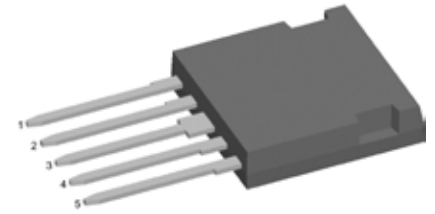
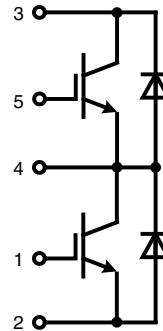


IGBT phaseleg

in ISOPLUS i4-PAC™

$$\begin{aligned} I_{C25} &= 30 \text{ A} \\ V_{CES} &= 600 \text{ V} \\ V_{CE(sat) \text{ typ.}} &= 1.9 \text{ V} \end{aligned}$$



E72873

IGBT						
Symbol	Conditions	Maximum Ratings				
V_{CES}	$T_{VJ} = 25^{\circ}\text{C}$ to 150°C	600			V	
V_{GES}		± 20			V	
I_{C25}	$T_C = 25^{\circ}\text{C}$	30			A	
I_{C90}	$T_C = 90^{\circ}\text{C}$	18			A	
I_{CM}	$V_{GE} = \pm 15\text{ V}$; $R_G = 47\ \Omega$; $T_{VJ} = 125^{\circ}\text{C}$	40			A	
V_{CEK}	RBSOA Clamped inductive load; $L = 100\ \mu\text{H}$	V_{CES}				
t_{SC} (SCSOA)	$V_{CE} = V_{CES}$; $V_{GE} = \pm 15\text{ V}$; $R_G = 47\ \Omega$ $T_{VJ} = 125^{\circ}\text{C}$; non-repetitive	10			μs	
P_{tot}	$T_C = 25^{\circ}\text{C}$	100			W	
Symbol	Conditions	Characteristic Values				
($T_{VJ} = 25^{\circ}\text{C}$, unless otherwise specified)						
		min.	typ.	max.		
$V_{CE(sat)}$	$I_C = 20\text{ A}$; $V_{GE} = 15\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$	1.9	2.4	V	
		$T_{VJ} = 125^{\circ}\text{C}$	2.2		V	
$V_{GE(th)}$	$I_C = 0.5\text{ mA}$; $V_{GE} = V_{CE}$		4.5	6.5	V	
I_{CES}	$V_{CE} = V_{CES}$; $V_{GE} = 0\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$		0.6	mA	
		$T_{VJ} = 125^{\circ}\text{C}$	0.6		mA	
I_{GES}	$V_{CE} = 0\text{ V}$; $V_{GE} = \pm 20\text{ V}$			200	nA	
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off}	Inductive load $V_{CE} = 300\text{ V}$; $I_C = 20\text{ A}$ $V_{GE} = \pm 15\text{ V}$; $R_G = 47\ \Omega$ $T_{VJ} = 125^{\circ}\text{C}$		50		ns	
			55		ns	
			200		ns	
			30		ns	
			0.75		mJ	
			0.6		mJ	
C_{ies}	$V_{CE} = 25\text{ V}$; $V_{GE} = 0\text{ V}$; $f = 1\text{ MHz}$		1.1		nF	
Q_{Gon}	$V_{CE} = 300\text{ V}$; $V_{GE} = 15\text{ V}$; $I_C = 20\text{ A}$		65		nC	
R_{thJC} R_{thJH}	with heatsink compound		2.5	1.25	K/W K/W	

Features

- NPT IGBT technology
- low saturation voltage
- positive temperature coefficient for easy paralleling
- fast switching
- HiPerFRED™ diode
- optimized fast and soft reverse recovery
- low operating forward voltage
- low leakage current
- ISOPLUS i4-PAC™ package
- isolated back surface
- low coupling capacity between pins and heatsink
- enlarged creepage towards heatsink
- application friendly pinout
- low inductive current path
- high reliability
- industry standard outline
- UL registered E 72873

Applications

- single phaseleg
- buck-boost chopper
- H bridge
- power supplies
- induction heating
- four quadrant DC drives
- controlled rectifier
- three phase bridge
- AC drives
- controlled rectifier

