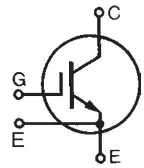
Advance Technical Data

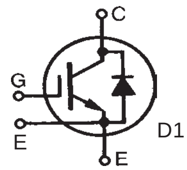
HiPerFAST™ IGBT with Diode

C2-Class High Speed IGBTs

IXGN 60N60C2
IXGN60N60C2D1

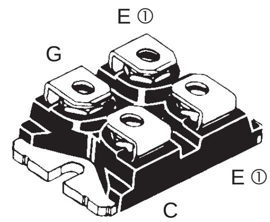
V_{CES}	=	600	V
I_{C25}	=	75	A
$V_{CE(sat)}$	=	2.5	V
$t_{fi(typ)}$	=	35	ns





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 @ $V_{CE} \leq$ 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, t = 1 min	2500	V~
	$I_{ISOL} \leq$ 1 mA, t = 1 s	3000	V~
M_d	Mounting torque	1.15/13	Nm/lb.in.
	Terminal connection torque (M4)	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

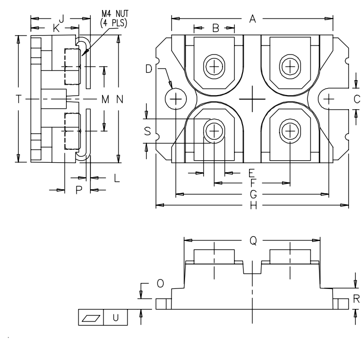
Advantages

- 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}	T_J = 25°C			650	mA
	V_{GE} = 0 V	T_J = 125°C			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	T_J = 25°C		2.1	2.5	V
	Note 1	T_J = 125°C		1.8		V

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) Min.	Typ.	Max.	
g_{fs}	I_C = 50 A; V_{CE} = 10 V, Note 1	40	58		S
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		3900		pF
C_{oes}			280		pF
C_{res}			97		pF
Q_g	I_C = 50 A, V_{GE} = 15 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°C** I_C = 50 A, V_{GE} = 15 V V_{CE} = 400 V, R_G = R_{off} = 2.0 Ω		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°C** I_C = 50 A, V_{GE} = 15 V V_{CE} = 400 V, R_G = R_{off} = 2.0 Ω		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}				0.26	K/W
R_{thCK}			0.05		K/W

SOT-227B miniBLOC



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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°C, unless otherwise specified) min.	typ.	max.	
V_F	I_F = 60 A, V_{GE} = 0 V, Note 1			2.1	V
	T_J = 150°C			1.4	
I_{RM}	I_F = 60 A, V_{GE} = 0 V, -di_F/dt = 100 A/µ T_J = 100°C V_R = 100 V			8.3	A
t_{rr}	I_F = 1 A; -di/dt = 200 A/ms; V_R = 30 V		35		ns
R_{thJC}				0.85	K/W

