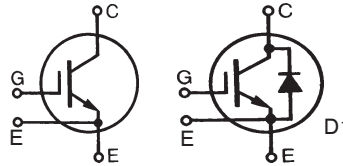


HiPerFAST™ IGBT with Diode

C2-Class High Speed IGBTs

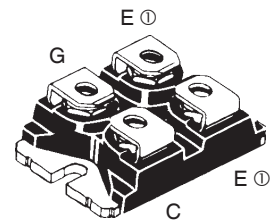
IXGN 60N60C2
IXGN60N60C2D1

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



Symbol	Test Conditions	Maximum Ratings
V_{CES}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	600 V
V_{CGR}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1 \text{ MW}$	600 V
V_{GES}	Continuous	$\pm 20 \text{ V}$
V_{GEM}	Transient	$\pm 30 \text{ V}$
I_{C25}	$T_C = 25^\circ\text{C}$ (limited by leads)	100 A
I_{C110}	$T_C = 110^\circ\text{C}$	60 A
I_{CM}	$T_C = 25^\circ\text{C}, 1 \text{ ms}$	300 A
SSOA (RBSOA)	$V_{GE} = 15 \text{ V}, T_{VJ} = 125^\circ\text{C}, R_G = 10 \text{ W}$ Clamped inductive load @ $V_{CE} \leq 600 \text{ V}$	$I_{CM} = 100 \text{ A}$
P_C	$T_C = 25^\circ\text{C}$	480 W
T_J		-55 ... +150 °C
T_{JM}		150 °C
T_{stg}		-55 ... +150 °C
V_{ISOL}	50/60 Hz $I_{ISOL} \leq 1 \text{ mA}$	t = 1 min 2500 V~ t = 1 s 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

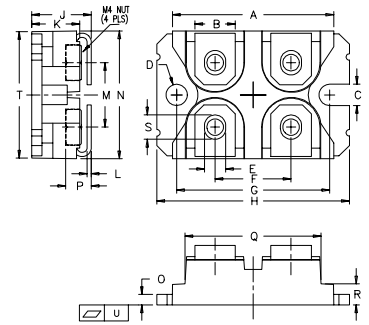
Advantages

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

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		Min.	Typ.	Max.
$V_{GE(th)}$	$I_C = 250 \text{ mA}, V_{CE} = V_{GE}$	3.0		5.0 V
I_{CES}	$V_{CE} = V_{CES}$ $V_{GE} = 0 \text{ V}$		$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	650 mA 5 mA
I_{GES}	$V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$			$\pm 100 \text{ nA}$
$V_{CE(sat)}$	$I_C = 50 \text{ A}, V_{GE} = 15 \text{ V}$ Note 1		$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	2.1 V 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		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°C, unless otherwise specified)		
		min.	typ.	max.
V_F	I _F = 60 A, V _{GE} = 0 V, Note 1			2.1 V
				1.4
I_{RM}	I _F = 60 A, V _{GE} = 0 V, -di _F /dt = 100 A/μs 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 %

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. 1. Output Characteristics
@ 25 Deg. C

