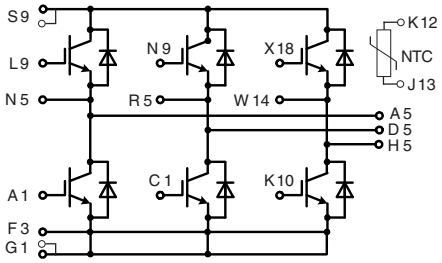
IGBT Module

Sixpack in ECO-PAC 2

I_{C25} = 19 A
V_{CES} = 600 V
$V_{CE(sat)\,typ.}$ = 1.9 V





Pin arangement see outlines

IGBTs

Symbol	Conditions	Maximum Ratings	
V_{CES}	T_{VJ} = 25°C to 150°C	600	V
V_{GES}		± 20	V
I_{C25}	T_C = 25°C	19	A
I_{C80}	T_C = 80°C	14	A
I_{CM}	V_{GE} = ±15 V; R_G = 82 Ω; T_{VJ} = 125°C	20	A
V_{CEK}	RBSOA, Clamped inductive load; L = 100 µH	V_{CES}	
t_{SC} (SCSOA)	V_{CE} = 720 V; V_{GE} = ±15 V; R_G = 82 Ω; T_{VJ} = 125°C non-repetitive	10	µs
P_{tot}	T_C = 25°C	73	W

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
$V_{CE(sat)}$	I_C = 10 A; V_{GE} = 15 V; T_{VJ} = 25°C		1.9	2.4	V
	T_{VJ} = 125°C		2.2		V
$V_{GE(th)}$	I_C = 0.35 mA; V_{GE} = V_{CE}	4.5		6.5	V
I_{CES}	V_{CE} = V_{CES}; V_{GE} = 0 V; T_{VJ} = 25°C			0.6	mA
	T_{VJ} = 125°C		2.7		mA
I_{GES}	V_{CE} = 0 V; V_{GE} = ± 20 V			100	nA
$t_{d(on)}$	Inductive load, T_{VJ} = 125°C		35		ns
t_r	V_{CE} = 300 V; I_C = 10 A		35		ns
$t_{d(off)}$	V_{GE} = ±15 V; R_G = 82 Ω		230		ns
t_f			30		ns
E_{on}			0.4		mJ
E_{off}			0.3		mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz		600		pF
Q_{Gon}	V_{CE} = 300 V; V_{GE} = 15 V; I_C = 10 A		39		nC
R_{thJC}	(per IGBT)			1.7	K/W
R_{thJH}	with heatsink compound (0.42 K/m.K; 50 µm)		3.4		K/W

Features

- NPT IGBT's
  - positive temperature coefficient of saturation voltage
  - fast switching
- FRED diodes
  - fast reverse recovery
  - low forward voltage
- Industry Standard Package
  - solderable pins for PCB mounting
  - isolated DCB ceramic base plate

Typical Applications

- AC drives
- power supplies with power factor correction

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Diodes

Symbol	Conditions	Maximum Ratings	
I_{F25}	T_C = 25°C	21	A
I_{F80}	T_C = 80°C	14	A

Symbol	Conditions	Characteristic Values min.	typ.	max.	
V_F	I_F = 10 A; T_{VJ} = 25°C		1.9	2.1	V
	T_{VJ} = 125°C		1.4		V
I_{RM}	I_F = 10 A; di_F/dt = -400 A/µs; T_{VJ} = 125°C		11		A
t_{rr}	V_R = 300 V; V_{GE} = 0 V		80		ns
R_{thJC}				3.5	K/W
R_{thJH}	with heatsink compound (0.42 K/m.K; 50 µm)		7.0		K/W

Data according to IEC 60747 and refer to a single diode unless otherwise stated.

