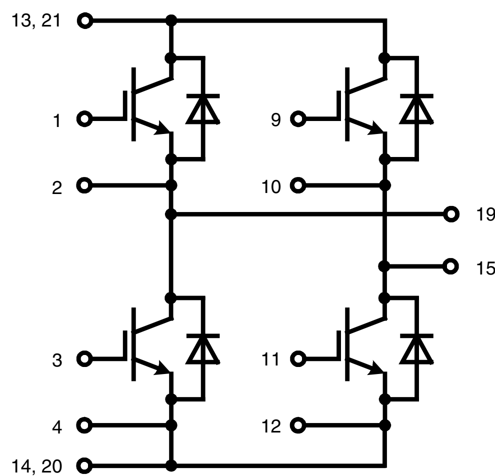
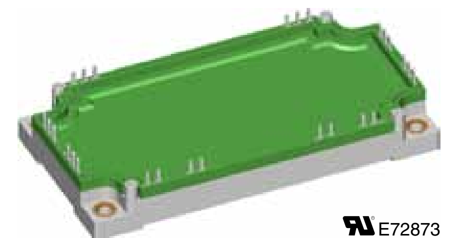
IGBT Module
H Bridge

V_{CES} = 1200 V
I_{C25} = 120 A
$V_{CE(sat)}$ = 1.8 V

Part name (Marking on product)

MIXA81H1200EH





Features:

- Easy paralleling due to the positive temperature coefficient of the on-state voltage
- Rugged XPT design (Xtreme light Punch Through) results in:
  - short circuit rated for 10 µsec.
  - very low gate charge
  - square RBSOA @ 3x I_C
  - low EMI
- Thin wafer technology combined with the XPT design results in a competitive low $V_{CE(sat)}$
- SONIC™ diode
  - fast and soft reverse recovery
  - low operating forward voltage

Application:

- AC motor drives
- Solar inverter
- Medical equipment
- Uninterruptible power supply
- Air-conditioning systems
- Welding equipment
- Switched-mode and resonant-mode power supplies

Package:

- "E3-Pack" standard outline
- Insulated copper base plate
- Soldering pins for PCB mounting
- Optimizes pin layout

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Ouput Inverter T1 - T6

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
					Ratings		
V_{CES}	collector emitter voltage		T_{VJ} = 25°C			1200	V
V_{GES} V_{GEM}	max. DC gate voltage max. transient collector gate voltage	continuous transient				±20 ±30	V V
I_{C25} I_{C80}	collector current		T_C = 25°C T_C = 80°C			120 84	A A
P_{tot}	total power dissipation		T_C = 25°C			390	W
$V_{CE(sat)}$	collector emitter saturation voltage	I_C = 77 A; V_{GE} = 15 V	T_{VJ} = 25°C T_{VJ} = 125°C		1.8 2.1	2.1	V V
$V_{GE(th)}$	gate emitter threshold voltage	I_C = 3 mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	5.4	6.0	6.5	V
I_{CES}	collector emitter leakage current	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C T_{VJ} = 125°C		0.03 0.6	0.2	mA mA
I_{GES}	gate emitter leakage current	V_{GE} = ±20 V				500	nA
$Q_{G(on)}$	total gate charge	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 75 A			230		nC
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off}	turn-on delay time current rise time turn-off delay time current fall time turn-on energy per pulse turn-off energy per pulse	inductive load V_{CE} = 600 V; I_C = 75 A V_{GE} = ±15 V; R_G = 10 Ω	T_{VJ} = 125°C		70 40 250 100 6.8 8.3		ns ns ns ns mJ mJ
RBSOA	reverse bias safe operating area	V_{GE} = ±15 V; R_G = 10 Ω;	T_{VJ} = 125°C V_{CEK} = 1200 V			225	A
SCSOA t_{SC} I_{SC}	short circuit safe operating area short circuit duration short circuit current	V_{CE} = 900 V; V_{GE} = ±15 V; R_G = 10 Ω; non-repetitive	T_{VJ} = 125°C		 300	 10	 µs A
R_{thJC}	thermal resistance junction to case	(per IGBT)				0.32	K/W

