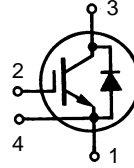


IGBT with Diode

IXSN 35N100U1

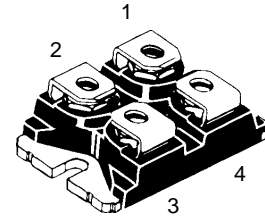
$V_{CES} = 1000 \text{ V}$
 $I_{C25} = 38 \text{ A}$
 $V_{CE(sat)} = 3.5 \text{ V}$

High Short Circuit SOA Capability



Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	1000	V
V_{CGR}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1 \text{ M}\Omega$	1000	A
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$	38	A
I_{C90}	$T_C = 90^\circ\text{C}$	25	A
I_{CM}	$T_C = 25^\circ\text{C}, 1 \text{ ms}$	50	A
SSOA (RBSOA)	$V_{GE} = 15 \text{ V}, T_{VJ} = 125^\circ\text{C}, R_G = 22 \Omega$ Clamped inductive load, $L = 30 \mu\text{H}$	$I_{CM} = 50$ @ $0.8 V_{CES}$	A
t_{SC} (SCSOA)	$V_{GE} = 15 \text{ V}, V_{CE} = 0.6 \cdot V_{CES}, T_J = 125^\circ\text{C}$ $R_G = 22 \Omega$, non repetitive	10	μs
P_C	$T_C = 25^\circ\text{C}$	205	W
V_{ISOL}	50/60 Hz	$t = 1 \text{ min}$	2500 V~
	$I_{ISOL} \leq 1 \text{ mA}$	$t = 1 \text{ s}$	3000 V~
T_J		-40 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-40 ... +150	$^\circ\text{C}$
M_d	Mounting torque	1.5/13	Nm/lb.in.
	Terminal connection torque (M4)	1.5/13	Nm/lb.in.
Weight		30	g

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_{tr} and I_{RM}
- Low collector-to-case capacitance (< 50 pF)
 - reduced RFI
- Low package inductance (< 10 nH)
 - easy to drive and to protect

Applications

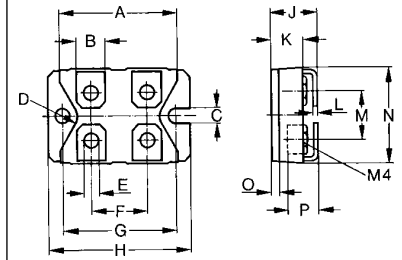
- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies

Advantages

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

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

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
g_{fs}	$I_C = I_{C90}$; $V_{CE} = 20\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$	10	20	S
$I_{C(on)}$	$V_{GE} = 15\text{ V}$		300	A
C_{ies}	$V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$, $f = 1\text{ MHz}$		4.5	nF
C_{oes}			0.5	nF
C_{res}			0.09	nF
Q_g	$I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $V_{CE} = 0.5 V_{CES}$		180	nC
Q_{ge}			45	nC
Q_{gc}			120	nC
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $V_{CE} = 0.6 \cdot V_{CES}$, $R_{on} = 6.8\ \Omega$, $R_{off} = 22\ \Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.6 \cdot V_{CES}$, higher T_J or increased R_G		80	ns
t_{ri}			150	ns
$t_{d(off)}$			800	ns
t_{fi}			2000	ns
E_{on}			3.2	mJ
E_{off}			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		Inches	
	Min.	Max.	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 ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
V_F	$I_F = I_{C90}$, $V_{GE} = 0\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$			2.3 V
I_{RM}	$I_F = I_{C90}$, $V_{GE} = 0\text{ V}$, $-di_F/dt = 480\text{ A}/\mu\text{s}$ $T_J = 125^\circ\text{C}$, $V_R = 360\text{ V}$			33 A
t_{rr}			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