Temperature Sensor NTC

Symbol	Conditions	Characteristic Values min.	typ.	max.	
R_{25}	T = 25°C	4.75	5.0	5.25	kΩ
$B_{25/50}$			3375		K

Component

Symbol	Conditions	Maximum Ratings	
T_{VJ}		-40...+150	°C
T_{stg}		-40...+125	°C
V_{ISOL}	$I_{ISOL} \leq$ 1 mA; 50/60 Hz; t = 1 s	3600	V~
M_d	mounting torque (M4)	1.5 - 2.0	Nm
		14 - 18	lb.in.
a	Max. allowable acceleration	50	m/s^2

Symbol	Conditions	Characteristic Values min.	typ.	max.	
d_S	Creepage distance on surface (Pin to heatsink)	11.2			mm
d_A	Strike distance in air (Pin to heatsink)	11.2			mm
Weight			24		g

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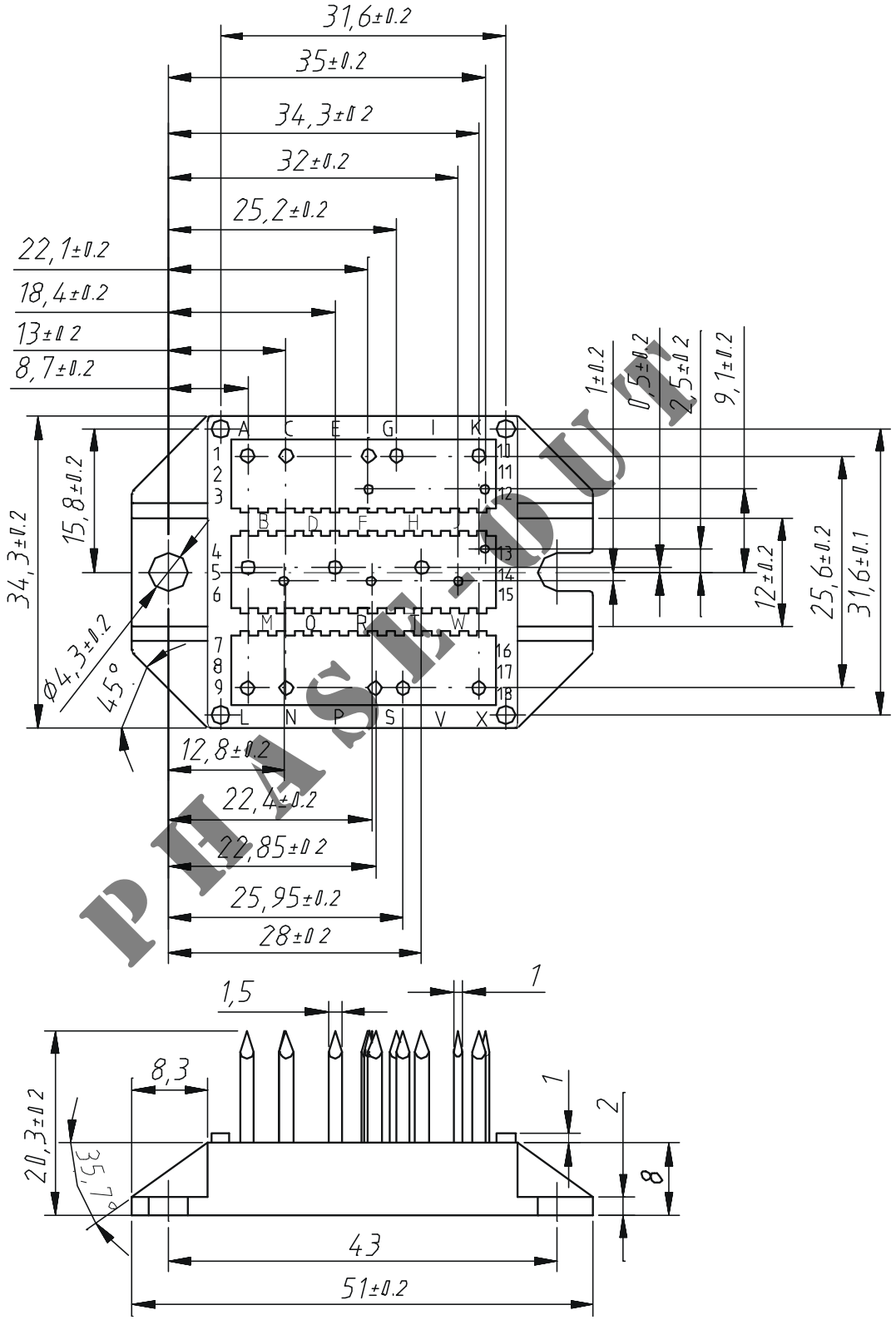
Dimensions in mm (1 mm = 0.0394")



