

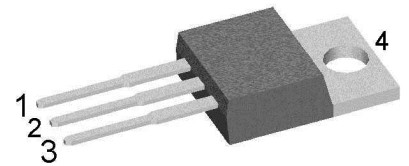
HiPerFRED²

$V_{RRM} = 400\text{ V}$
 $I_{FAV} = 2 \times 10\text{ A}$
 $t_{rr} = 45\text{ ns}$

High Performance Fast Recovery Diode
 Low Loss and Soft Recovery
 Common Cathode

Part number

DPG20C400PB



Backside: cathode



Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behaviour
- Very low I_{rm} -values
- Very soft recovery behaviour
- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low I_{rm} reduces:
 - Power dissipation within the diode
 - Turn-on loss in the commutating switch

Applications:

- Antiparallel diode for high frequency switching devices
- Antisaturation diode
- Snubber diode
- Free wheeling diode
- Rectifiers in switch mode power supplies (SMPS)
- Uninterruptible power supplies (UPS)

Package: TO-220

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

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Fast Diode				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage					400	V
V_{RRM}	max. repetitive reverse blocking voltage					400	V
I_R	reverse current, drain current	$V_R = 400\text{ V}$	$T_{VJ} = 25^\circ\text{C}$			1	μA
		$V_R = 400\text{ V}$	$T_{VJ} = 150^\circ\text{C}$			0.15	mA
V_F	forward voltage drop	$I_F = 10\text{ A}$	$T_{VJ} = 25^\circ\text{C}$			1.32	V
		$I_F = 20\text{ A}$				1.51	V
		$I_F = 10\text{ A}$	$T_{VJ} = 150^\circ\text{C}$			1.03	V
		$I_F = 20\text{ A}$				1.24	V
I_{FAV}	average forward current	$T_C = 150^\circ\text{C}$ rectangular $d = 0.5$	$T_{VJ} = 175^\circ\text{C}$			10	A
V_{FO}	threshold voltage	} for power loss calculation only				0.77	V
r_F	slope resistance					19.8	m Ω
R_{thJC}	thermal resistance junction to case					2.3	K/W
R_{thCH}	thermal resistance case to heatsink				0.5		K/W
P_{tot}	total power dissipation			$T_C = 25^\circ\text{C}$		65	W
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$		$T_{VJ} = 45^\circ\text{C}$		150	A
C_J	junction capacitance	$V_R = 200\text{ V}$ $f = 1\text{ MHz}$		$T_{VJ} = 25^\circ\text{C}$		12	pF
I_{RM}	max. reverse recovery current	} $I_F = 10\text{ A}; V_R = 270\text{ V}$ $-di_F/dt = 200\text{ A}/\mu\text{s}$		$T_{VJ} = 25^\circ\text{C}$		4	A
				$T_{VJ} = 125^\circ\text{C}$		6	A
t_{rr}	reverse recovery time			$T_{VJ} = 25^\circ\text{C}$		45	ns
				$T_{VJ} = 125^\circ\text{C}$		65	ns



Package TO-220			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal ¹⁾			35	A
T_{VJ}	virtual junction temperature		-55		175	°C
T_{op}	operation temperature		-55		150	°C
T_{stg}	storage temperature		-55		150	°C
Weight				2		g
M_D	mounting torque		0.4		0.6	Nm
F_C	mounting force with clip		20		60	N

Product Marking



Part description

- D = Diode
- P = HiPerFRED
- G = extreme fast
- 20 = Current Rating [A]
- C = Common Cathode
- 400 = Reverse Voltage [V]
- PB = TO-220AB (3)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DPG20C400PB	DPG20C400PB	Tube	50	506647

Similar Part	Package	Voltage class
DPG20C400PN	TO-220ABFP (3)	400
DPG20C400PC	TO-263AB (D2Pak) (2)	400