Note 1: Pulse test, t ≤ 300 ms, duty cycle ≤ 2 %

Fig. 1. Output Characteristics
@ 25 Deg. C

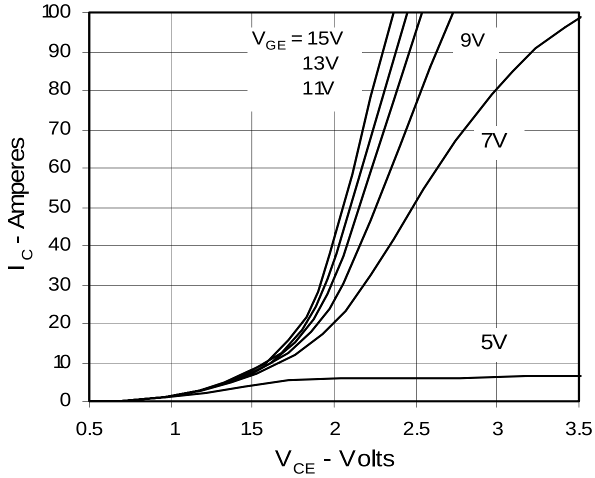


Fig. 2. Extended Output Characteristics
@ 25 deg. C

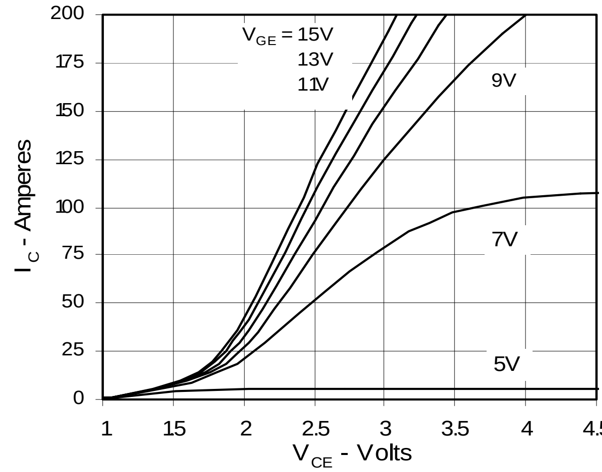


Fig. 3. Output Characteristics
@ 125 Deg. C

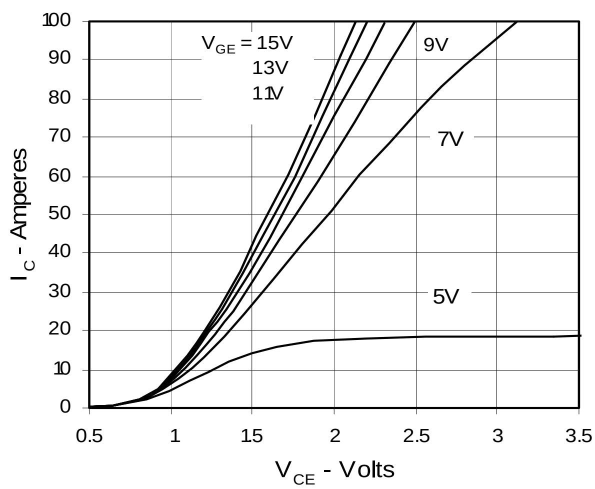