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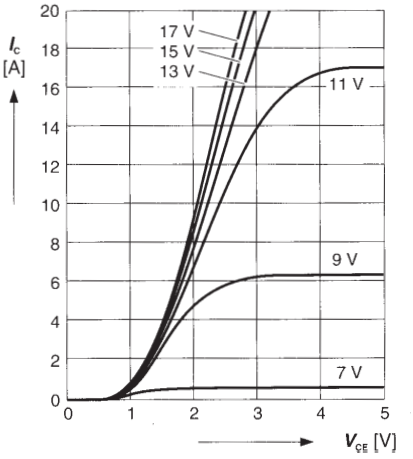
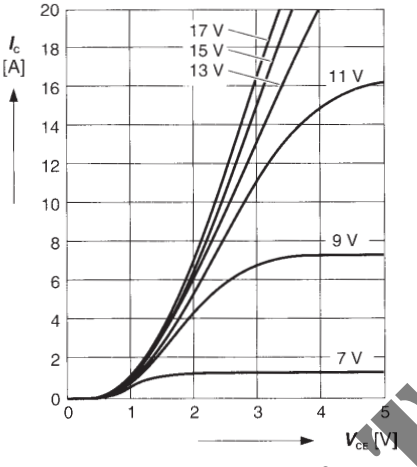
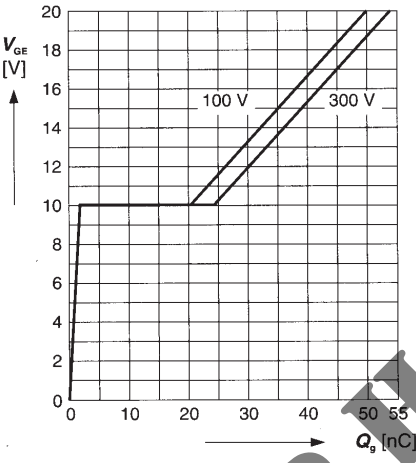
Typ. output characteristics
$I_C = f(V_{CE})$
parameter: t_p = 250 µs; T_j = 25 °C



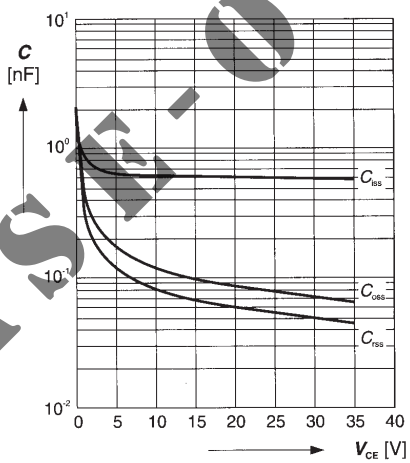
Typ. output characteristics
$I_C = f(V_{CE})$
parameter: t_p = 250 µs; T_j = 125 °C



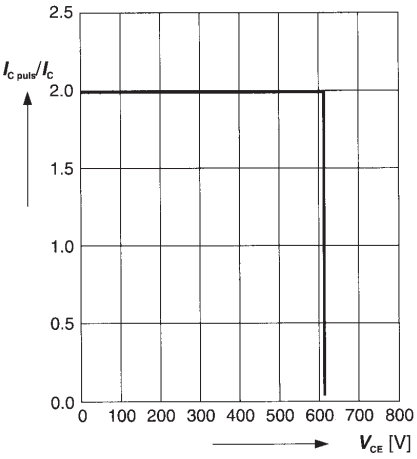
Typ. gate charge
$V_{GE} = f(Q_g)$
parameter: $I_{C\,puls}$ = 10 A