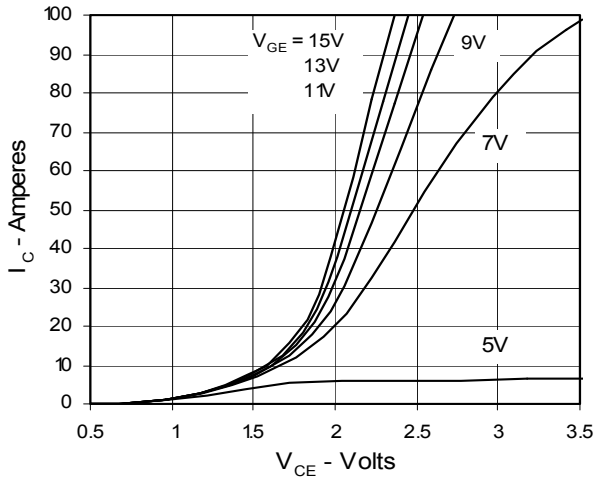


Fig. 2. Extended Output Characteristics
@ 25 deg. C

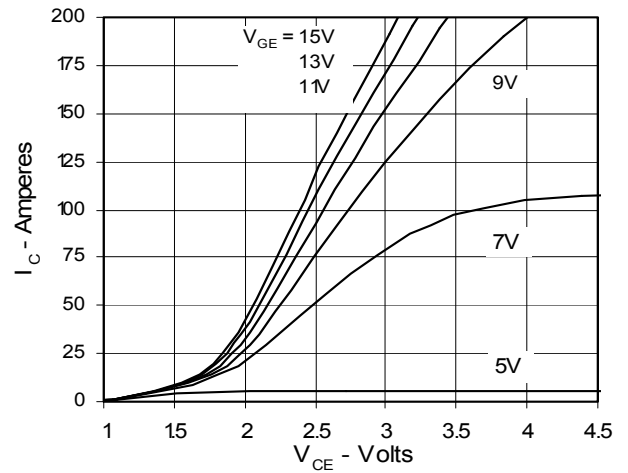


Fig. 3. Output Characteristics
@ 125 Deg. C

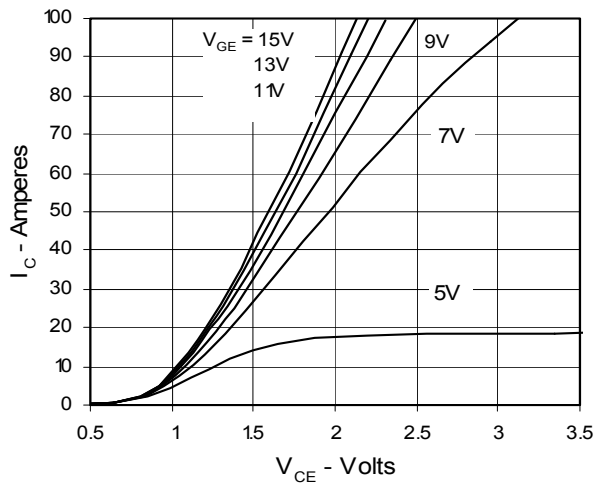


Fig. 4. Temperature Dependence of $V_{CE(sat)}$

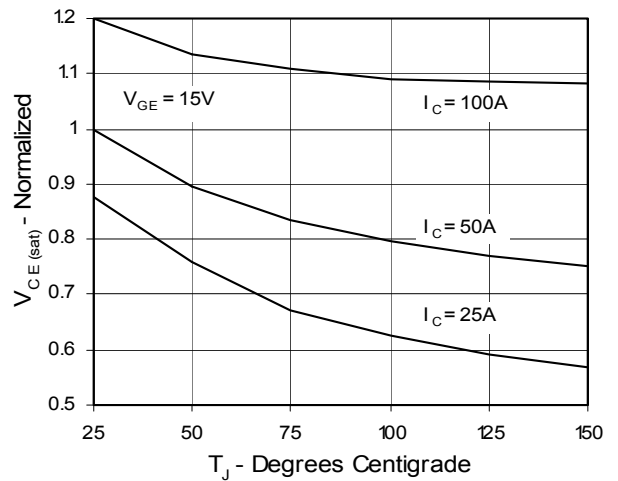


Fig. 5. Collector-to-Emitter Voltage