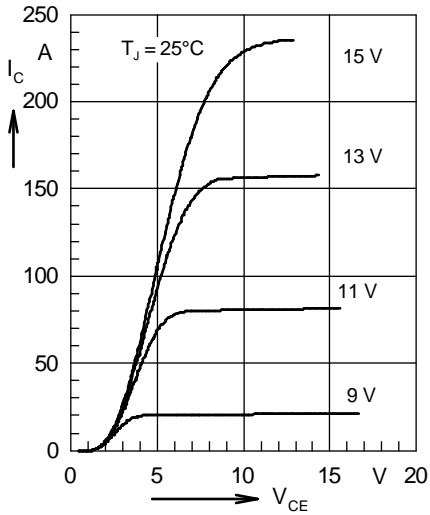


Fig. 1 Typ. output characteristics

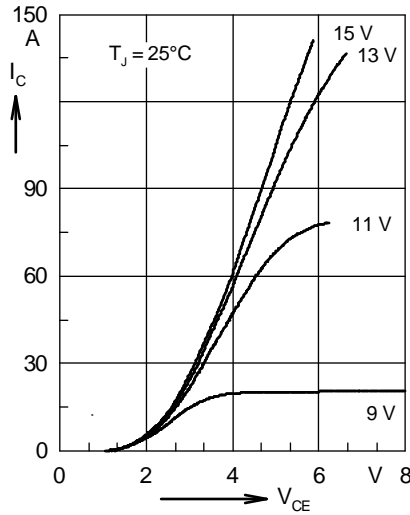


Fig. 2 Typ. output characteristics

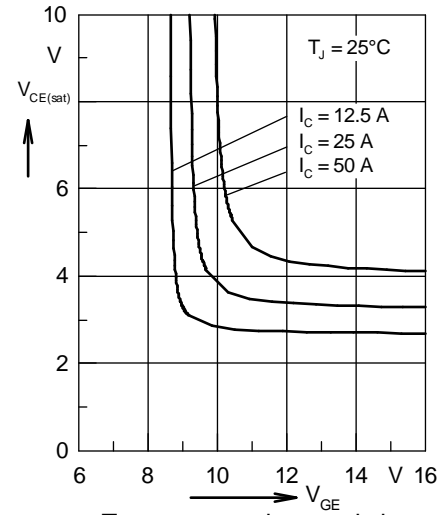


Fig. 3 Typ. on-state characteristics

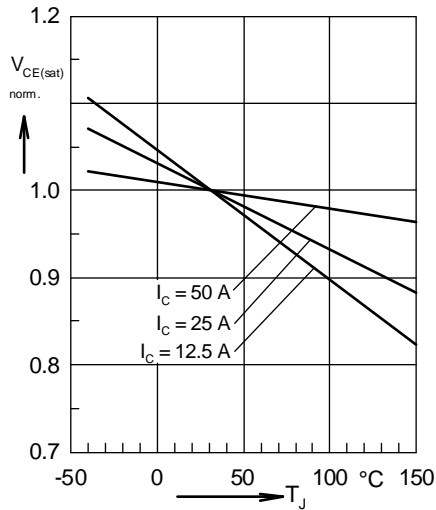


Fig. 4 Typ. temp. dependence of $V_{CE(sat)}$

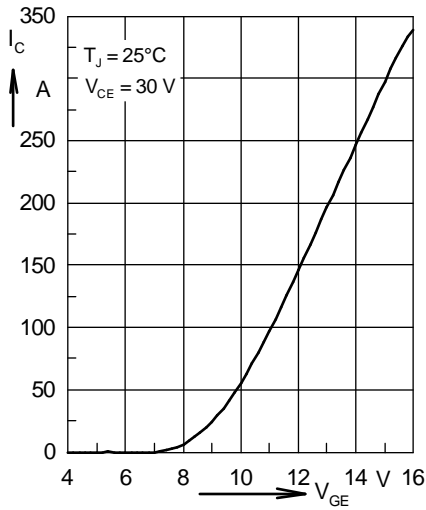


Fig. 5 Typ. transfer characteristics

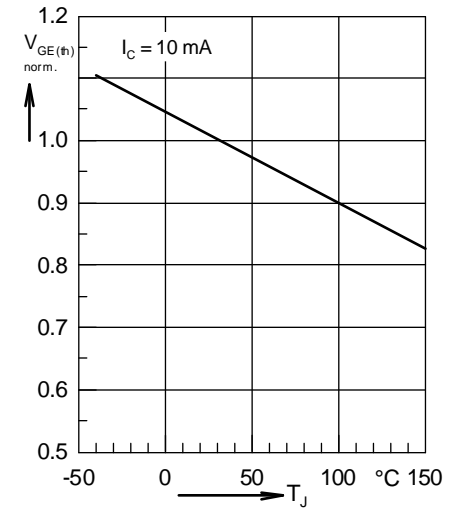