Output Inverter D1 - D6

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
					Ratings		
V_{RRM}	max. repetitve reverse voltage		T_{VJ} = 25°C			1200	V
I_{F25} I_{F80}	forward current		T_C = 25°C T_C = 80°C			135 90	A A
V_F	forward voltage	I_F = 100 A; V_{GE} = 0 V	T_{VJ} = 25°C T_{VJ} = 125°C		1.95 1.95	2.2	V V
Q_{rr} I_{RM} t_{rr} E_{rec}	reverse recovery charge max. reverse recovery current reverse recovery time reverse recovery energy	V_R = 600 V di_F/dt = -1600 A/µs I_F = 100 A; V_{GE} = 0 V	T_{VJ} = 125°C		12.5 100 350 4		µC A ns mJ
R_{thJC}	thermal resistance junction to case	(per diode)				0.4	K/W

T_C = 25°C unless otherwise stated

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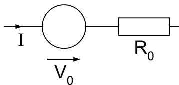
Module

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
T_{VJ}	*operating temperature*			-40		125	°C
T_{VJM}	*max. virtual junction temperature*					150	°C
T_{stg}	*storage temperature*			-40		125	°C
V_{ISOL}	*isolation voltage*	$I_{ISOL} \leq 1$ mA; 50/60 Hz				3000	V~
CTI	*comparative tracking index*					200	
M_d	*mounting torque (M5)*			3		6	Nm
d_S	*creep distance on surface*			10			mm
d_A	*strike distance through air*			7.5			mm
$R_{pin-chip}$	*resistance pin to chip*				2.5		mΩ
R_{thCH}	*thermal resistance case to heatsink*	with heatsink compound			0.02		K/W
Weight					300		g

Equivalent Circuits for Simulation



Symbol	Definitions	Conditions		min.	typ.	max.	Unit
V_0	*IGBT*	T1 - T6	$T_{VJ} = 150°C$		1.1		V
R_0					17.9		mΩ
V_0	*free wheeling diode*	D1 - D6	$T_{VJ} = 150°C$		1.09		V
R_0					9.1		mΩ

$T_C = 25°C$ unless otherwise stated

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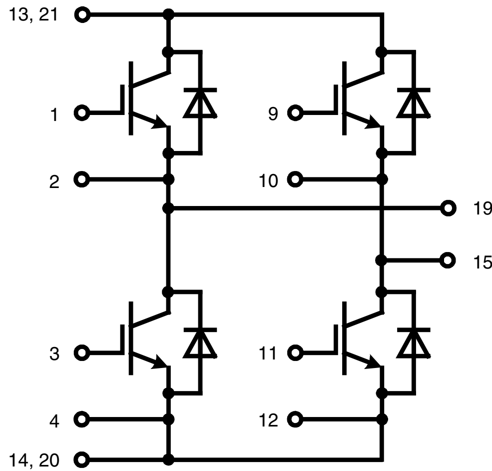
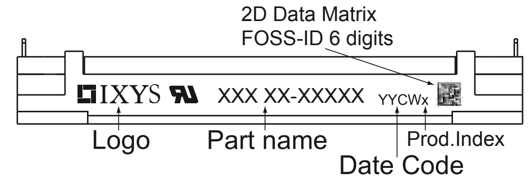
Circuit Diagram