vs. Gate-to-Emitter voltage

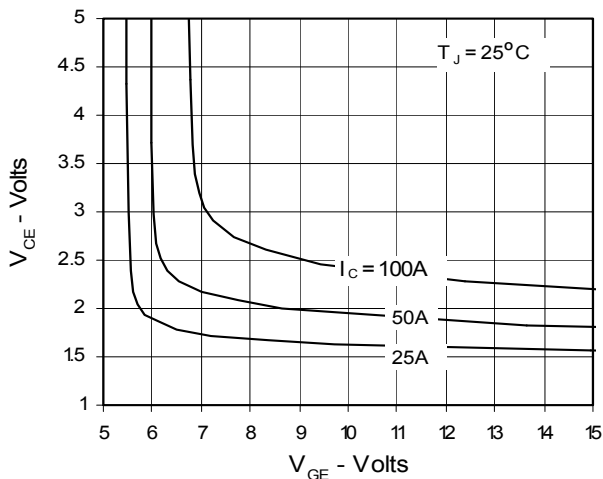


Fig. 6. Input Admittance

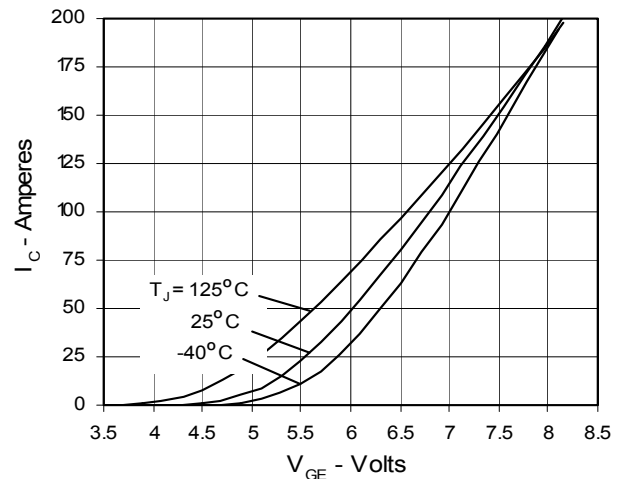


Fig. 7. Transconductance

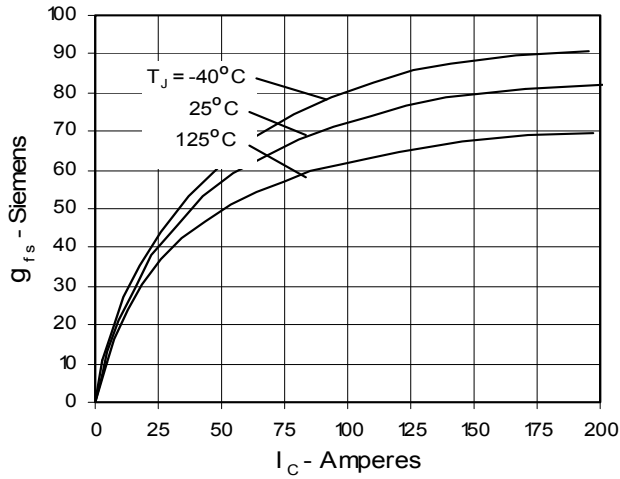


Fig. 8. Dependence of E_{off} on R_G

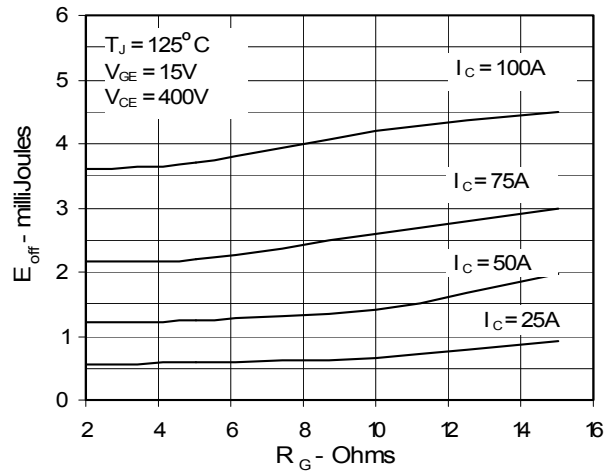


Fig. 9. Dependence of E_{off} on I_C

