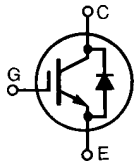
IXYS

IGBT

Combi Pack

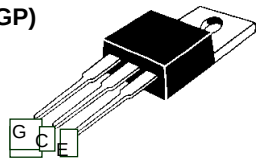
	V_{CES}	I_{C25}	$V_{CE(sat)}$
IXGA/IXGP12N100U1	1000 V	24 A	3.5 V
IXGA/IXGP12N100AU1	1000 V	24 A	4.0 V



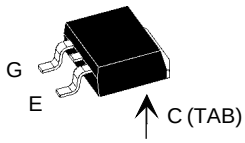
Preliminary Data Sheet

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	1000	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ	1000	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	24	A
I_{C90}	T_C = 90°C	12	A
I_{CM}	T_C = 25°C, 1 ms	48	A
SSOA	V_{GE} = 15 V, T_{VJ} = 125°C, R_G = 150 Ω	I_{CM} = 24	A
(RBSOA)	Clamped inductive load, L = 300 μH	@ 0.8 V_{CES}	
P_C	T_C = 25°C	100	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
M_d	Mounting torque with screw M3	0.45/4	Nm/lb.in.
	Mounting torque with screw M3.5	0.55/5	Nm/lb.in.
Weight		4	g
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	°C

TO-220AB(IXGP)



TO-263 AA (IXGA)



Features

- International standard packages JEDEC TO-220AB and TO-263AA
- IGBT with antiparallel FRED in one package
- Second generation HDMOS™ process
- Low $V_{CE(sat)}$
  - for minimum on-state conduction losses
- MOS Gate turn-on
  - drive simplicity
- Fast Recovery Expitaxial Diode (FRED)
  - soft recovery with low I_{RM}

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)		Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 3 mA, V_{GE} = 0 V		1000			V
$V_{GE(th)}$	I_C = 250 μA, V_{GE} = V_{GE}		2.5		5.5	V
I_{CES}	V_{CE} = 0.8, V_{CES}	T_J = 25°C			300	μA
	V_{GE} = 0 V	T_J = 125°C			3	mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±100	nA
$V_{CE(sat)}$	I_C = I_{CE90}, V_{GE} = 15	12N100			3.5	V
		12N100A			4.0	V

Applications

- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies

Advantages

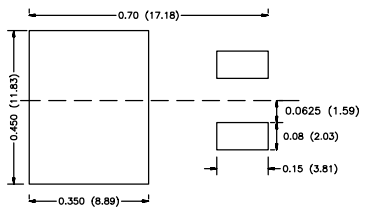
- Easy to mount with one screw
- Space savings (two devices in one package)
- Reduces assembly time and cost
- High power density

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)		Characteristic Values Min.	Typ.	Max.	
g_{fs}	$I_C = I_{C90}$; V_{CE} = 10 V, Pulse test, t ≤ 300 µs, duty cycle ≤ 2 %		6	10		S
Q_g	$I_C = I_{C90}$, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}			65	90	nC
Q_{ge}				8	20	nC
Q_{gc}				24	45	nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**			100		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V, L = 300 µH			200		ns
$t_{d(off)}$	V_{CE} = 800 V, $R_G = R_{off}$ = 120 Ω			850	1000	ns
t_{fi}	Remarks: Switching times may	12N100A		500	700	ns
	increase for V_{CE} (Clamp) > 0.8 V_{CES},	12N100		800	1000	ns
E_{off}	higher T_J or increased R_G	12N100A		4	6	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**			100		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V, L = 300 µH			200		ns
E_{on}	V_{CE} = 800 V, $R_G = R_{off}$ = 120 Ω			1.1		mJ
$t_{d(off)}$	Remarks: Switching times may			900		ns
t_{fi}	increase for V_{CE} (Clamp) > 0.8 V_{CES},	12N100A		950		ns
	higher T_J or increased R_G	12N100		1250		ns
E_{off}		12N100A		8		mJ
		12N100		10		mJ
R_{thJC}					1.25	K/W
R_{thCK}				0.25		K/W