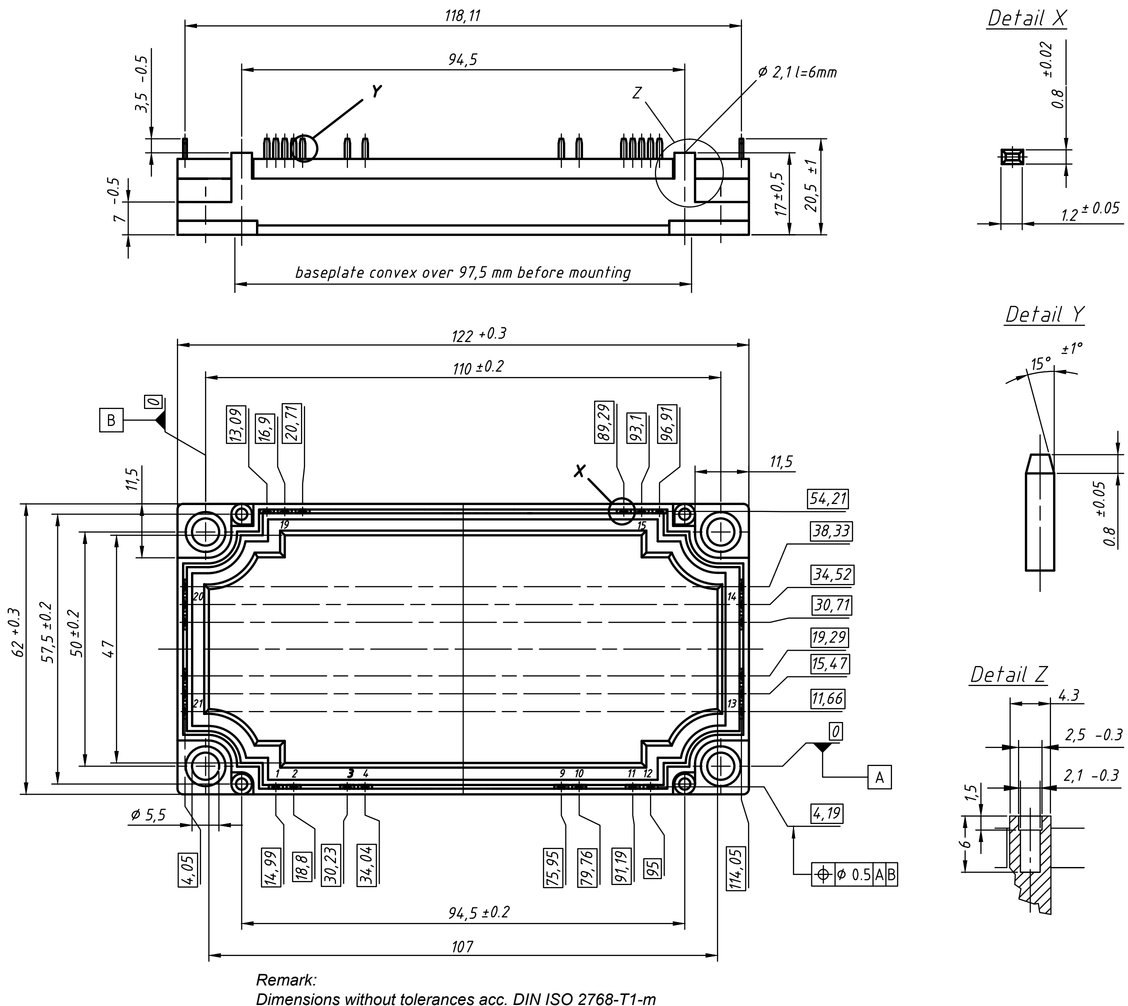


Part number

M = Module
I = IGBT
X = XPT
A = standard
81 = Current Rating [A]
H = H~ Bridge
1200 = Reverse Voltage [V]
EH = E3-Pack

Outline Drawing

Dimensions in mm (1 mm = 0.0394“)



Remark:
Dimensions without tolerances acc. DIN ISO 2768-T1-m

Product Marking

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MIXA 81 H 1200 EH	MIXA81H1200EH	Box	5	511053

