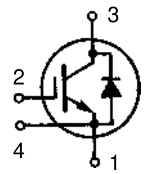
IGBT with Diode

IXSN 35N100U1

V_{CES} = 1000 V
I_{C25} = 38 A
$V_{CE(sat)}$ = 3.5 V

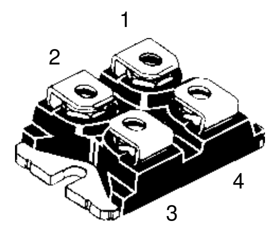
High Short Circuit SOA Capability



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	A
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	38	A
I_{C90}	T_C = 90°C	25	A
I_{CM}	T_C = 25°C, 1 ms	50	A
SSOA (RBSOA)	V_{GE}= 15 V, T_{VJ} = 125°C, R_G = 22 Ω Clamped inductive load, L = 30 µH	I_{CM} = 50 @ 0.8 V_{CES}	A
t_{SC} **(SCSOA)**	V_{GE}= 15 V, V_{CE} = 0.6 • V_{CES}, T_J = 125°C R_G = 22 Ω, non repetitive	10	µs
P_C	T_C = 25°C	205	W
V_{ISOL}	50/60 Hz t = 1 min I_{ISOL} ≤ 1 mA t = 1 s	2500 3000	V~ V~
T_J		-40 ... +150	°C
T_{JM}		150	°C
T_{stg}		-40 ... +150	°C
M_d	Mounting torque Terminal connection torque (M4)	1.5/13 1.5/13	Nm/lb.in. Nm/lb.in.
Weight		30	g

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
BV_{CES}	I_C = 6 mA, V_{GE} = 0 V	1000			V
$V_{GE(th)}$	I_C = 10 mA, V_{CE} = V_{GE}	5		8	V
I_{CES}	V_{CE} = 0.8 • V_{CES} T_J = 25°C V_{GE} = 0 V T_J = 125°C			750 15	µA mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V			±500	nA
$V_{CE(sat)}$	I_C = I_{C90}, V_{GE} = 15 V			3.5	V

miniBLOC, SOT-227 B



1 = Emitter, 3 = Collector
2 = Gate, 4 = Kelvin Emitter

Features
- International standard package miniBLOC (ISOTOP) compatible
- Isolation voltage 3000 V~
- 2nd generation HDMOS™ process
  - for high short circuit SOA
- Low $V_{CE(sat)}$
  - for minimum on-state conduction losses
- MOS Gate turn-on
  - drive simplicity
- Fast Recovery Epitaxial Diode (FRED)
  - short t_{rr} and I_{RM}
- Low collector-to-case capacitance (< 50 pF)
  - reducesd RFI
- Low package inductance (< 10 nH)
  - easy to drive and to protect

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

Advantages
- Space savings
- Easy to mount with 2 screws
- High power density

IXYS reserves the right to change limits, test conditions and dimensions.

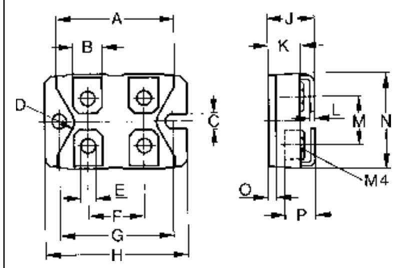
93005C (7/94)

IXYS Corporation
3540 Bassett Street, Santa Clara CA 95054
Phone: 408-982-0700, Fax: 408-496-0670

IXYS Semiconductor GmbH
Edisonstr. 15, D-68623 Lampertheim
Phone: +49-6206-503-0, Fax: +49-6206-503627