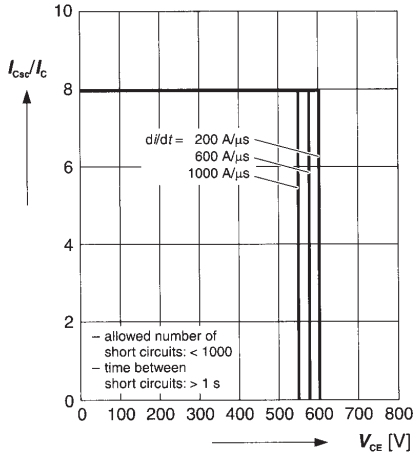
Typ. capacitances
$C = f(V_{CE})$
parameter: V_{GE} = 0 V ; f = 1 MHz



Reverse biased safe operating area
$I_{C\,puls} = f(V_{CE})$, T_j = 150 °C
parameter: V_{GE} = 15 V



Short circuit safe operating area
$I_{Csc} = f(V_{CE})$, T_j = 150 °C
parameter: V_{GE} = ± 15 V ; $t_{sc} \leq$ 10 µs; L < 60 nH



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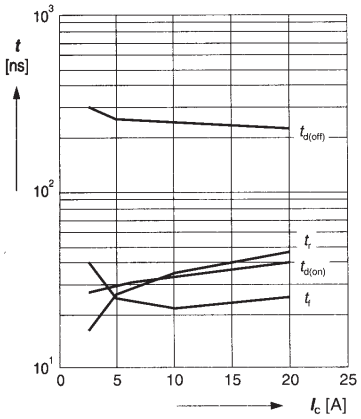
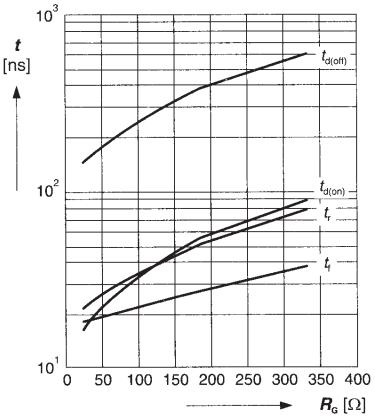
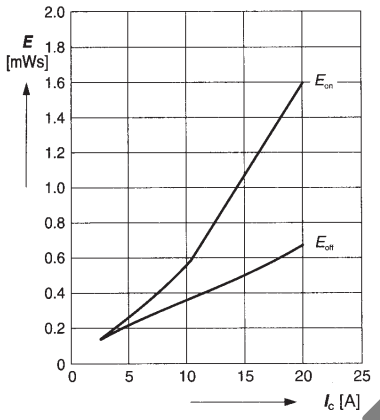
Typ. switching time
$t = f(I_C)$, inductive load, T_j = 125 °C
parameter: V_{CE} = 300 V; V_{GE} = ± 15 V; R_G = 100 Ω



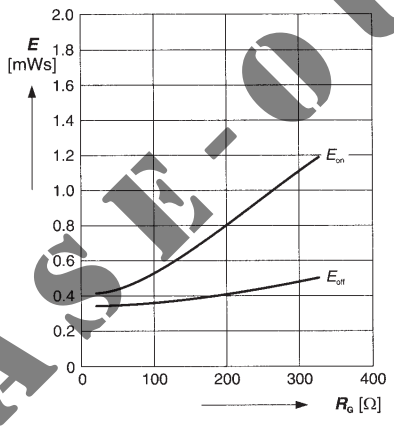
Typ. switching time
$t = f(R_G)$, inductive load, T_j = 125 °C
parameter: V_{CE} = 300 V; V_{GE} = ± 15 V; I_C = 10 A



