tentative

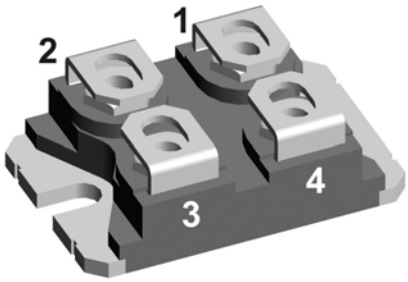
XPT IGBT

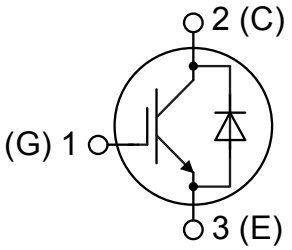
V_{CES} = 650V
I_{C25} = 75A
$V_{CE(sat)}$ = 1.5V

Trench IGBT (medium speed)
Copack

Part number

IXD75IF650NA





Features / Advantages:

- 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
  - low EMI
  - square RBSOA @ 2x Ic
- Thin wafer technology combined with the XPT design results in a competitive low VCE(sat)
- SONIC™ diode
  - fast and soft reverse recovery
  - low operating forward voltage

Applications:

- AC motor drives
- Solar inverter
- Medical equipment
- Uninterruptible power supply
- Air-conditioning systems
- Welding equipment
- Switched-mode and resonant-mode power supplies
- Inductive heating, cookers
- Pumps, Fans

Package: SOT-227B (minibloc)

- Isolation Voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

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IGBT				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{CES}	*collector emitter voltage*		T_{VJ} = 25°C			650	V
V_{GES}	*max. DC gate voltage*					20	V
V_{GEM}	*max. transient gate emitter voltage*					tbd	V
I_{C25}	*collector current*		T_C = 25°C			75	A
I_{C100}			T_C = 100°C			tbd	A
P_{tot}	*total power dissipation*		T_C = 25°C			tbd	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 75A; V_{GE} = 15 V	T_{VJ} = 25°C		1.5	1.7	V
			T_{VJ} = 150°C		1.75		V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 1.2mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	5	5.8	6.5	V
I_{CES}	*collector emitter leakage current*	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C			0.1	mA
			T_{VJ} = 150°C		0.1		mA
I_{GES}	*gate emitter leakage current*	V_{GE} = ±20 V				500	nA
$Q_{G(on)}$	*total gate charge*	V_{CE} = 300 V; V_{GE} = 15 V; I_C = 75 A			130		nC
$t_{d(on)}$	*turn-on delay time*				25		ns
t_r	*current rise time*				45		ns
$t_{d(off)}$	*turn-off delay time*	inductive load	T_{VJ} = 150°C		120		ns
t_f	*current fall time*	V_{CE} = 300 V; I_C = 75 A			40		ns
E_{on}	*turn-on energy per pulse*	V_{GE} = ±15 V; R_G = 10 Ω			1.1		mJ
E_{off}	*turn-off energy per pulse*				1.7		mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 10 Ω	T_{VJ} = 150°C				
I_{CM}		V_{CEmax} = 650 V				150	A
SCSOA	*short circuit safe operating area*	V_{CEmax} = 360 V					
t_{SC}	*short circuit duration*	V_{CE} = 360 V; V_{GE} = ±15 V	T_{VJ} = 150°C			10	µs
I_{SC}	*short circuit current*	R_G = 10 Ω; non-repetitive			300		A
R_{thJC}	*thermal resistance junction to case*					tbd	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.10		K/W

Diode							
V_{RRM}	*max. repetitive reverse voltage*		T_{VJ} = 25°C			650	V
I_{F25}	*forward current*		T_C = 25°C			tbd	A
I_{F100}			T_C = 100°C			tbd	A
V_F	*forward voltage*	I_F = 75A	T_{VJ} = 25°C			2.00	V
			T_{VJ} = 125°C		1.80		V
I_R	*reverse current*	V_R = V_{RRM}	T_{VJ} = 25°C			0.15	mA
			T_{VJ} = 125°C		0.75		mA
Q_{rr}	*reverse recovery charge*	V_R = 300 V			7		µC
I_{RM}	*max. reverse recovery current*	-di_F/dt = 1200 A/µs	T_{VJ} = 125°C		55		A
t_{rr}	*reverse recovery time*	I_F = 75A; V_{GE} = 0 V			100		ns
E_{rec}	*reverse recovery energy*				1.5		mJ
R_{thJC}	*thermal resistance junction to case*					1	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.10		K/W