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
g_{fs}	$I_C = I_{C90}$; V_{CE} = 20 V, Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %	10	20		S
$I_{C(on)}$	V_{GE} = 15 V		300		A
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		4.5		nF
C_{oes}			0.5		nF
C_{res}			0.09		nF
Q_g	$I_C = I_{C90}$, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}		180		nC
Q_{ge}			45		nC
Q_{gc}			120		nC
$t_{d(on)}$	**Inductive load, T_J = 125°C**		80		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V,		150		ns
$t_{d(off)}$	V_{CE} = 0.6 • V_{CES}, R_{on} = 6.8 Ω, R_{off} = 22 Ω		800		ns
t_{fi}	Remarks: Switching times may increase		2000		ns
E_{on}	for V_{CE} (Clamp) > 0.6 • V_{CES}, higher T_J or		3.2		mJ
E_{off}	increased R_G		6.8		mJ
R_{thJC}				0.61	K/W
R_{thCK}			0.05		K/W

miniBLOC, SOT-227 B



M4 screws (4x) supplied

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	31.5	31.7	1.241	1.249
B	7.8	8.2	0.307	0.323
C	4.0	-	0.158	-
D	4.1	4.3	0.162	0.169
E	4.1	4.3	0.162	0.169
F	14.9	15.1	0.587	0.595
G	30.1	30.3	1.186	1.193
H	38.0	38.2	1.497	1.505
J	11.8	12.2	0.465	0.481
K	8.9	9.1	0.351	0.359
L	0.75	0.85	0.030	0.033
M	12.6	12.8	0.496	0.504
N	25.2	25.4	0.993	1.001
O	1.95	2.05	0.077	0.081
P	-	5.0	-	0.197

Reverse Diode (FRED)

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
V_F	$I_F = I_{C90}$, V_{GE} = 0 V, Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %			2.3	V
I_{RM}	$I_F = I_{C90}$, V_{GE} = 0 V, $-di_F/dt$ = 480 A/µs			33	A
t_{rr}	T_J = 125°C, V_R = 360 V		150		ns
R_{thJC}				0.7	K/W

IXYS MOSFETs and IGBTs are covered by one of the following U.S.patents: 4,835,592 4,881,108 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

IXYS reserves the right to change limits, test conditions, and dimensions.

IXYS Corporation
3540 Bassett Street, Santa Clara CA 95054
Phone: 408-982-0700, Fax: 408-496-0670

IXYS Semiconductor GmbH
Edisonstr. 15, D-68623 Lampertheim
Phone: +49-6206-503-0, Fax: +49-6206-503627