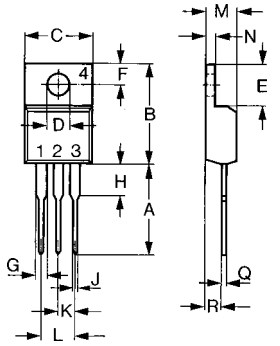
Reverse Diode (FRED) — Characteristic Values
(T_J = 25°C, unless otherwise specified)

Symbol	Test Conditions	Min.	Typ.	Max.	
V_F	I_F =8A, V_{GE} = 0 V, Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %			2.75	V
I_{RM}	$I_F = I_{C90}$, V_{GE} = 0 V, -di_F/dt = 100 A/µs		6.5		A
t_{rr}	V_R = 100 V, T_J = 125°C		140		ns
	I_F = 1 A, -di/dt = 50 A/µs, V_R = 30 V T_J = 25°C		50	60	ns
R_{thJC}				2.5	K/W

Min. Recommended Footprint

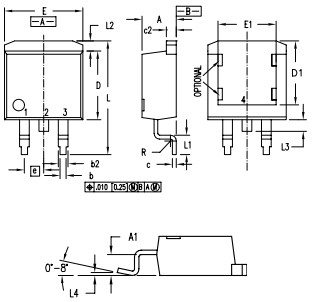


TO-220 AB (IXGP) Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	12.70	13.97	0.500	0.550
B	14.73	16.00	0.580	0.630
C	9.91	10.66	0.390	0.420
D	3.54	4.08	0.139	0.161
E	5.85	6.85	0.230	0.270
F	2.54	3.18	0.100	0.125
G	1.15	1.65	0.045	0.065
H	2.79	5.84	0.110	0.230
J	0.64	1.01	0.025	0.040
K	2.54	BSC	0.100	BSC
M	4.32	4.82	0.170	0.190
N	1.14	1.39	0.045	0.055
Q	0.35	0.56	0.014	0.022
R	2.29	2.79	0.090	0.110

TO-263 AA (IXGA) Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.06	4.83	.160	.190
A1	2.03	2.79	.080	.110
b	0.51	0.99	.020	.039
b2	1.14	1.40	.045	.055
c	0.46	0.74	.018	.029
c2	1.14	1.40	.045	.055
D	8.64	9.65	.340	.380
D1	7.11	8.13	.280	.320
E	9.65	10.29	.380	.405
E1	6.86	8.13	.270	.320
e	2.54	BSC	.100	BSC
L	14.61	15.88	.575	.625
L1	2.29	2.79	.090	.110
L2	1.02	1.40	.040	.055
L3	1.27	1.78	.050	.070
L4	0	0.38	0	.015
R	0.46	0.74	.018	.029

IXYS MOSFETS and IGBTs are covered by one or more of the following U.S. patents:
4,835,592 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715
4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025