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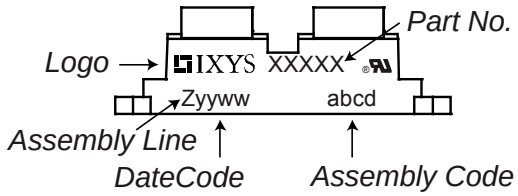
Package SOT-227B (minibloc)				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I_{RMS}	*RMS current*	per terminal [1]				150	A
T_{VJ}	*virtual junction temperature*			-40		175	°C
T_{op}	*operation temperature*			-40		150	°C
T_{stg}	*storage temperature*			-40		150	°C
Weight					30		g
M_D	*mounting torque*			1.1		1.5	Nm
M_T	*terminal torque*			1.1		1.5	Nm
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*	*terminal to terminal*	10.5	3.2			mm
$d_{Spb/Apb}$		*terminal to backside*	8.6	6.8			mm
V_{ISOL}	*isolation voltage*	t = 1 second	50/60 Hz, RMS; I_{ISOL} ≤ 1 mA	3000			V
		t = 1 minute		2500			V

[1] I_{RMS} is typically limited by the pin-to-chip resistance (1); or by the current capability of the chip (2). In case of (1) and a product with multiple pins for one chip-potential, the current capability can be increased by connecting the pins as one contact.

Product Marking



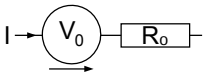
Part number

I = IGBT
X = XPT IGBT
D = Trench 1 / std
75 = Current Rating [A]
IF = Copack
650 = Reverse Voltage [V]
NA = SOT-227B (minibloc)

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	IXD75IF650NA	IXD75IF650NA	Tube	10	513716

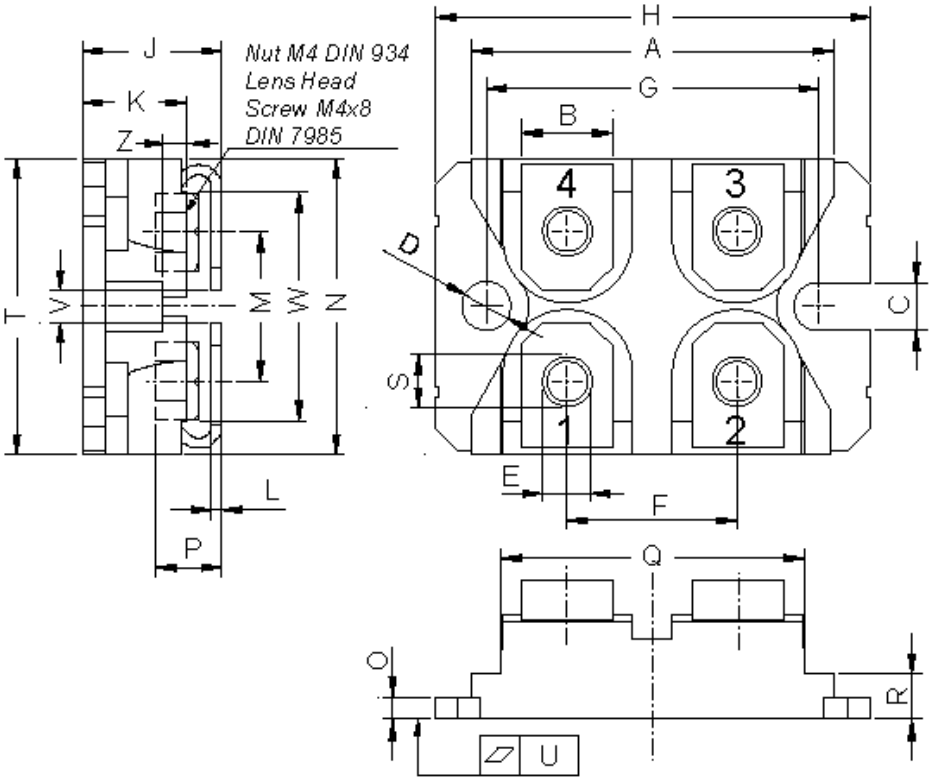
Equivalent Circuits for Simulation

** on die level* T_{VJ} = 175 °C

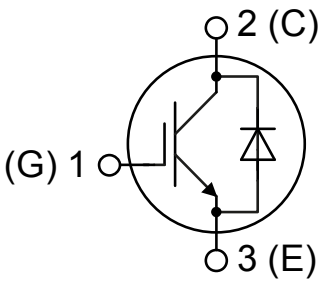


$V_{0\,max}$	*threshold voltage*	V
$R_{0\,max}$	*slope resistance **	mΩ

Outlines SOT-227B (minibloc)