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Transistor T1 - T6

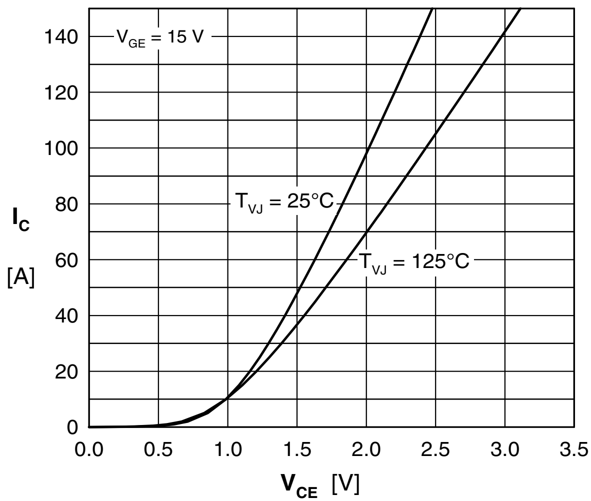

Fig. 1 Typ. output characteristics

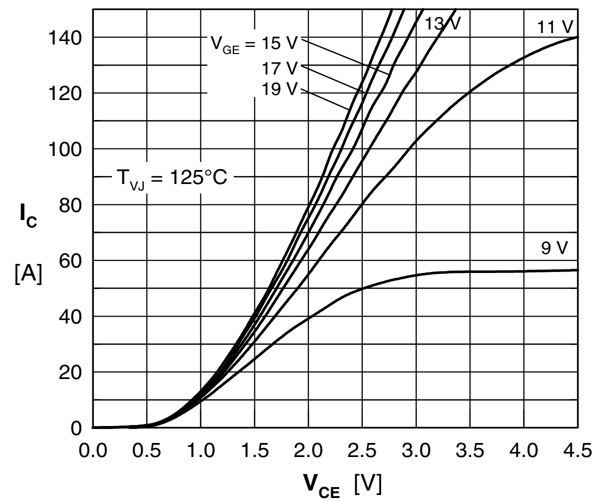

Fig. 2 Typ. output characteristics

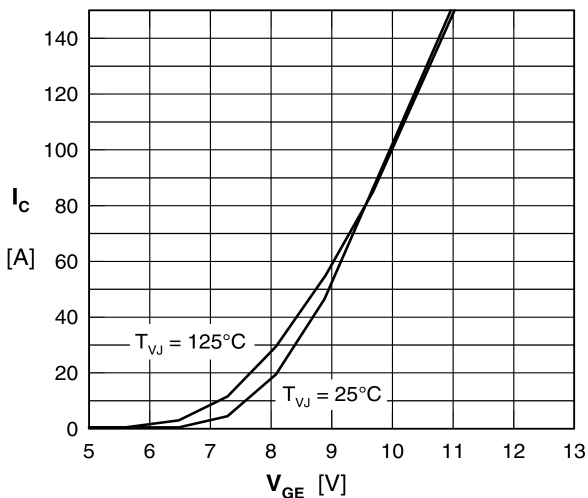

Fig. 3 Typ. tranfer characteristics

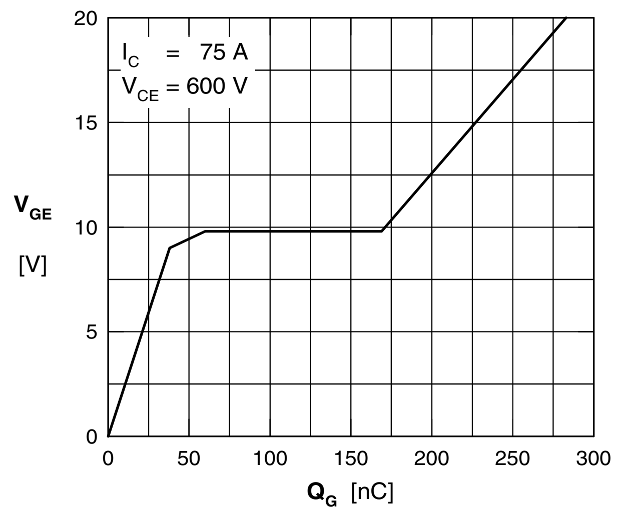

Fig. 4 Typ. turn-on gate charge

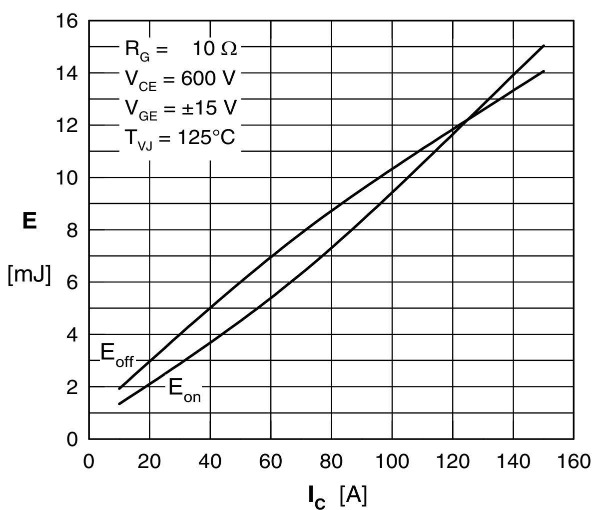

Fig. 5 Typ. switching energy vs. collector current