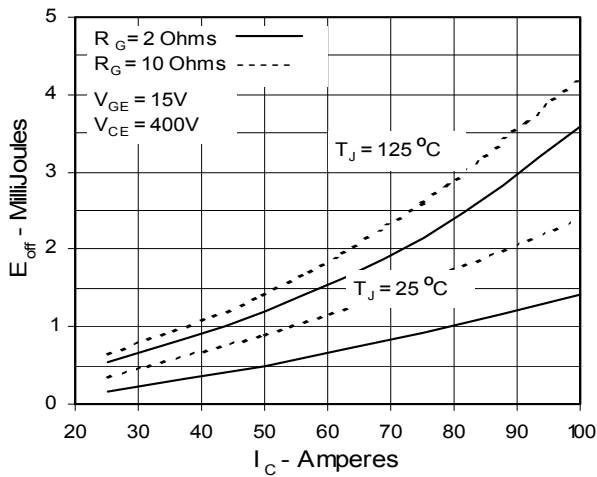


Fig. 10. Dependence of E_{off} on Temperature

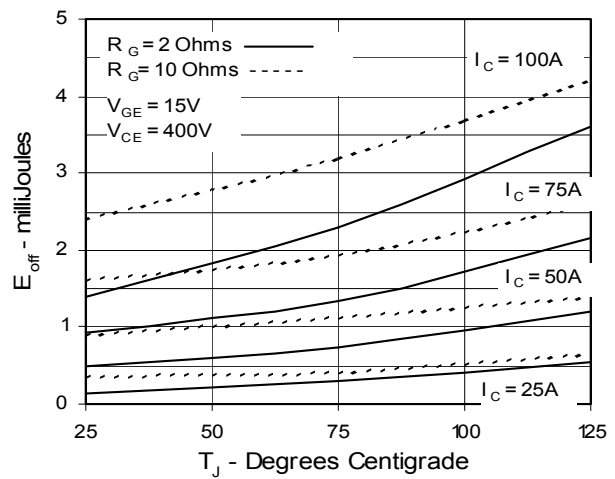


Fig. 11. Gate Charge

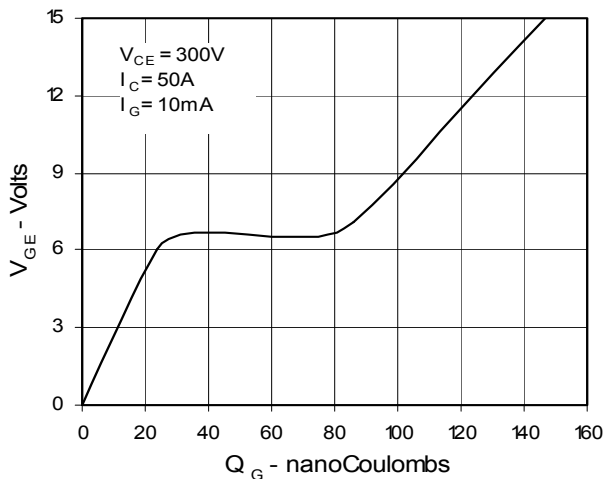
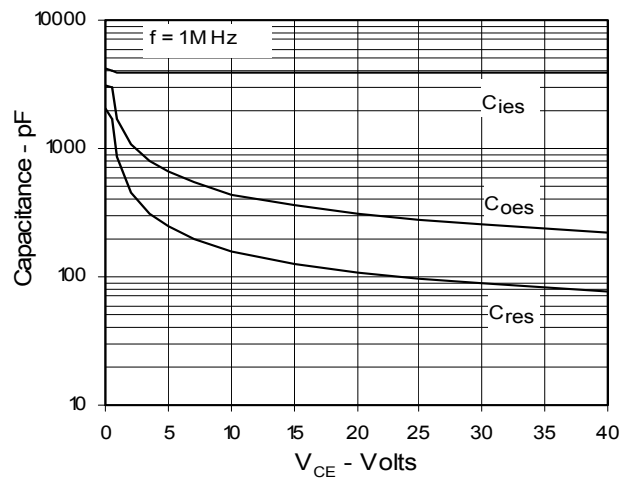


Fig. 12. Capacitance



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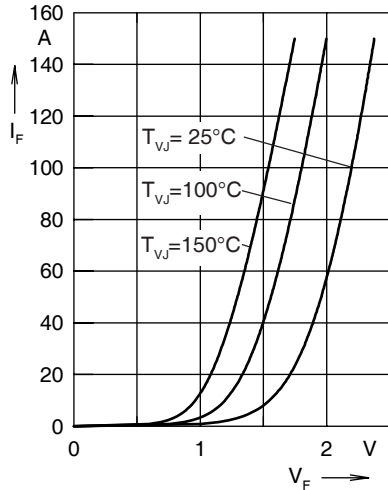