Dim.	Millimeter		Inches	
	min	max	min	max
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	37.80	38.23	1.488	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.74	0.84	0.029	0.033
M	12.50	13.10	0.492	0.516
N	25.15	25.42	0.990	1.001
O	1.95	2.13	0.077	0.084
P	4.95	6.20	0.195	0.244
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.167
S	4.55	4.85	0.179	0.191
T	24.59	25.25	0.968	0.994
U	-0.05	0.10	-0.002	0.004
V	3.20	5.50	0.126	0.217
W	19.81	21.08	0.780	0.830
Z	2.50	2.70	0.098	0.106



IGBT

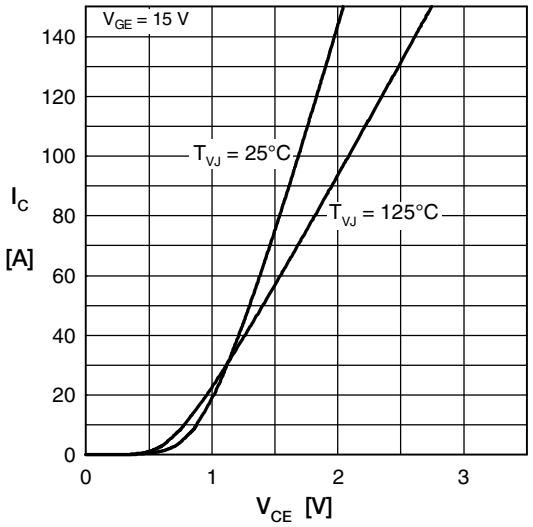


Fig. 1 Typ. output characteristics

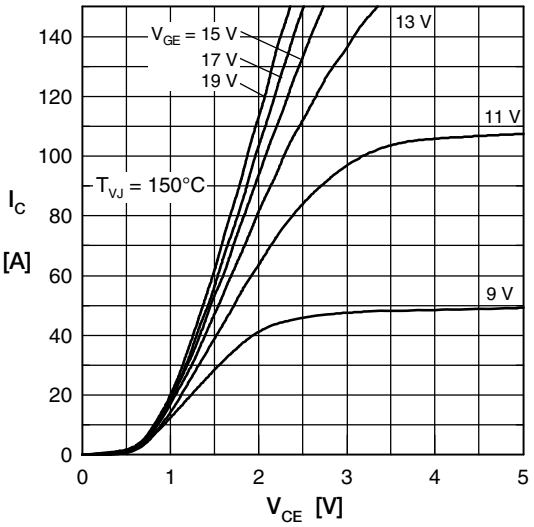


Fig. 2 Typ. output characteristics

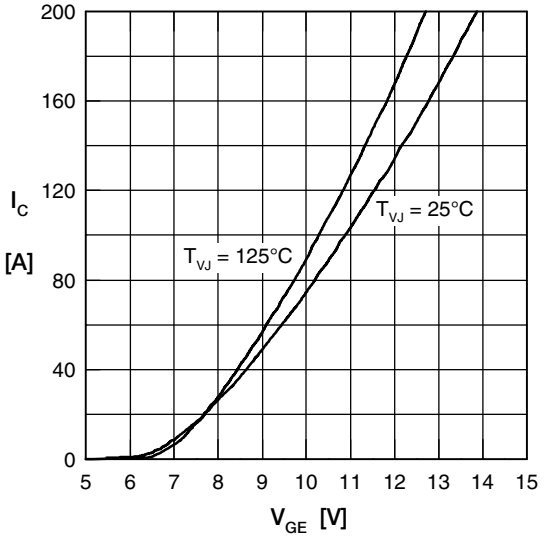


Fig. 3 Typ. tranfer characteristics

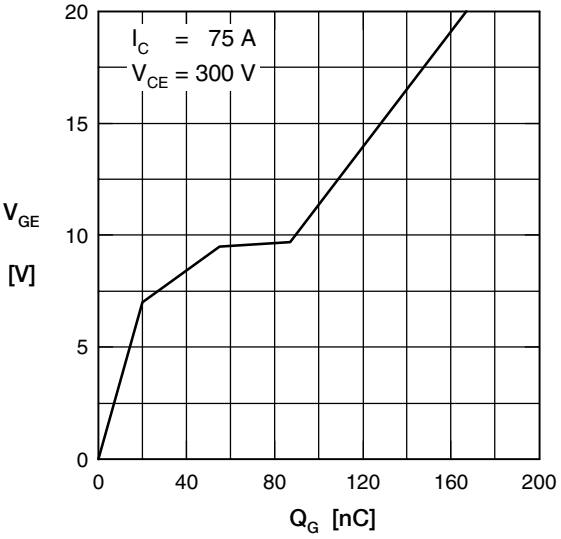


Fig. 4 Typ. turn-on gate charge

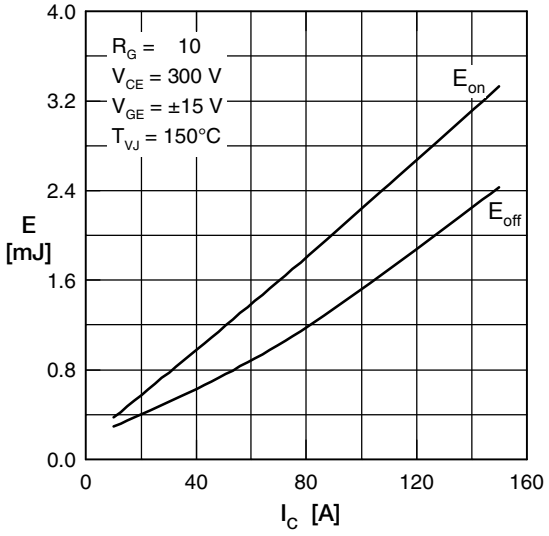


Fig. 5 Typ. switching energy vs. collector current

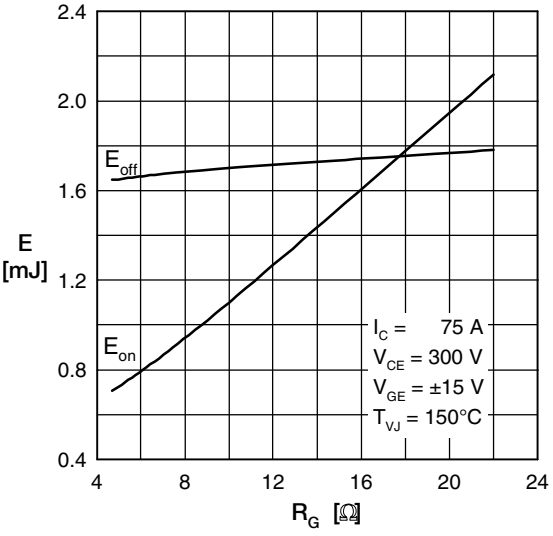


Fig. 6 Typ. switching energy vs. gate resistance

Diode

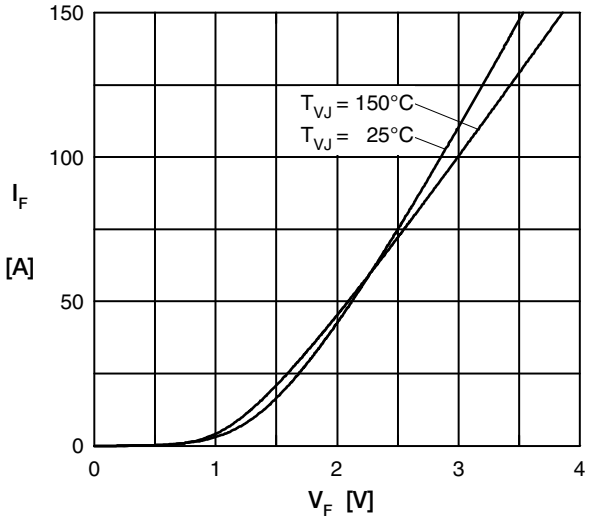