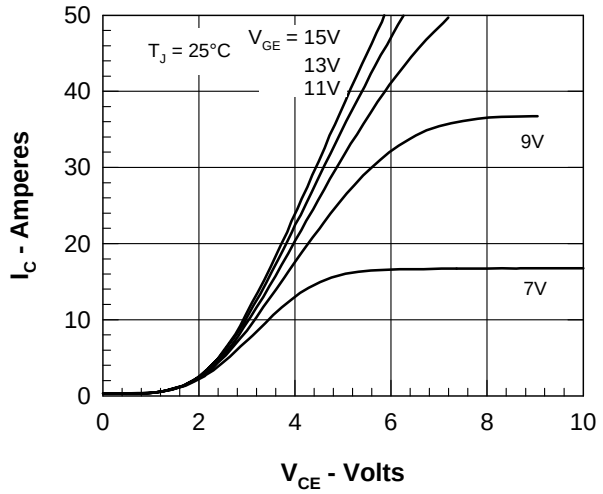


Figure 1. Saturation Voltage Characteristics

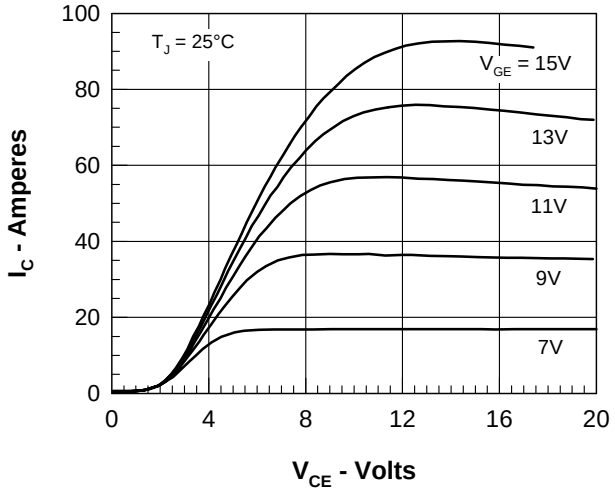


Figure 2. Extended Output Characteristics

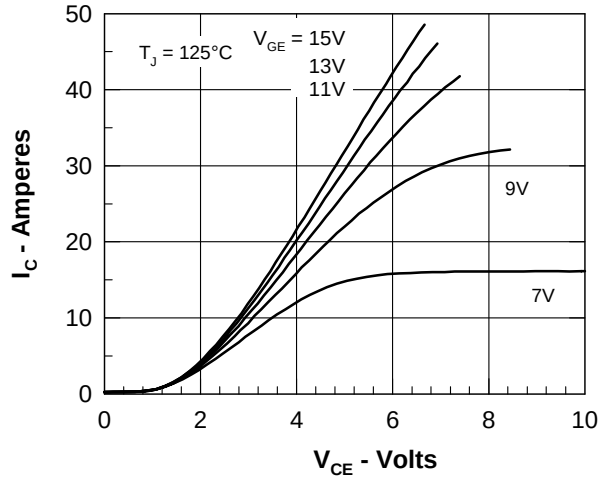


Figure 3. Saturation Voltage Characteristics

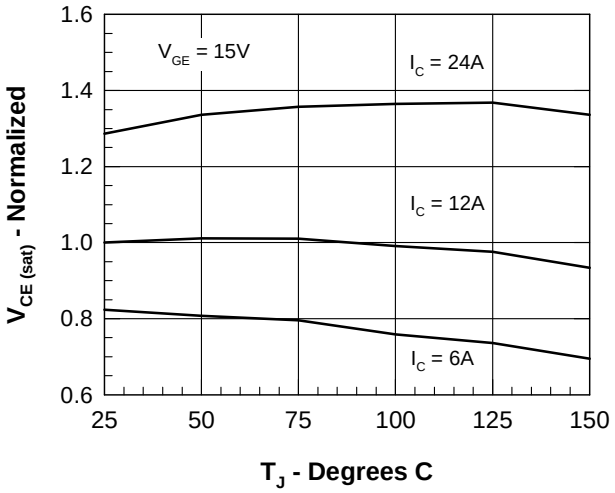


Figure 4. Temperature Dependence of $V_{CE(sat)}$