Diode

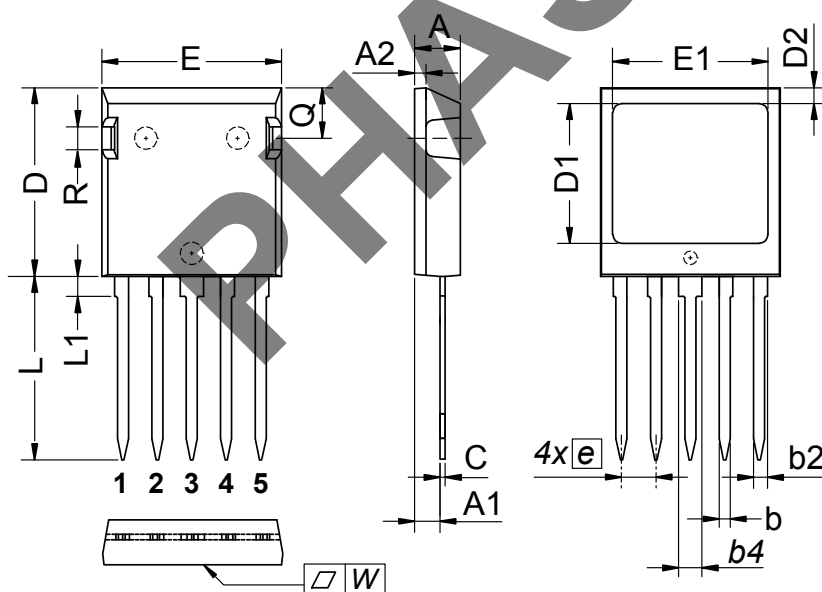
Symbol	Conditions	Maximum Ratings	
V_{RRM}	$T_{VJ} = 25^{\circ}\text{C}$ to 150°C	600	V
I_{F25}	$T_C = 25^{\circ}\text{C}$	30	A
I_{F90}	$T_C = 90^{\circ}\text{C}$	15	A

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
V_F	$I_F = 20\text{ A}$		2.3	2.7
	$T_{VJ} = 25^{\circ}\text{C}$			V
	$T_{VJ} = 125^{\circ}\text{C}$		1.6	V
I_{RM}	$I_F = 15\text{ A}; di_F/dt = -400\text{ A}/\mu\text{s};$ $V_R = 300\text{ V}; V_{GE} = 0\text{ V};$		7	A
t_{rr}			50	ns
R_{thJC}	(per diode)		2.3	K/W
R_{thJH}	with heatsink compound		4.6	K/W

Component

Symbol	Conditions	Maximum Ratings	
T_{VJ}	operating	-55...+150	$^{\circ}\text{C}$
T_{stg}		-55...+125	$^{\circ}\text{C}$
V_{ISOL}	$I_{ISOL} \leq 1\text{ mA}; 50/60\text{ Hz}; t = 1\text{ s}$	2500	V~
F_C	Mounting force with clip	20...120	Nm

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
C_P	coupling capacity between shorted pins and mounting tab in the case		40	pF
d_{S, d_A}	pin - pin	1.7		mm
d_{S, d_A}	pin - backside metal	5.5		mm
Weight			6	g



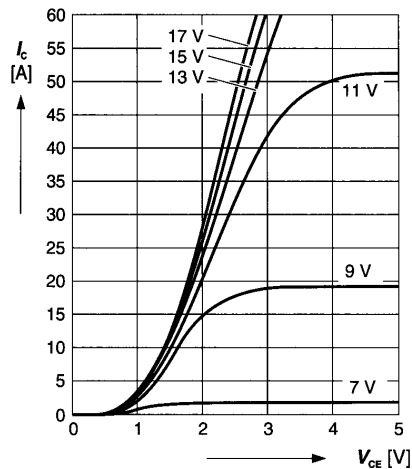
DIM.	MILLIMETER		INCHES	
	MIN	MAX	MIN	MAX
A	4.83	5.21	0.190	0.205
A1	2.59	3.00	0.102	0.118
A2	1.17	2.16	0.046	0.085
b	1.14	1.40	0.045	0.055
b2	1.47	1.73	0.058	0.068
b4	2.54	2.79	0.100	0.110
C	0.51	0.74	0.020	0.029
D	20.80	21.34	0.819	0.840
D1	14.99	15.75	0.590	0.620
D2	1.65	2.03	0.065	0.080
E	19.56	20.29	0.770	0.799
E1	16.76	17.53	0.660	0.690
e	3.81 BSC		0.15 BSC	
L	19.81	21.34	0.780	0.840
L1	2.11	2.59	0.083	0.102
Q	5.33	6.20	0.210	0.244
R	2.54	4.57	0.100	0.180
W	—	0.10	—	0.004