Fig. 1 Typ. Forward current versus V_F

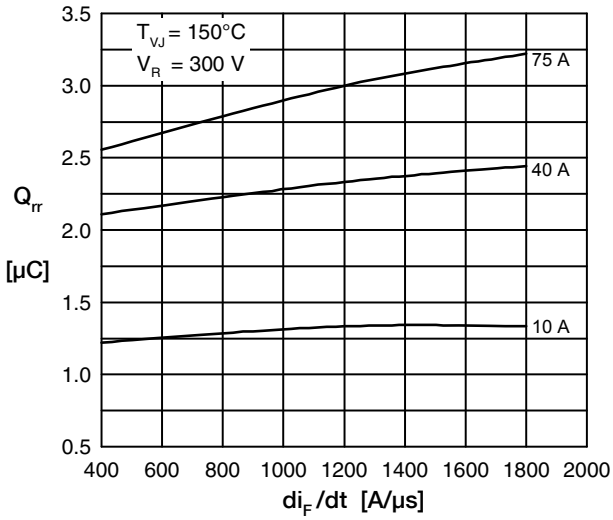


Fig. 2 Typ. reverse recov.charge Q_{rr} vs. di/dt

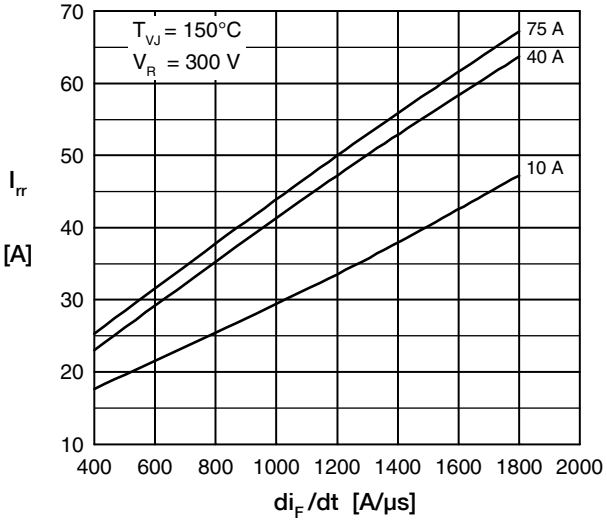


Fig. 3 Typ. peak reverse current I_{RM} vs. di/dt

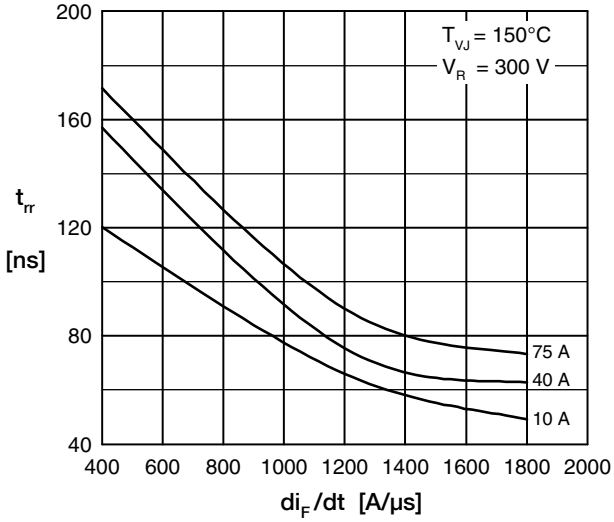


Fig. 4 Typ. recovery time t_{rr} versus di/dt

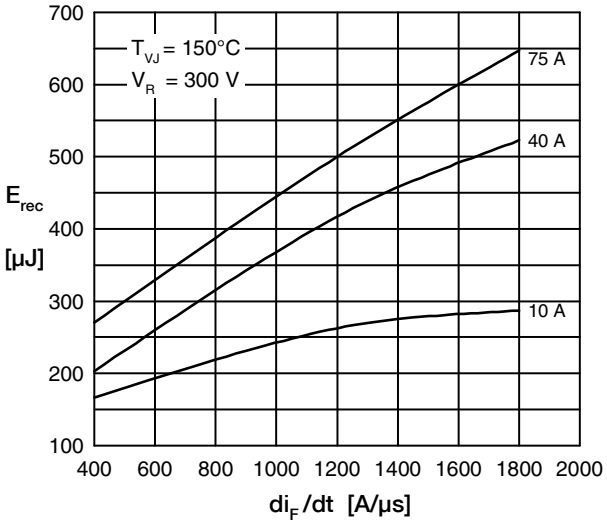


Fig. 5 Typ. recovery energy E_{rec} versus di/dt

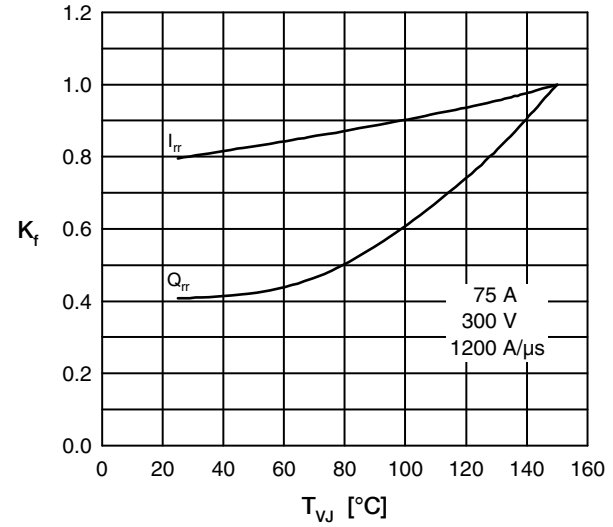


Fig. 6 Dynamic parameters Q_{rr}, I_{rr} vs. T_{VJ}