Fig. 4. Temperature Dependence of $V_{CE(sat)}$

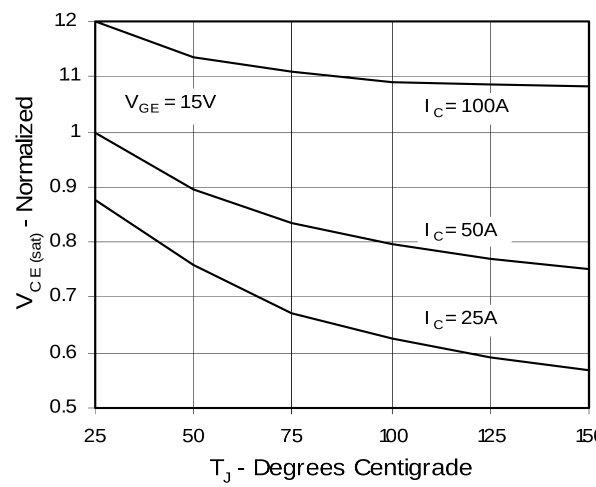


Fig. 5. Collector-to-Emitter Voltage
vs. Gate-to-Emitter voltage

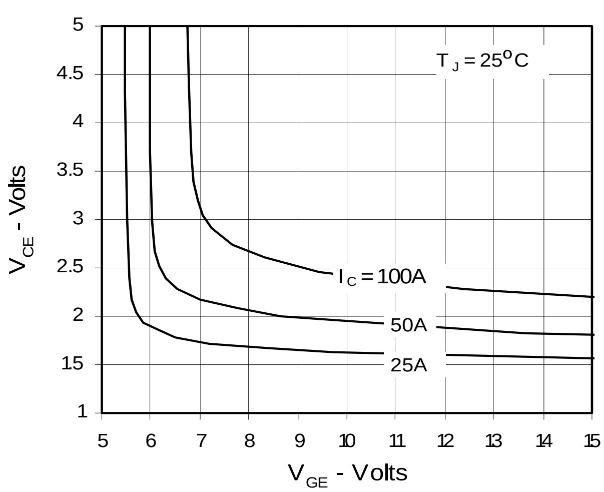


Fig. 6. Input Admittance

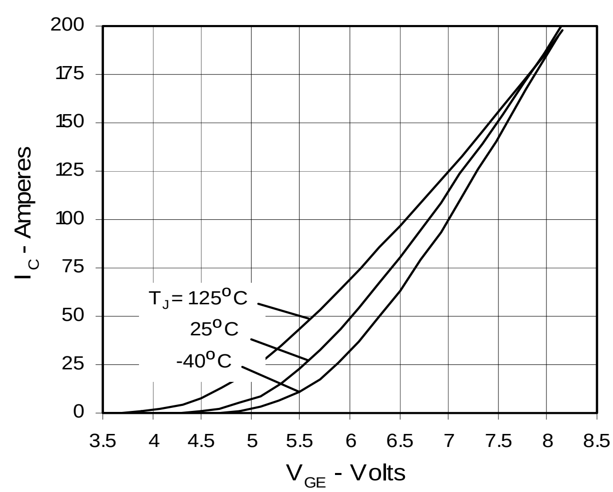


Fig. 7. Transconductance

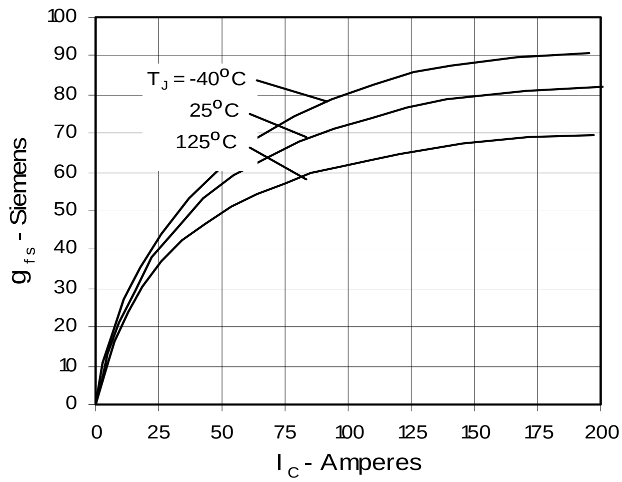