Die konvexe Form des Substrates ist typ. < 0.05 mm über der Kunststoffoberfläche der Bauteilunterseite
The convex bow of substrate is typ. < 0.05 mm over plastic surface level of device bottom side

Typ. output characteristics

$$I_C = f(V_{CE})$$

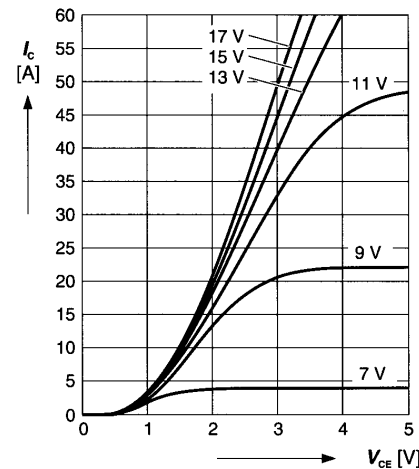
parameter: $t_p = 250 \mu s$; $T_j = 25^\circ C$



Typ. output characteristics

$$I_C = f(V_{CE})$$

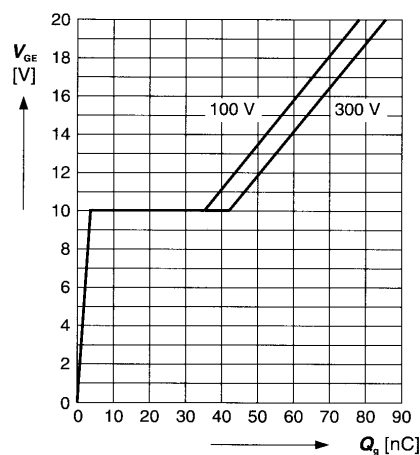
parameter: $t_p = 250 \mu s$; $T_j = 125^\circ C$



Typ. gate charge

$$V_{GE} = f(Q_g)$$

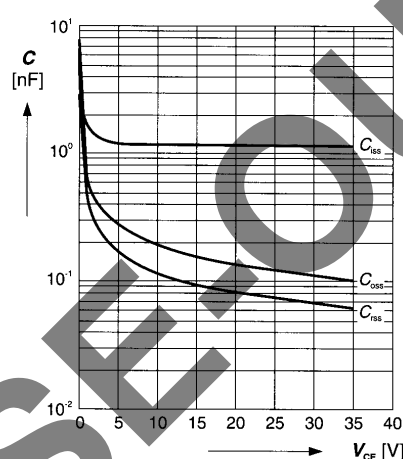
parameter: $I_{C\text{ puls}} = 20 A$



Typ. capacitances

$$C = f(V_{CE})$$

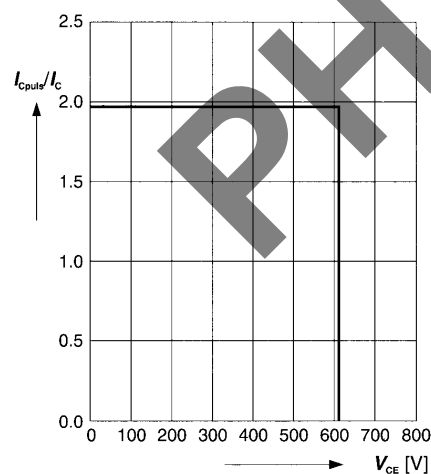
parameter: $V_{GE} = 0 V$; $f = 1 \text{ MHz}$