Fig. 6 Typ. temp. dependence of norm. $V_{GE(th)}$

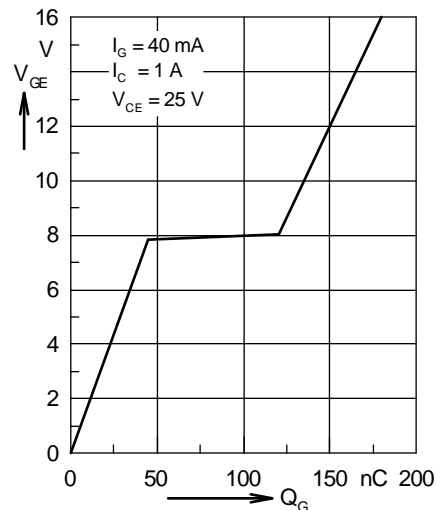


Fig. 7 Typ. turn-on gate charge characteristics, $V_{GE} = f(Q_G)$

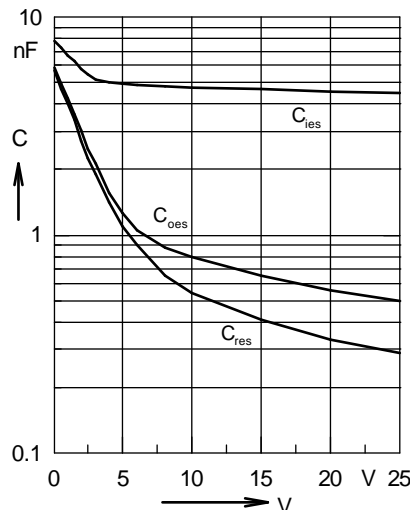


Fig. 8 Typ. capacitances

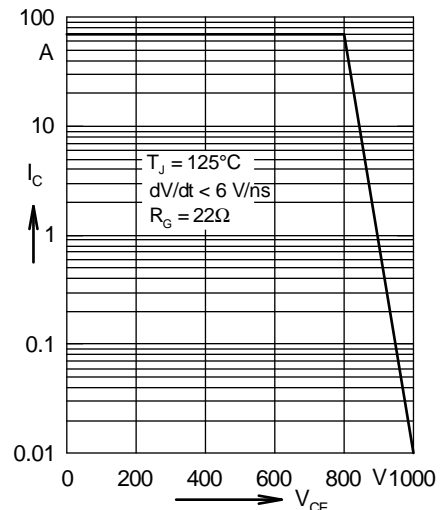


Fig. 9 Reverse biased safe operating area

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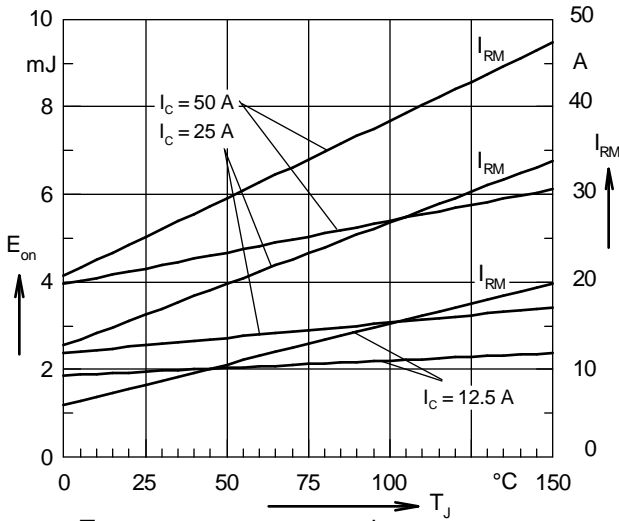