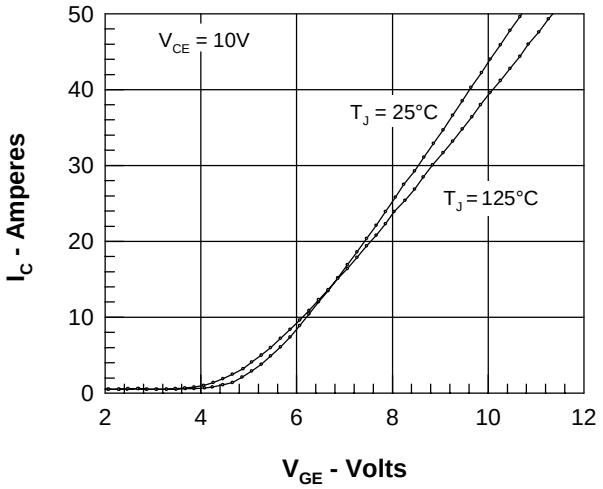


Figure 5. Admittance Curves

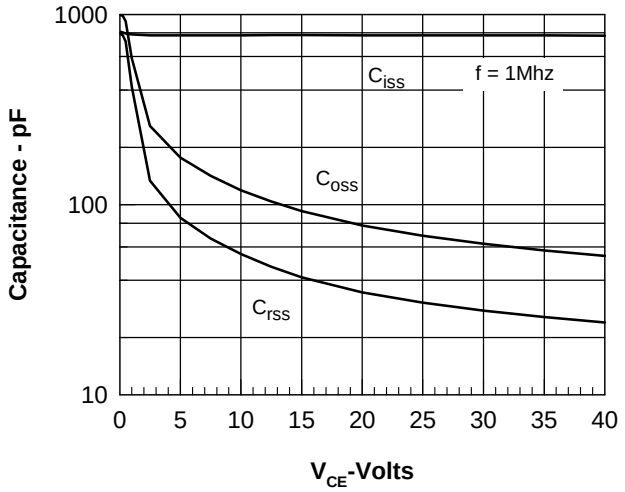


Figure 6. Capacitance Curves

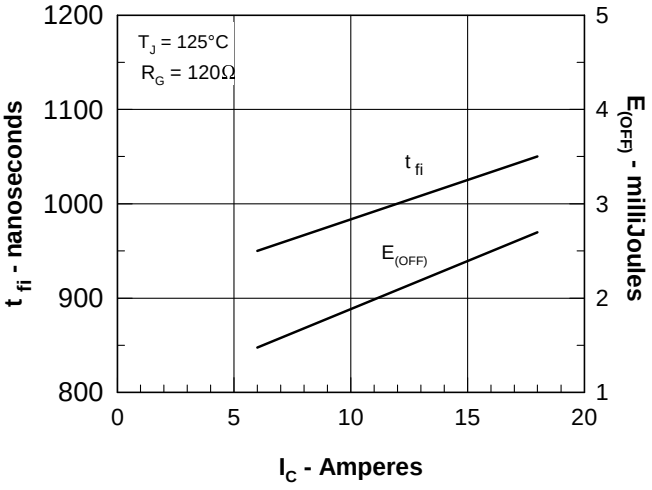


Figure 7. Dependence of tfi and E_{OFF} on I_C.

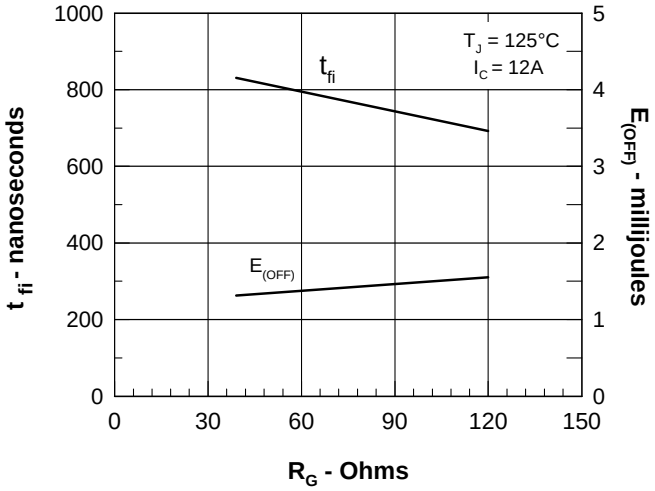


Figure 8. Dependence of tfi and E_{OFF} on R_G.