Reverse biased safe operating area

$$I_{C\text{ puls}} = f(V_{CE}), T_j = 150^\circ C$$

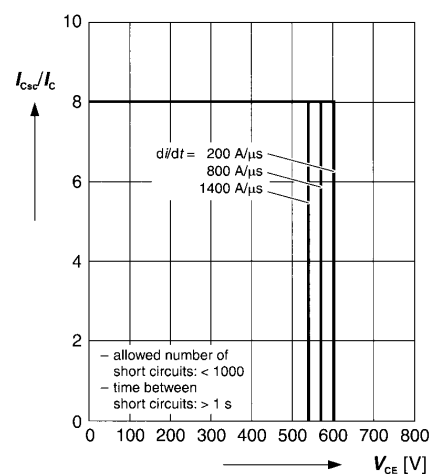
parameter: $V_{GE} = 15 V$



Short circuit safe operating area

$$I_{Csc} = f(V_{CE}), T_j = 150^\circ C$$

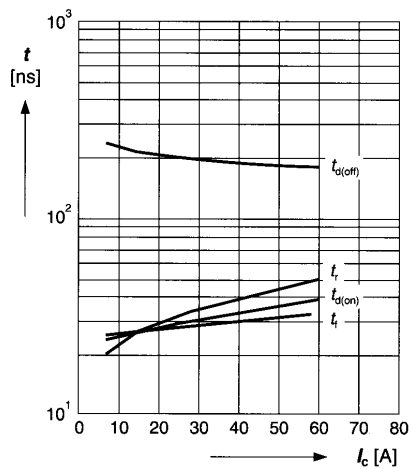
parameter: $V_{GE} = \pm 15 V$; $t_{sc} \leq 10 \mu s$; $L < 50 \text{ nH}$



Typ. switching time

$t = f(I_C)$, inductive load, $T_J = 125^\circ\text{C}$

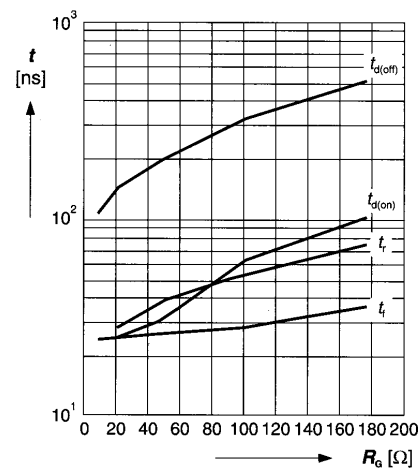
parameter: $V_{CE} = 300\text{ V}$; $V_{GE} = \pm 15\text{ V}$; $R_G = 33\ \Omega$



Typ. switching time

$t = f(R_G)$, inductive load, $T_J = 125^\circ\text{C}$

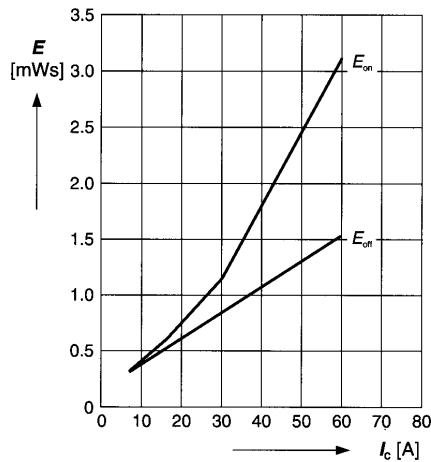
parameter: $V_{CE} = 300\text{ V}$; $V_{GE} = \pm 15\text{ V}$; $I_C = 30\text{ A}$