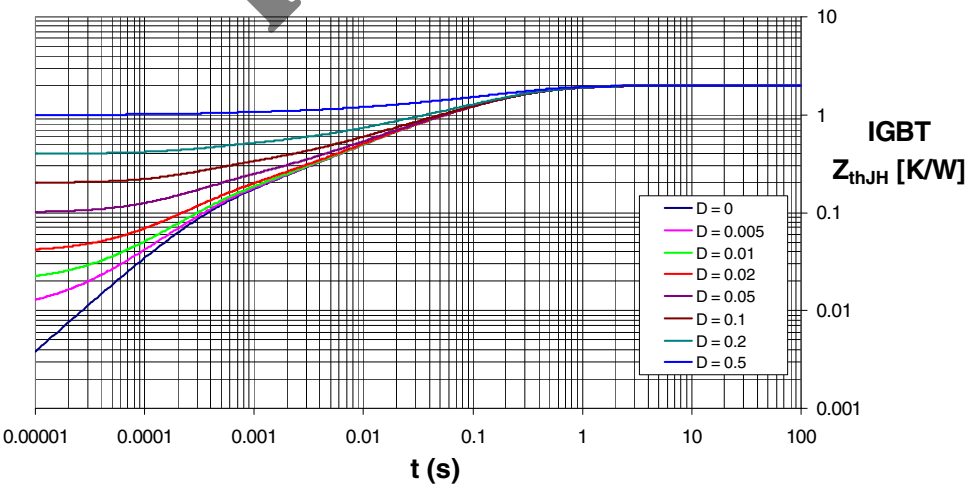
Typ. switching losses
$E = f(I_C)$, inductive load, T_j = 125 °C
parameter: V_{CE} = 300 V; V_{GE} = ± 15 V; R_G = 100 Ω



Typ. switching losses
$E = f(R_G)$, inductive load, T_j = 125 °C
parameter: V_{CE} = 300 V; V_{GE} = ± 15 V; I_C = 10 A



Transient thermal resistance junction to heatsink



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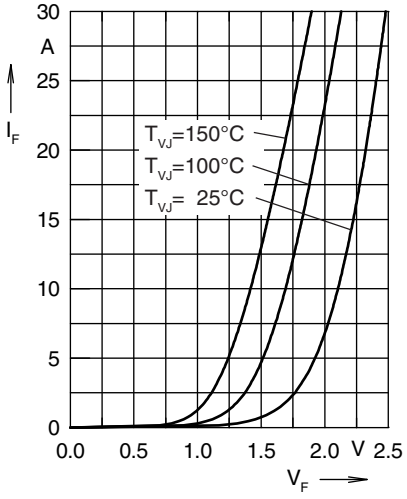
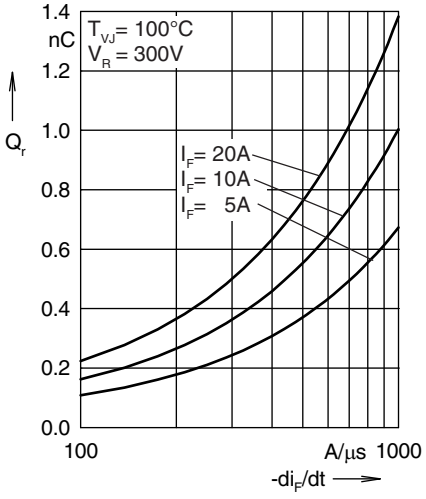
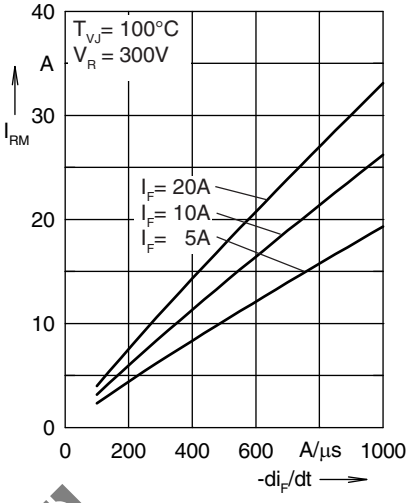
Diode



