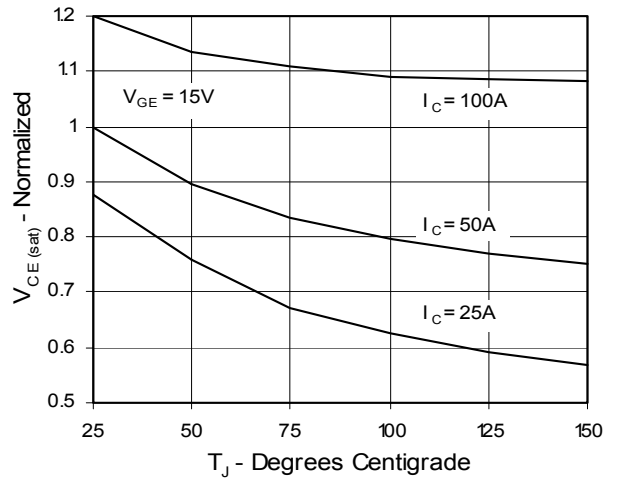


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter voltage

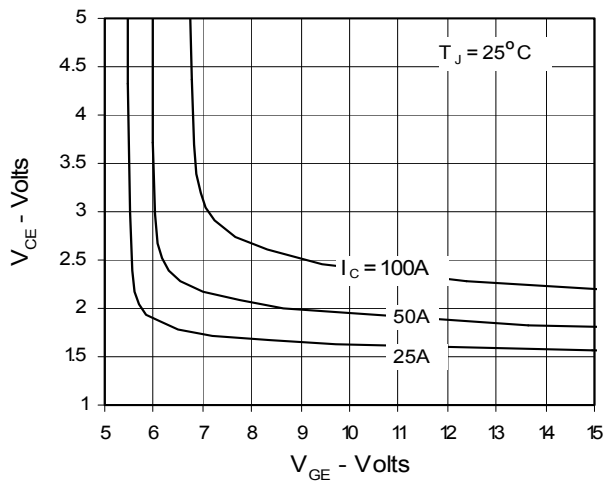


Fig. 6. Input Admittance

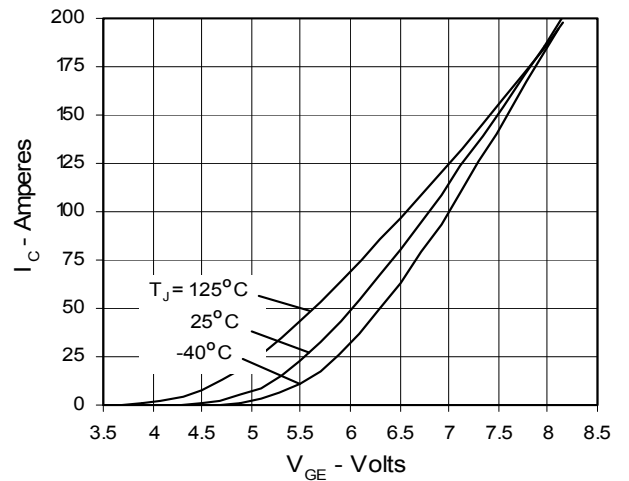


Fig. 7. Transconductance

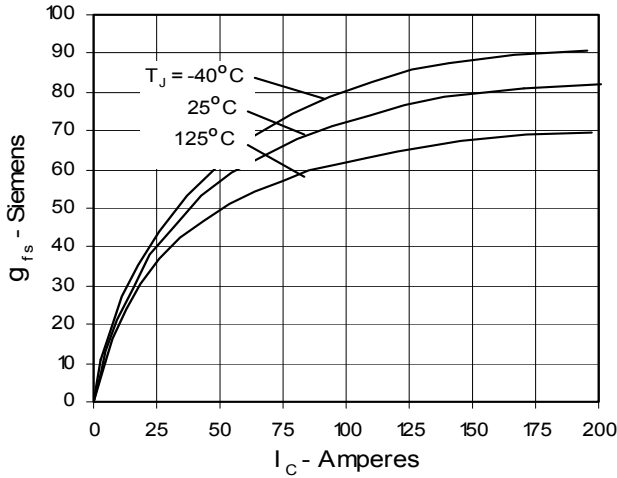


Fig. 8. Dependence of E_{off} on R_G

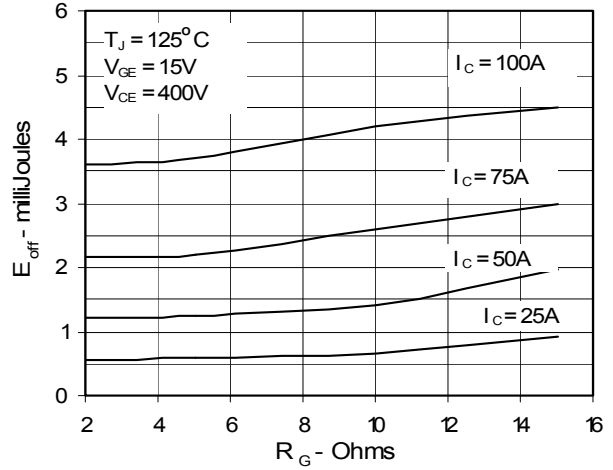


Fig. 9. Dependence of E_{off} on I_C

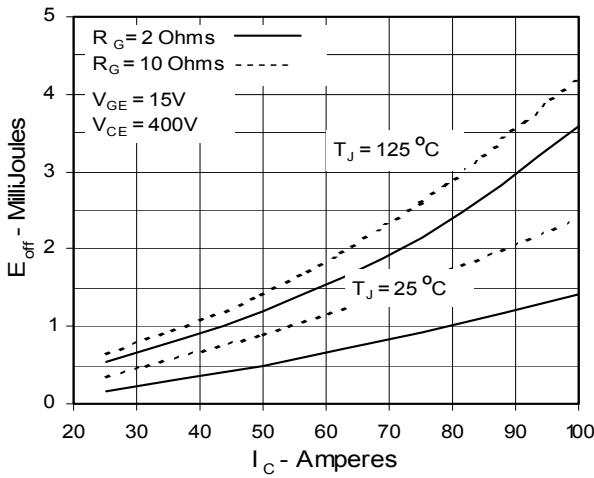