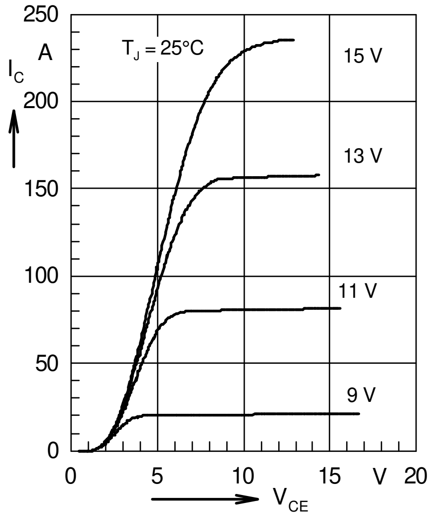


Fig. 1 Typ. output characteristics

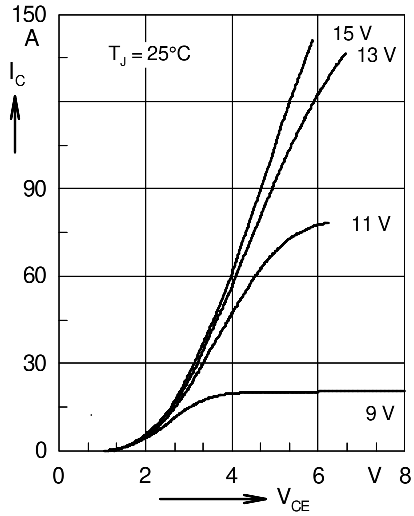


Fig. 2 Typ. output characteristics

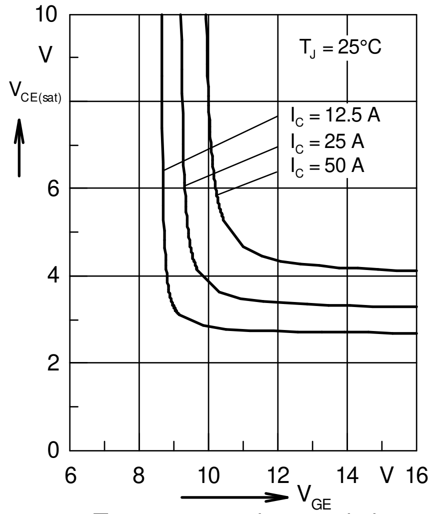


Fig. 3 Typ. on-state characteristics

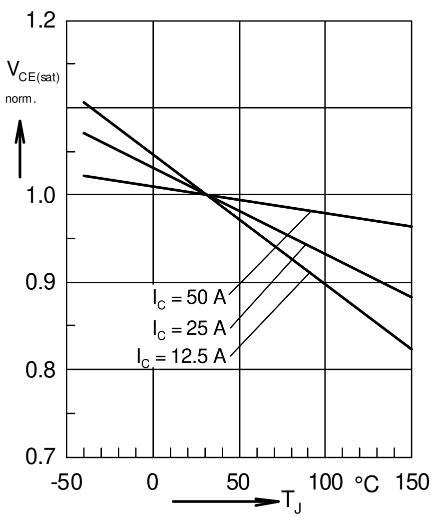


Fig. 4 Typ. temp. dependence of $V_{CE(sat)}$

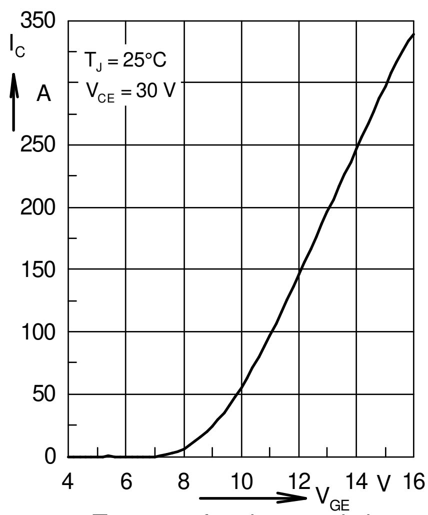


Fig. 5 Typ. transfer characteristics

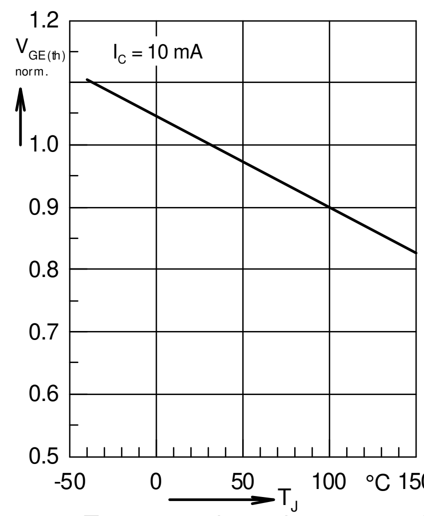


Fig. 6 Typ. temp. dependence of norm. $V_{GE(th)}$

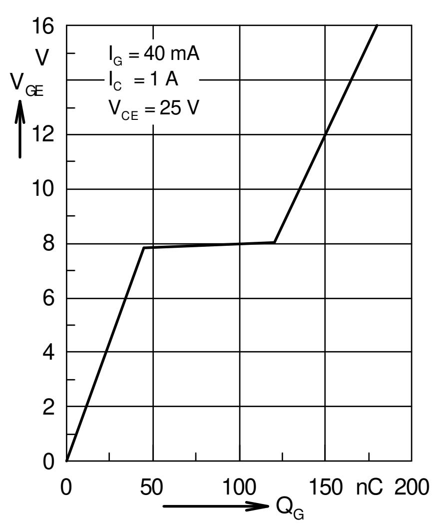