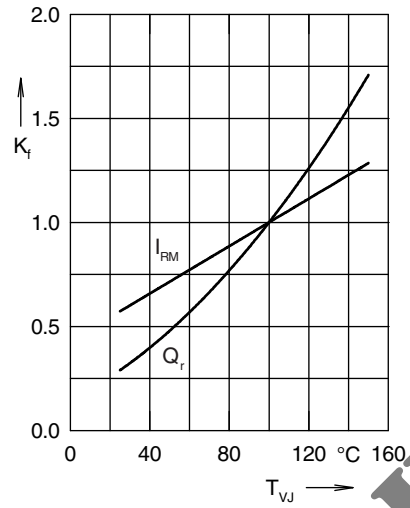
Forward current I_F versus V_F



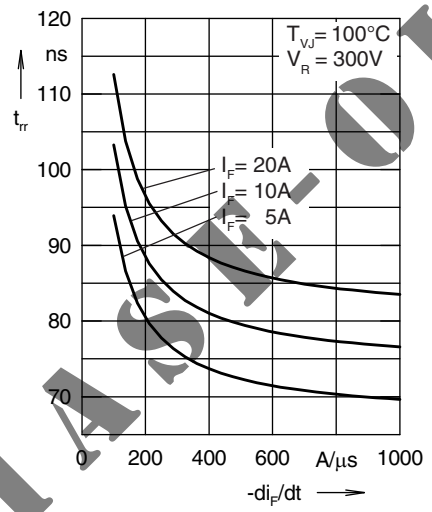
Reverse recovery charge Q_r versus $-di_F/dt$



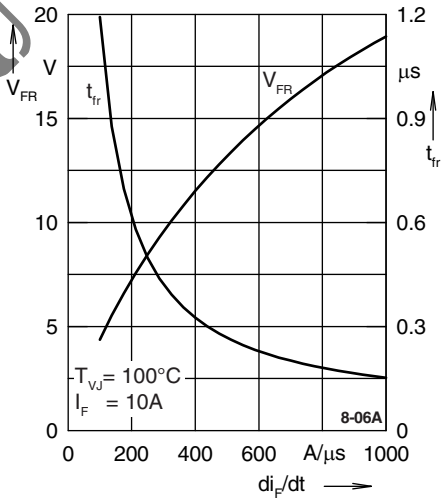
Peak reverse current I_{RM} versus $-di_F/dt$



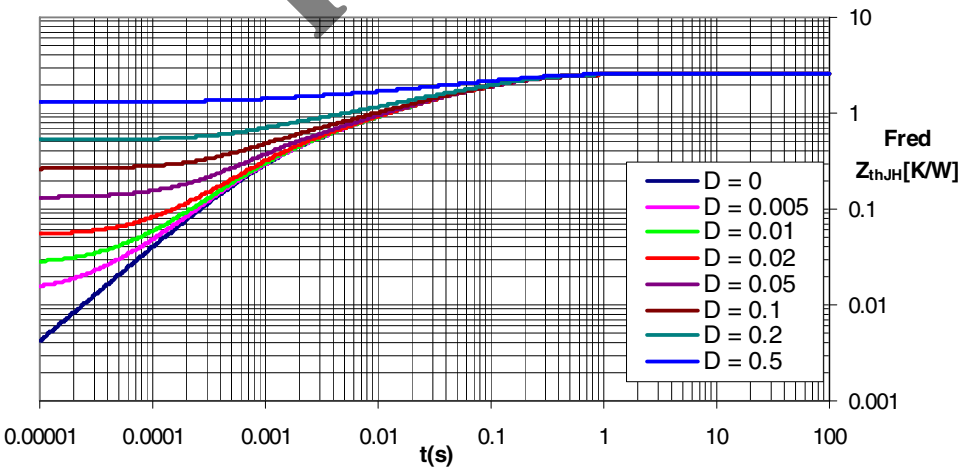
Dynamic parameters Q_r, I_{RM} versus T_{VJ}



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



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



Transient thermal resistance junction to heatsink

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