Fig. 10. Dependence of E_{off} on Temperature

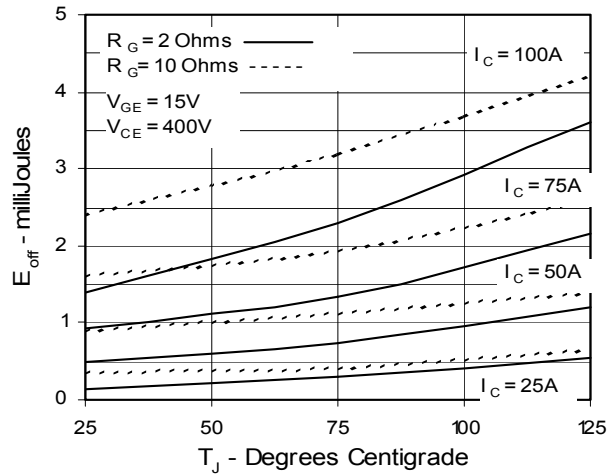


Fig. 11. Gate Charge

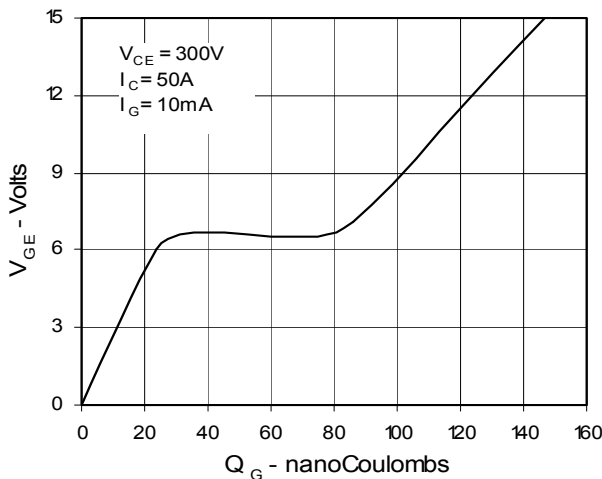
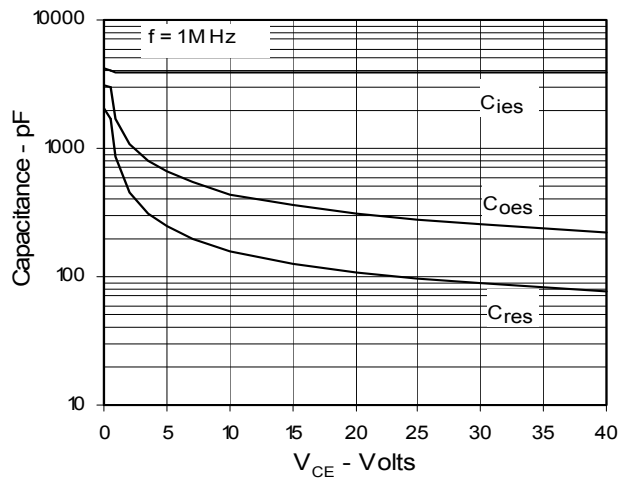


Fig. 12. Capacitance



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:

4,850,072	4,931,844	5,034,796	5,063,307	5,237,481	5,381,025	6,404,065B1	6,162,665	6,534,343	6,583,505
4,835,592	4,881,106	5,017,508	5,049,961	5,187,117	5,486,715	6,306,728B1	6,259,123B1	6,306,728B1	6,683,344