Equivalent Circuits for Simulation

** on die level*

$T_{VJ} = 175^{\circ}C$



Symbol	Definition	Fast Diode	Unit
$V_{0\ max}$	threshold voltage	0.77	V
$R_{0\ max}$	slope resistance *	16.6	mΩ



Outlines TO-220



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.32	4.82	0.170	0.190
A1	1.14	1.39	0.045	0.055
A2	2.29	2.79	0.090	0.110
b	0.64	1.01	0.025	0.040
b2	1.15	1.65	0.045	0.065
C	0.35	0.56	0.014	0.022
D	14.73	16.00	0.580	0.630
E	9.91	10.66	0.390	0.420
e	2.54	BSC	0.100	BSC
H1	5.85	6.85	0.230	0.270
L	12.70	13.97	0.500	0.550
L1	2.79	5.84	0.110	0.230
ØP	3.54	4.08	0.139	0.161
Q	2.54	3.18	0.100	0.125



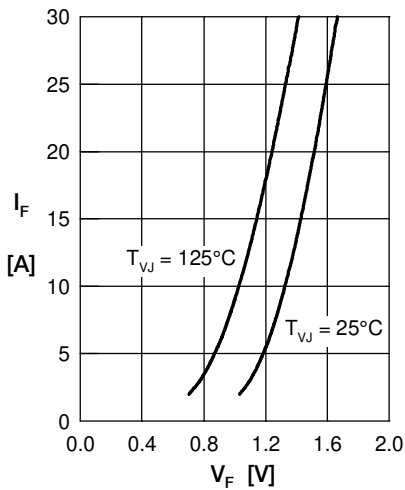
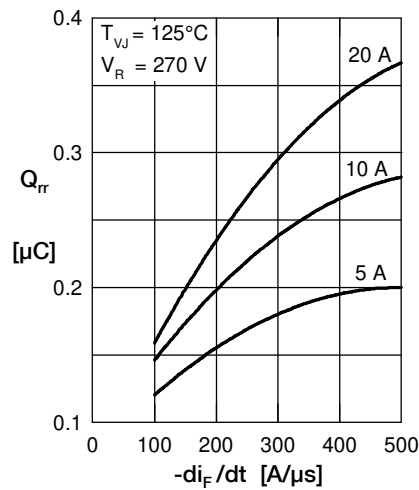