Fig. 12 Forward current I_F versus V_F

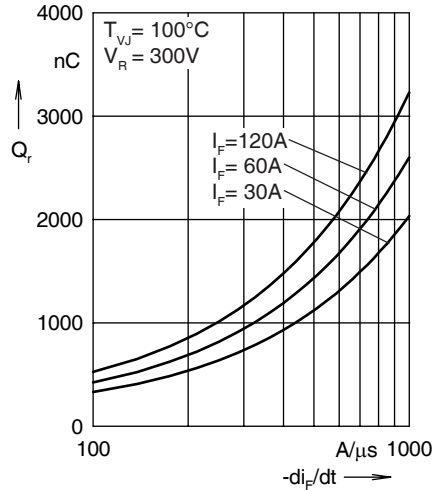


Fig. 13 Reverse recovery charge Q_r versus $-di_F/dt$

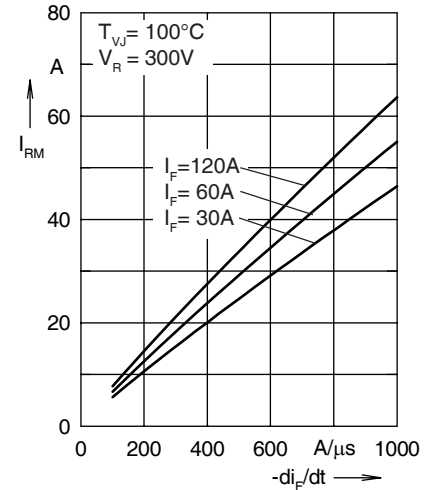


Fig. 14 Peak reverse current I_{RM} versus $-di_F/dt$

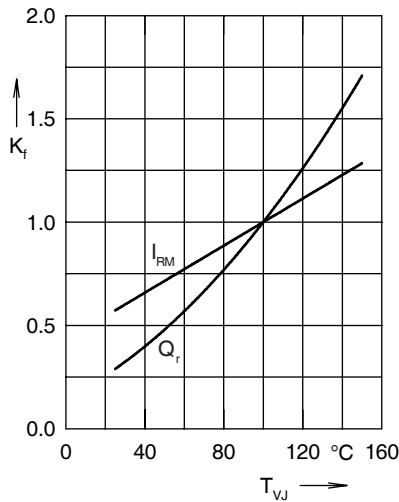


Fig. 15 Dynamic parameters Q_r , I_{RM} versus T_{VJ}

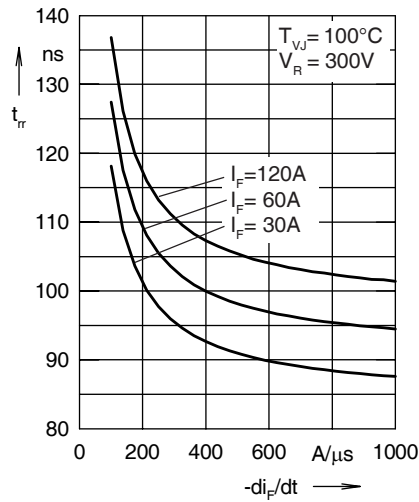


Fig. 16 Recovery time t_{rr} versus $-di_F/dt$

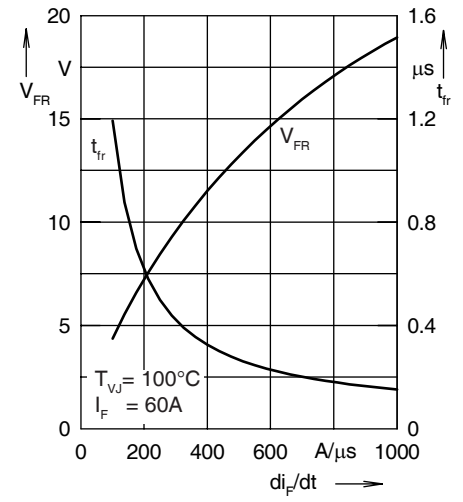


Fig. 17 Peak forward voltage V_{FR} and t_{fr} versus di_F/dt

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

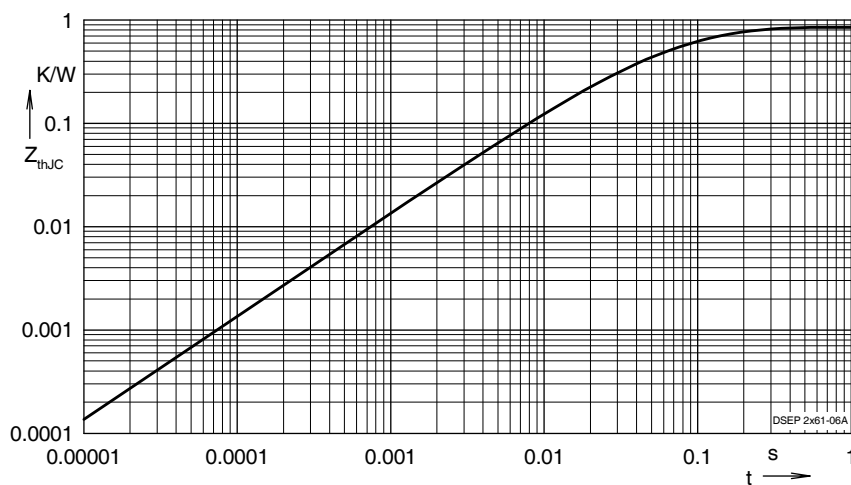


Fig. 18 Transient thermal resistance junction to case