Typ. switching losses

$E = f(I_C)$, inductive load, $T_J = 125^\circ\text{C}$

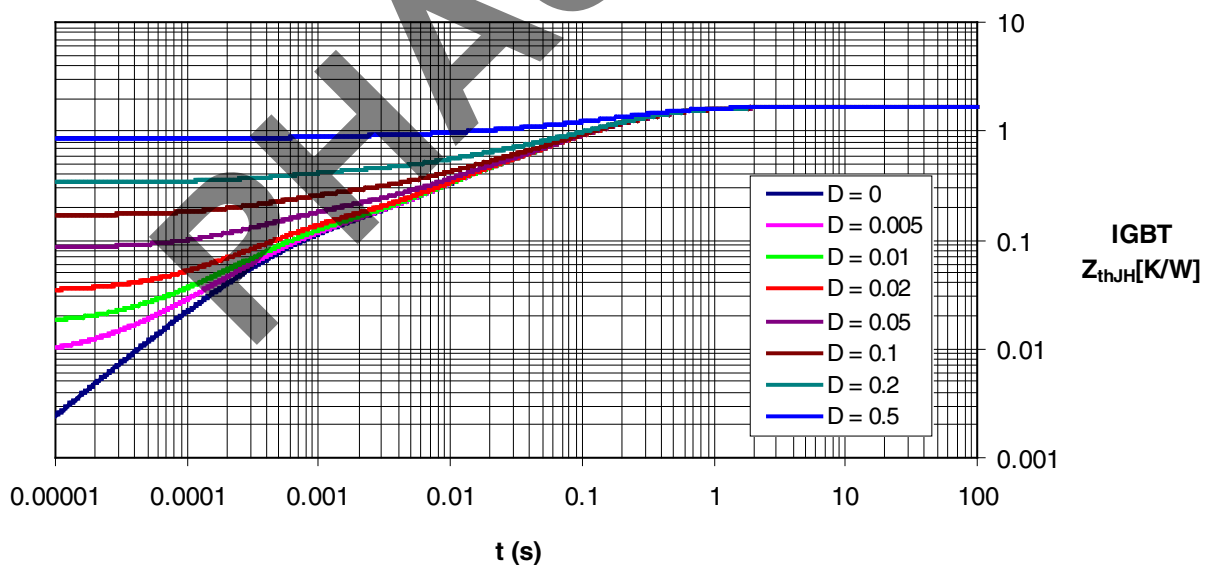
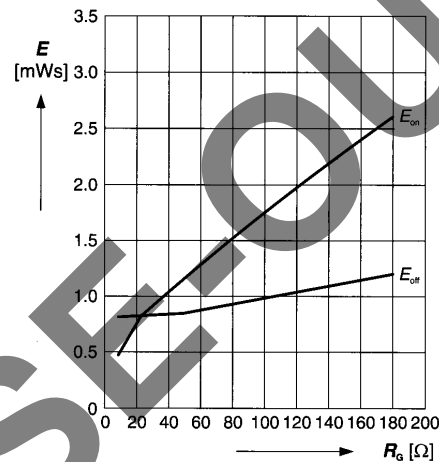
parameter: $V_{CE} = 300\text{ V}$; $V_{GE} = \pm 15\text{ V}$; $R_G = 33\ \Omega$



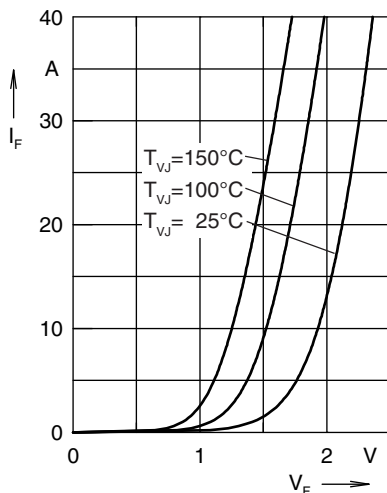
Typ. switching losses

$E = f(R_G)$, inductive load, $T_J = 125^\circ\text{C}$

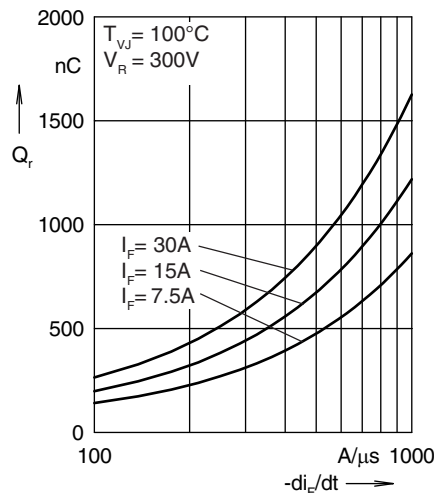
parameter: $V_{CE} = 300\text{ V}$; $V_{GE} = \pm 15\text{ V}$; $I_C = 30\text{ A}$