Fig. 8. Dependence of E_{off} on R_G

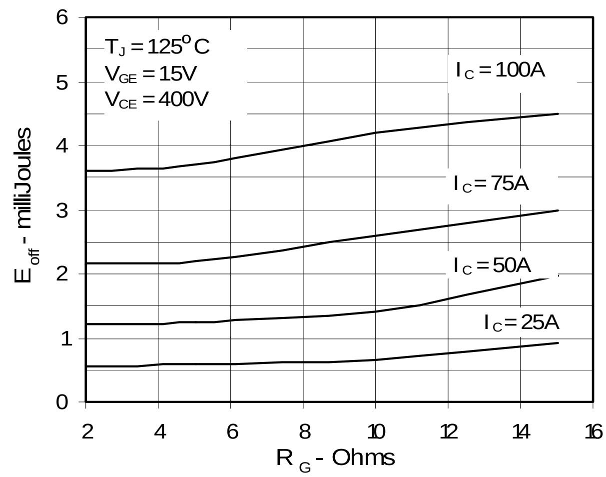


Fig. 9. Dependence of E_{off} on I_C

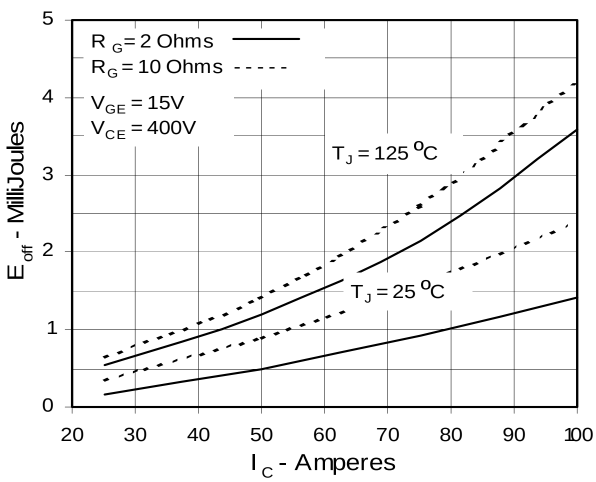


Fig. 10. Dependence of E_{off} on Temperature

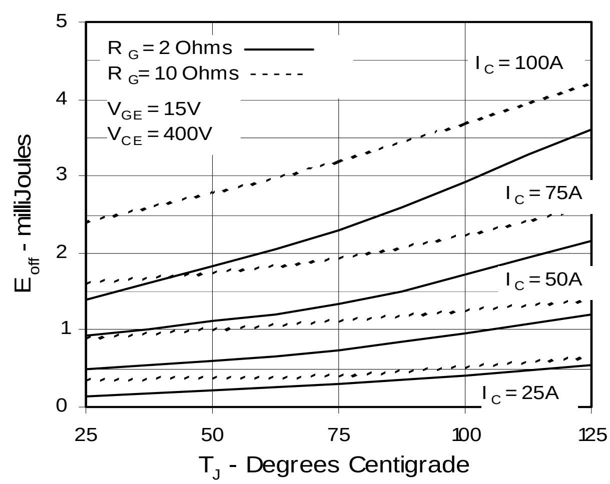


Fig. 11. Gate Charge

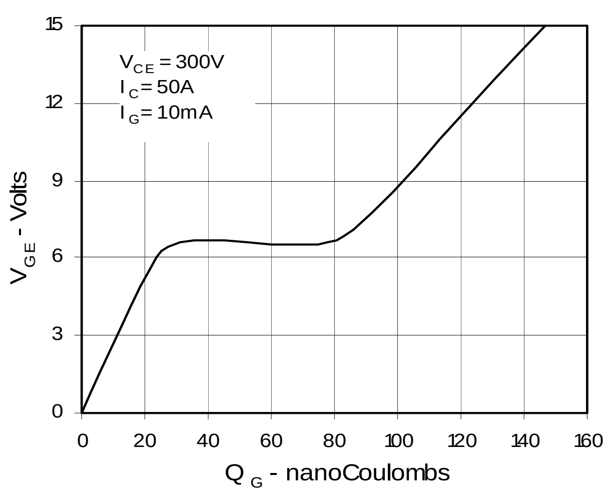
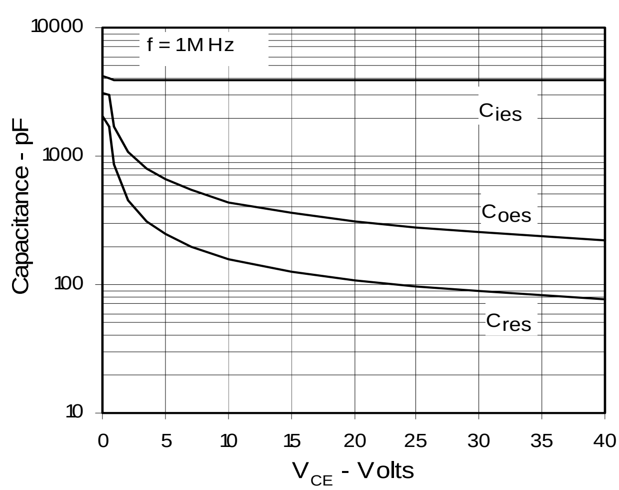