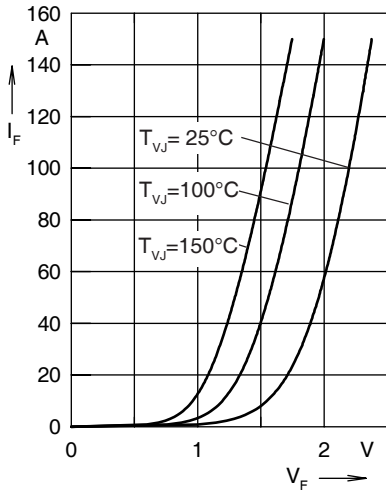


Fig. 12 Forward current I_F versus V_F

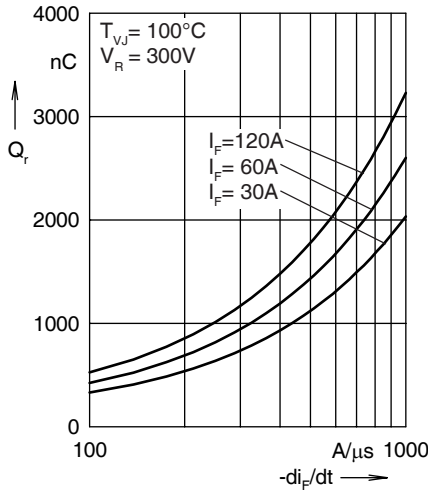


Fig. 13 Reverse recovery charge Q_r versus $-di_F/dt$

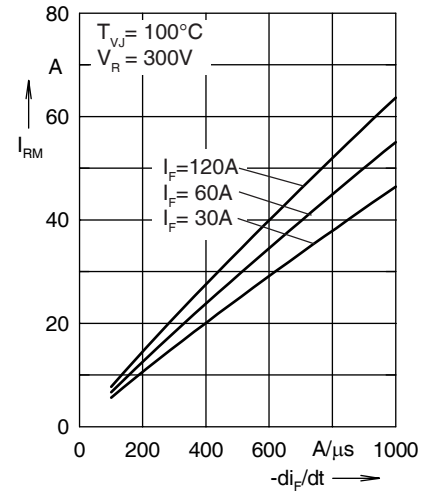


Fig. 14 Peak reverse current I_{RM} versus $-di_F/dt$

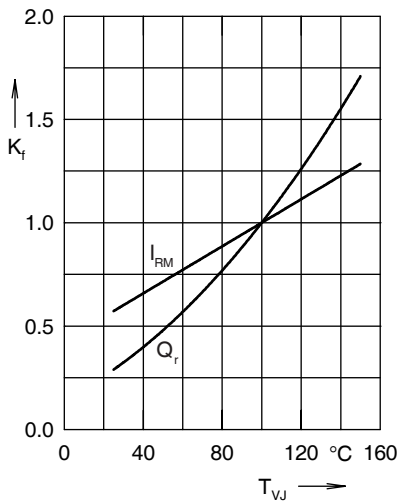


Fig. 15 Dynamic parameters Q_r , I_{RM} versus T_{VJ}