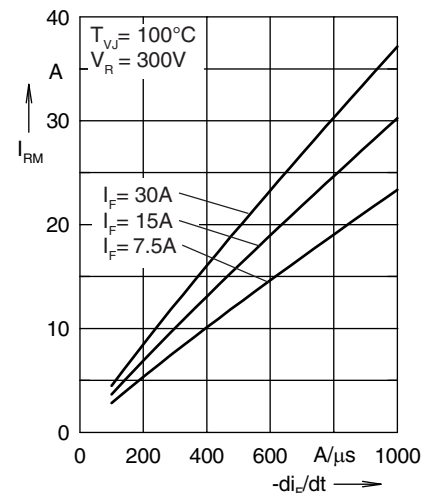
Diode



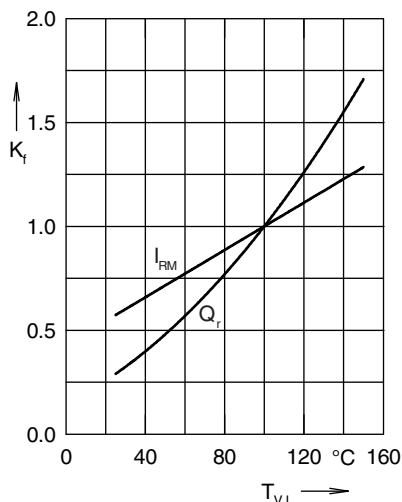
Forward current I_F versus V_F



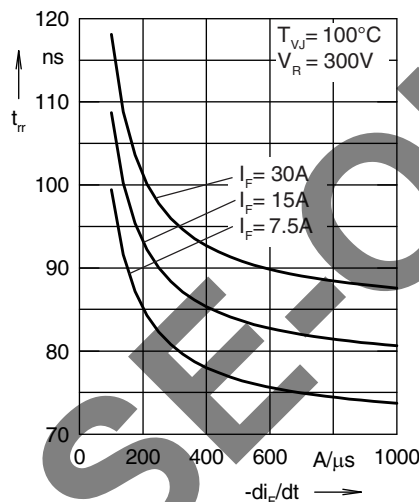
Reverse recovery charge Q_r versus $-di_F/dt$



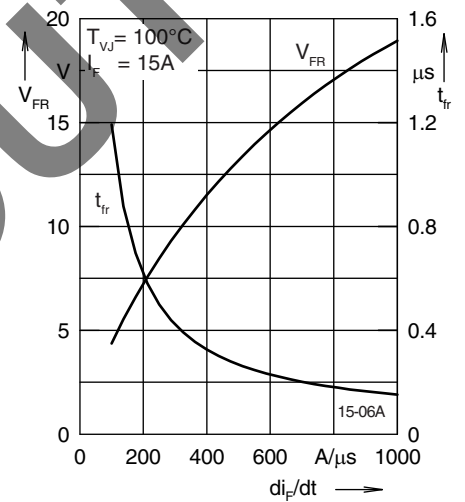
Peak reverse current I_{RM} versus $-di_F/dt$



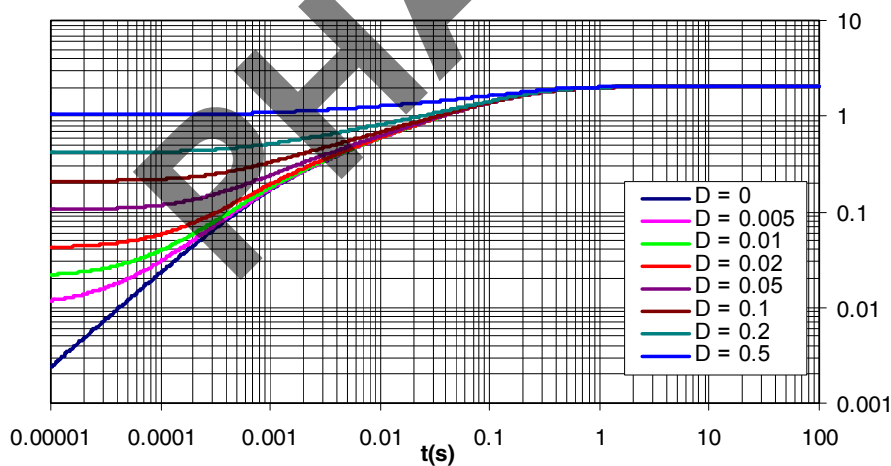
Dynamic parameters Q_r , I_{RM} versus T_{VJ}



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

FRED
 Z_{thJH} [K/W]