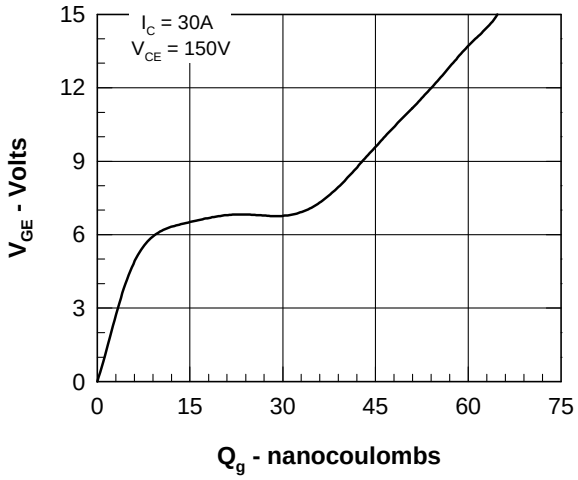


Figure 9. Gate Charge

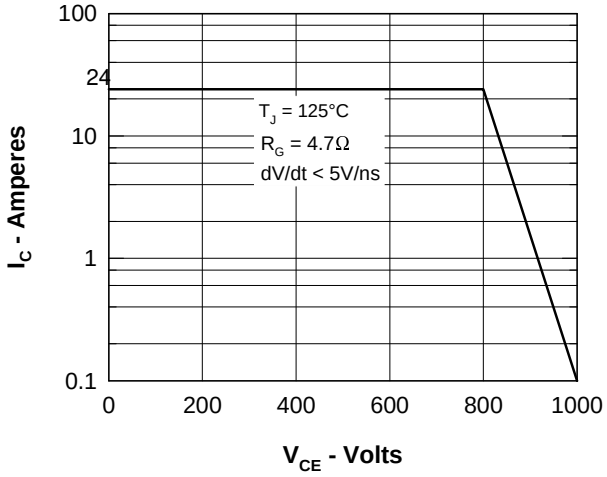


Figure 10. Turn-off Safe Operating Area

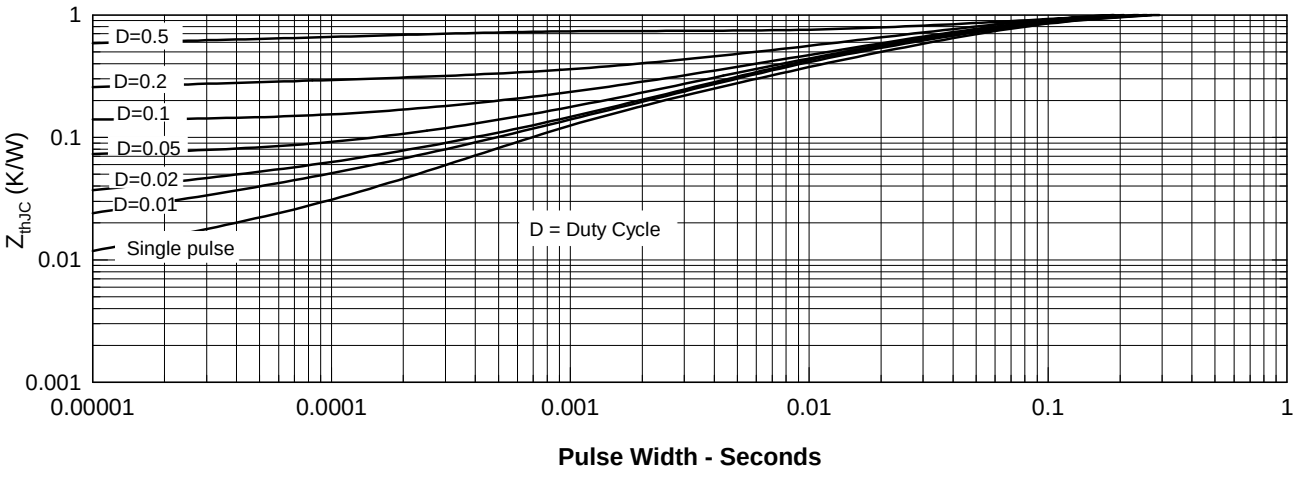


Figure 11. Transient Thermal Resistance