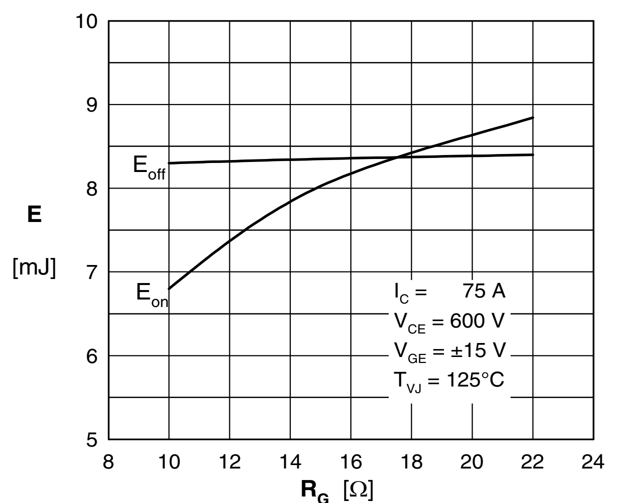

Fig. 6 Typ. switching energy vs. gate resistance

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Inverter D1 - D6

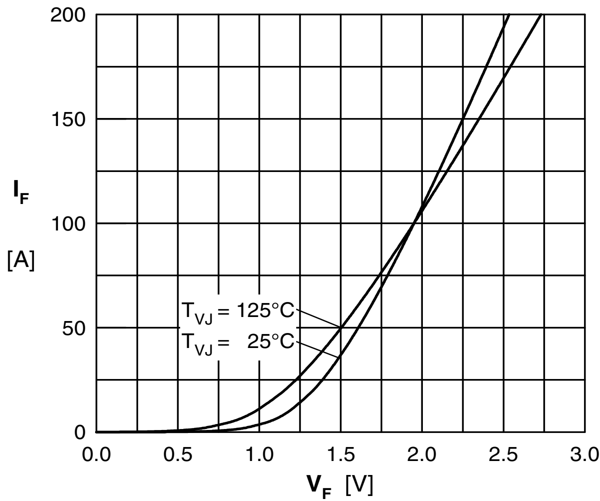


Fig. 7 Typ. Forward current versus V_F

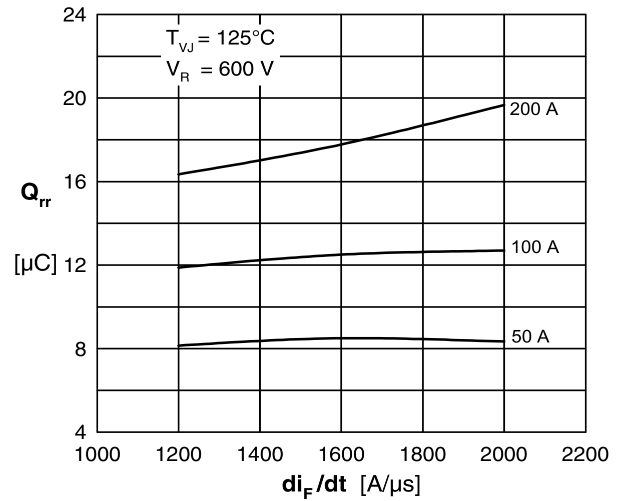


Fig. 8 Typ. reverse recov.charge Q_{rr} vs. di/dt

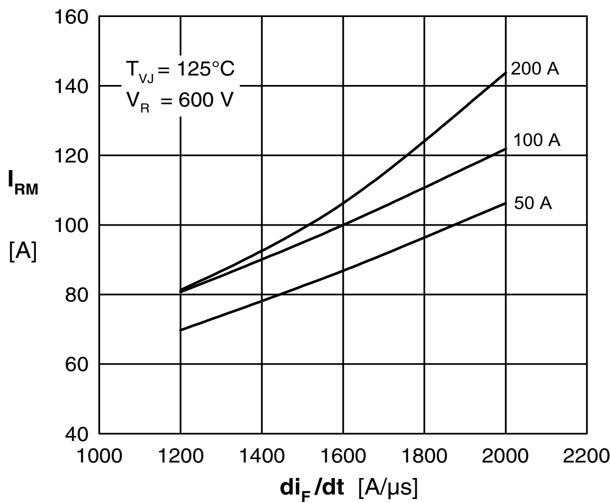


Fig. 9 Typ. peak reverse current I_{RM} vs. di/dt