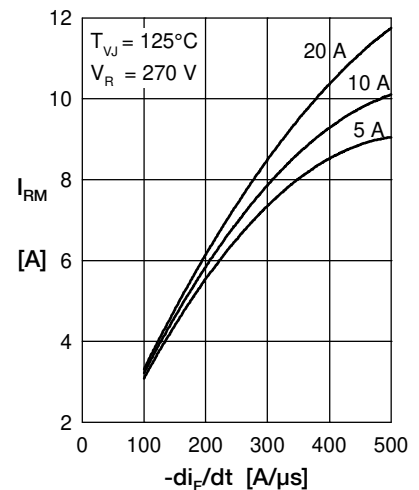
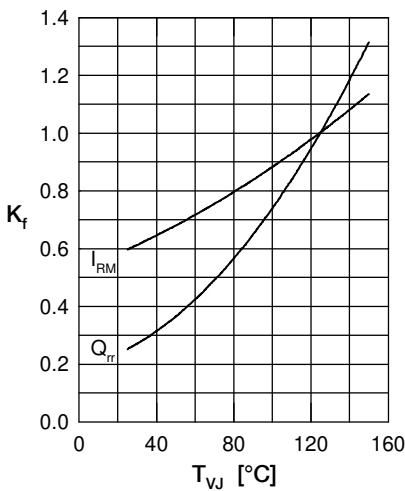
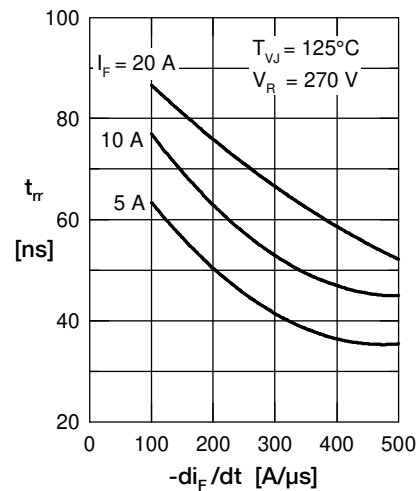
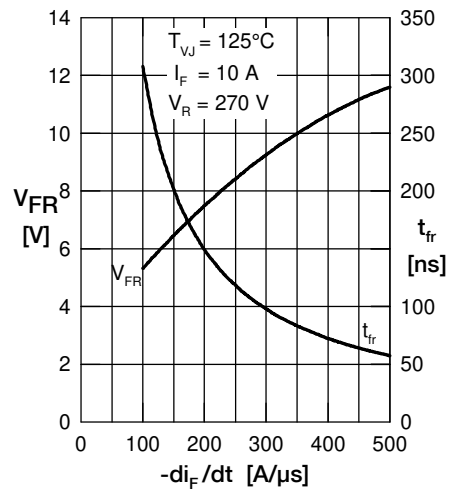
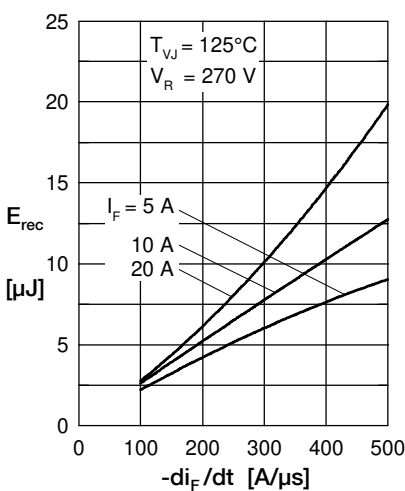
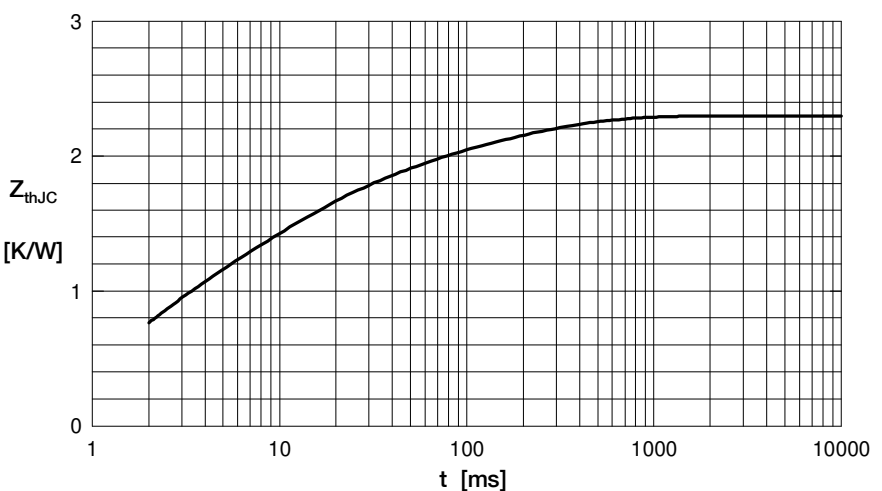
Fast Diode

 Fig. 1 Forward current I_F versus V_F

 Fig. 2 Typ. reverse recov. charge Q_{rr} versus $-di_F/dt$

 Fig. 3 Typ. reverse recov. current I_{RM} versus $-di_F/dt$

 Fig. 4 Typ. dynamic parameters Q_{rr} , I_{RM} versus T_{VJ}

 Fig. 5 Typ. reverse recov. time t_{rr} versus $-di_F/dt$

 Fig. 6 Typ. forward recovery voltage V_{FR} and t_{fr} versus di_F/dt

 Fig. 7 Typ. recovery energy E_{rec} versus $-di_F/dt$


Fig. 8 Transient thermal resistance junction to case