Fig. 7 Typ. turn-on gate charge characteristics, $V_{GE} = f(Q_G)$

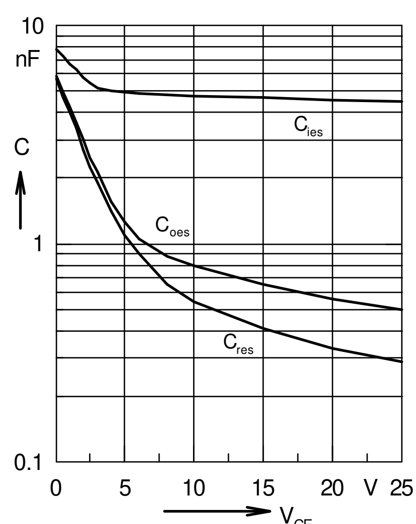


Fig. 8 Typ. capacitances

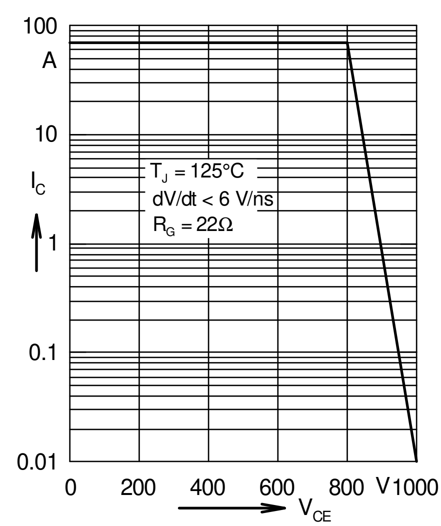


Fig. 9 Reverse biased safe operating area

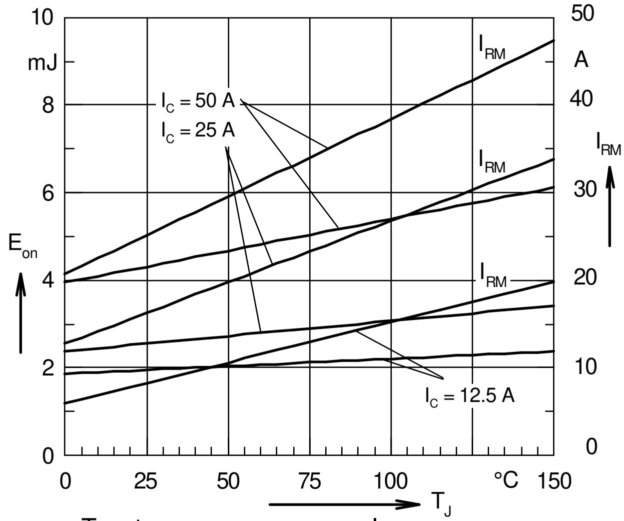


Fig. 10 Typ. turn-on energy per pulse

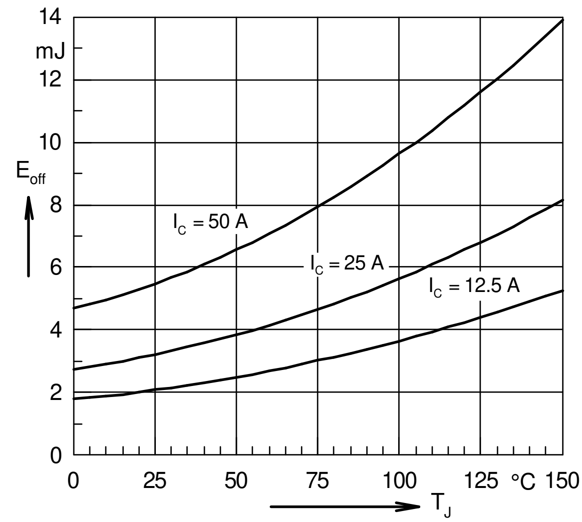


Fig. 11 Typ. turn-off energy per pulse

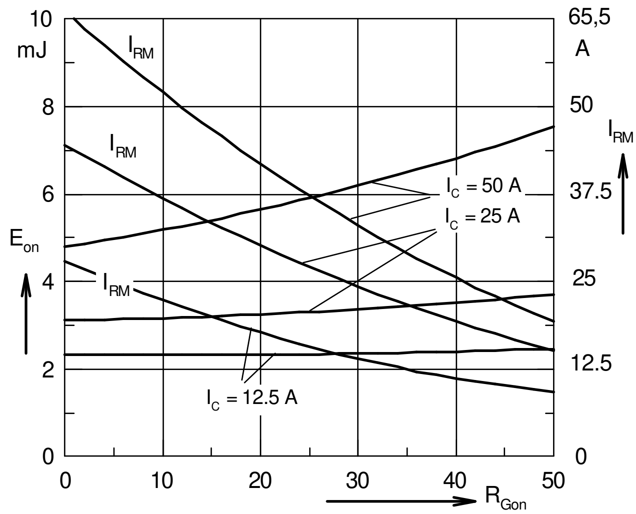


Fig. 12 Typ. turn-on energy per pulse

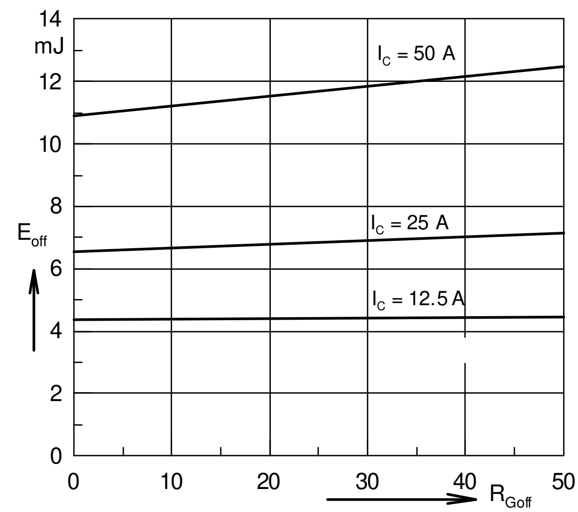


Fig. 13 Typ. turn-off energy per pulse

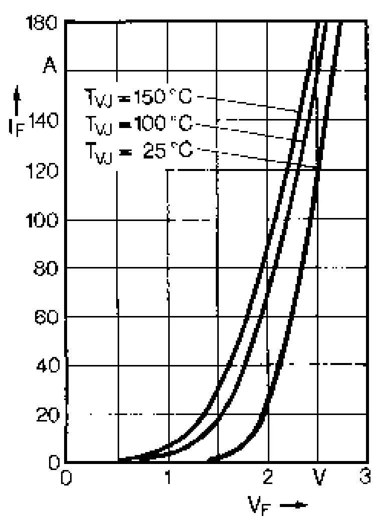