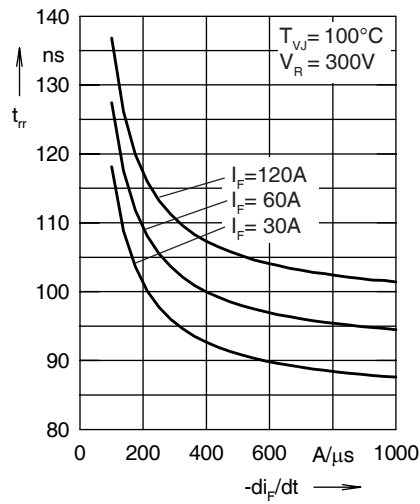


Fig. 16 Recovery time t_{rr} versus $-di_F/dt$

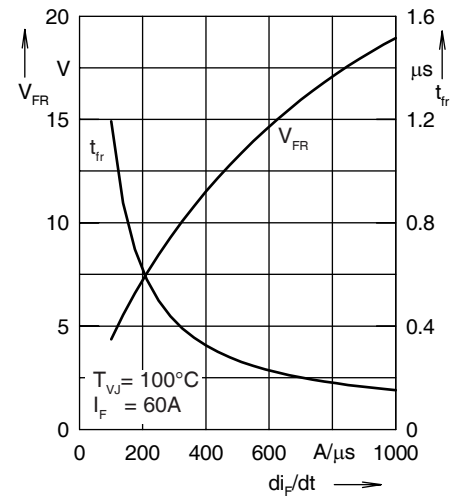


Fig. 17 Peak forward voltage V_{FR} and t_{tr} versus di_F/dt

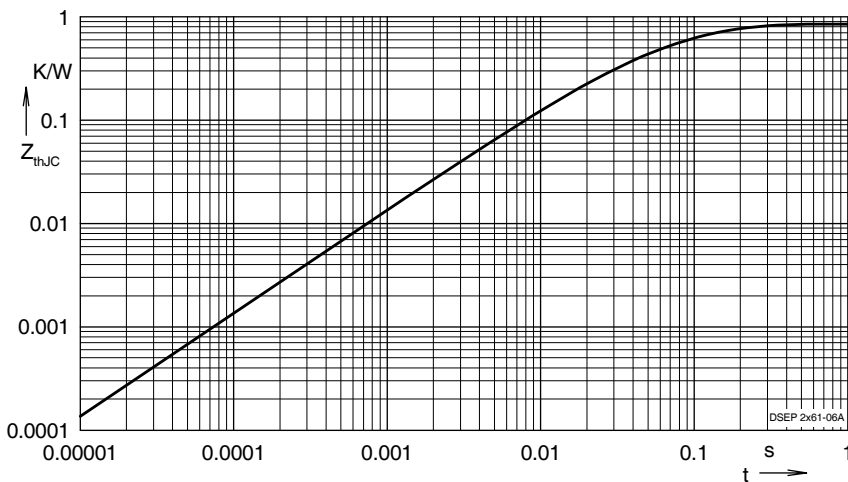


Fig. 18 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.3073	0.0055
2	0.3533	0.0092
3	0.0887	0.0007
4	0.1008	0.0399