Fig. 12. Capacitance



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

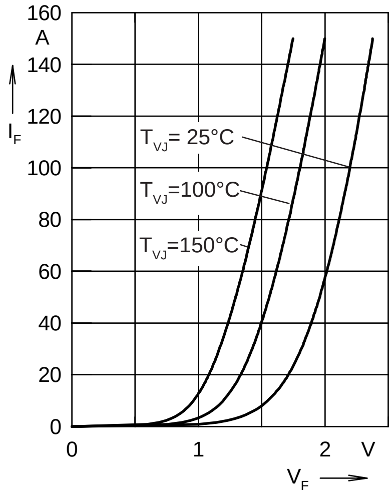


Fig. 12 Forward current I_F versus V_F

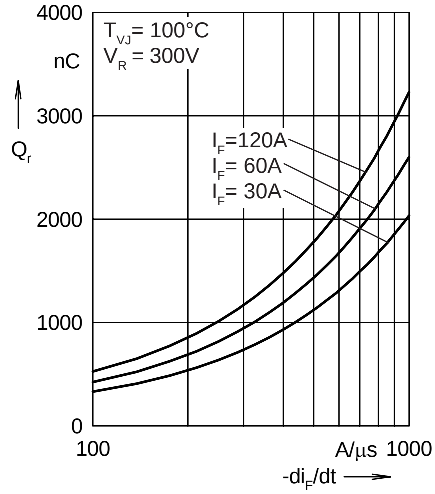


Fig. 13 Reverse recovery charge Q_r versus $-di_F/dt$

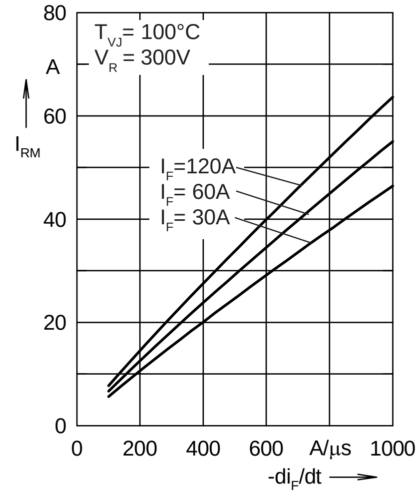


Fig. 14 Peak reverse current I_{RM} versus $-di_F/dt$

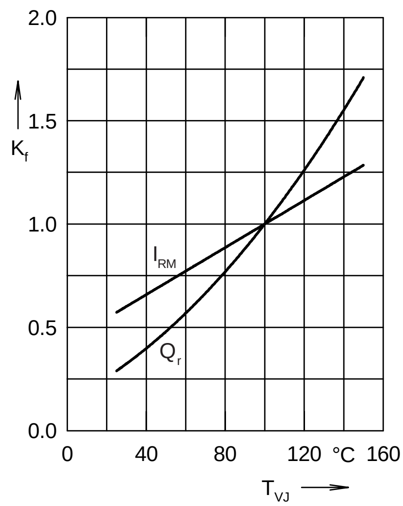


Fig. 15 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

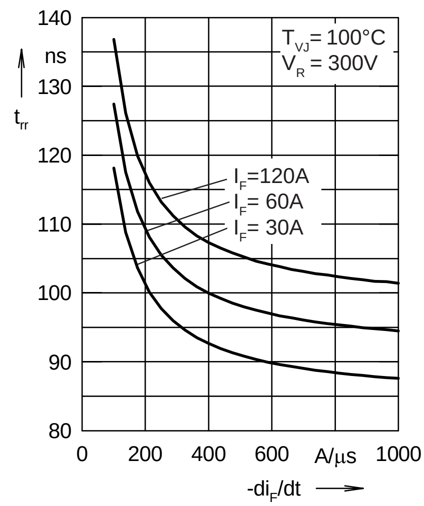


Fig. 16 Recovery time t_{rr} versus $-di_F/dt$

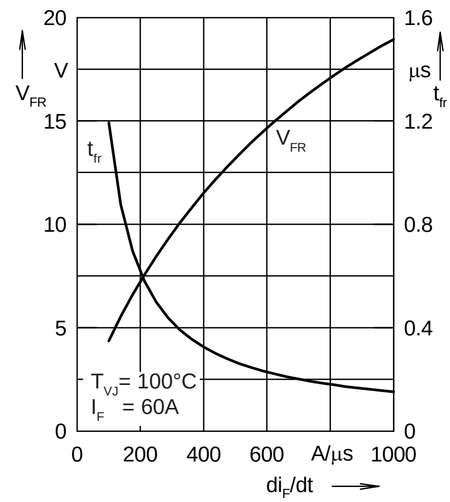


Fig. 17 Peak forward voltage V_{FR} and t_{fr}

versus di_F/dt

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

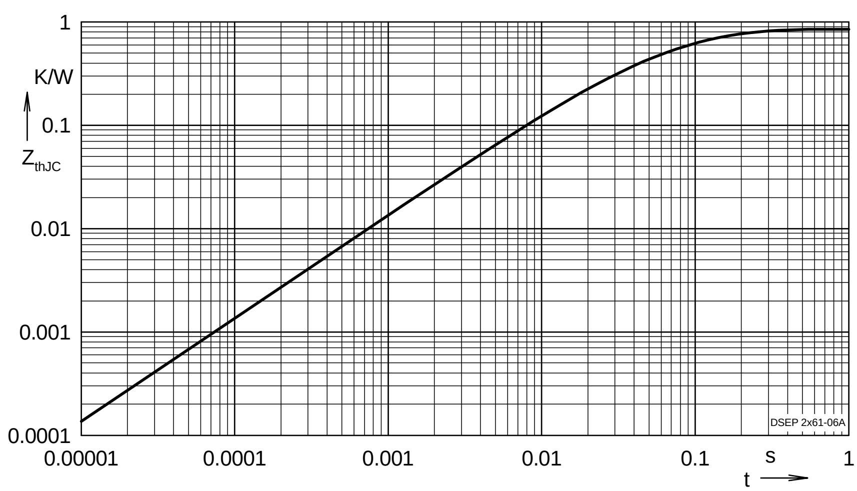


Fig. 18 Transient thermal resistance junction to case