Fig. 14 Forward characteristic of reverse diode

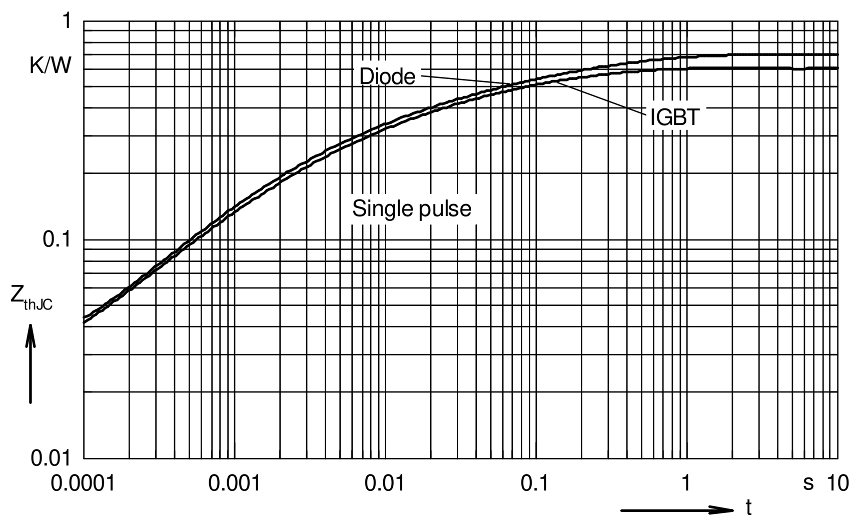


Fig. 15 Transient thermal resistance junction to case of IGBT and Diode

IXYS Corporation
3540 Bassett Street, Santa Clara CA 95054
Phone: 408-982-0700, Fax: 408-496-0670

IXYS Semiconductor GmbH
Edisonstr. 15, D-68623 Lampertheim
Phone: +49-6206-503-0, Fax: +49-6206-503627

IXYS Corporation
3540 Bassett Street, Santa Clara CA 95054
Phone: 408-982-0700, Fax: 408-496-0670

IXYS Semiconductor GmbH
Edisonstr. 15, D-68623 Lampertheim
Phone: +49-6206-503-0, Fax: +49-6206-503627