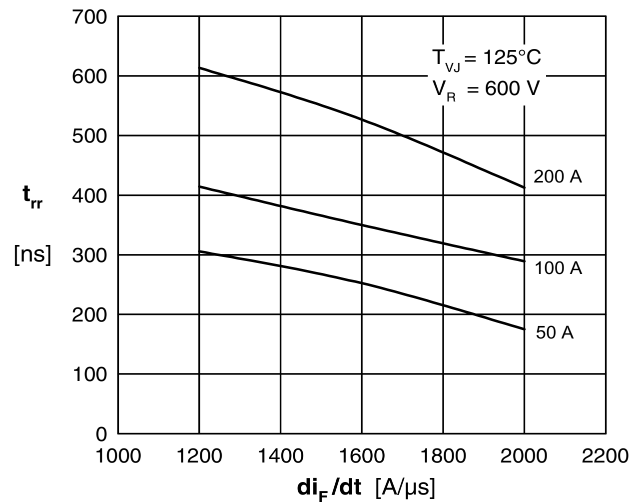


Fig. 10 Typ. recovery time t_{rr} versus di/dt

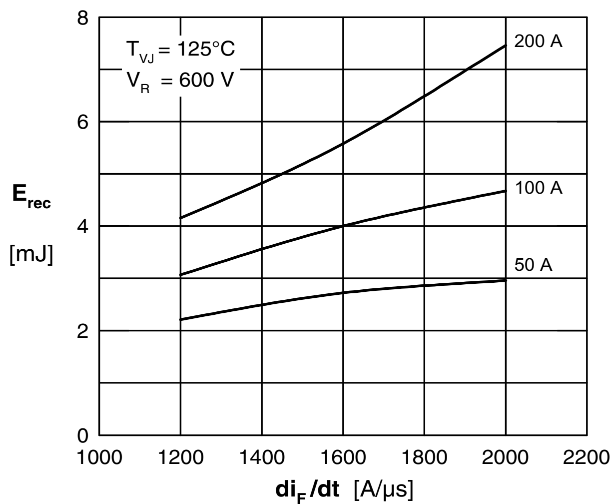
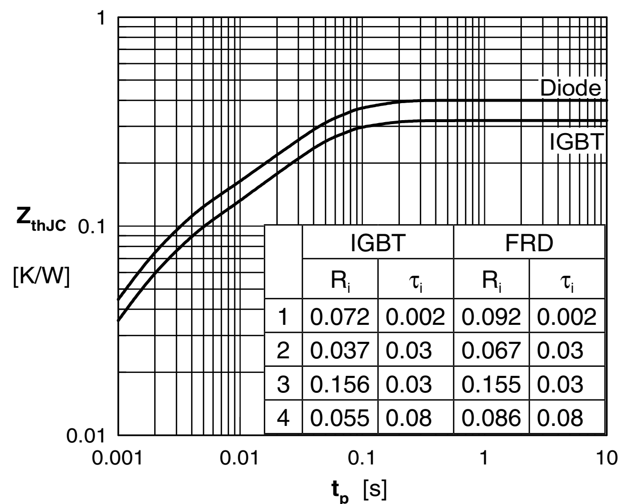


Fig. 11 Typ. recovery energy E_{rec} versus di/dt



	IGBT		FRD	
	R_i	τ_i	R_i	τ_i
1	0.072	0.002	0.092	0.002
2	0.037	0.03	0.067	0.03
3	0.156	0.03	0.155	0.03
4	0.055	0.08	0.086	0.08

Fig. 12 Typ. transient thermal impedance

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