Fig. 10 Typ. turn-on energy per pulse

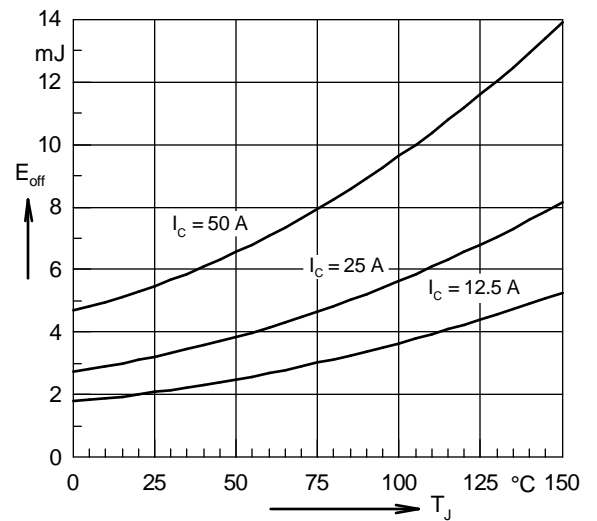


Fig. 11 Typ. turn-off energy per pulse

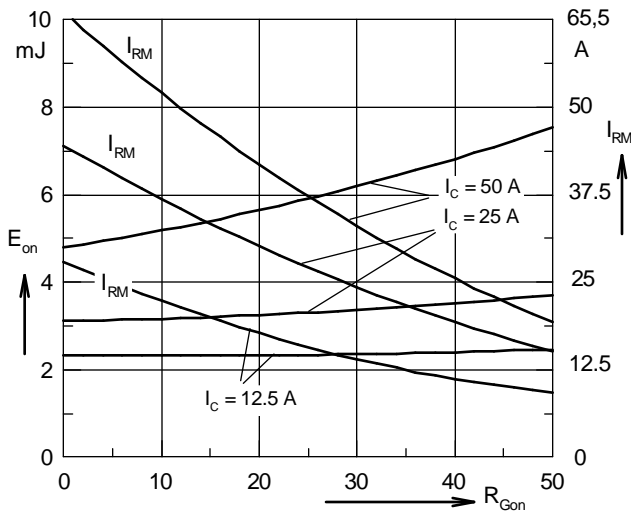


Fig. 12 Typ. turn-on energy per pulse

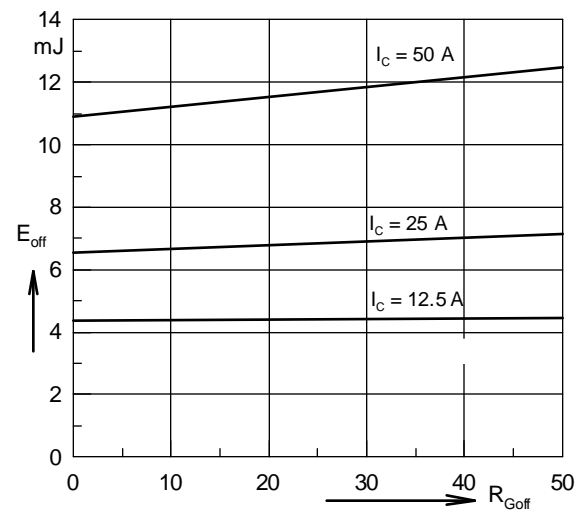


Fig. 13 Typ. turn-off energy per pulse

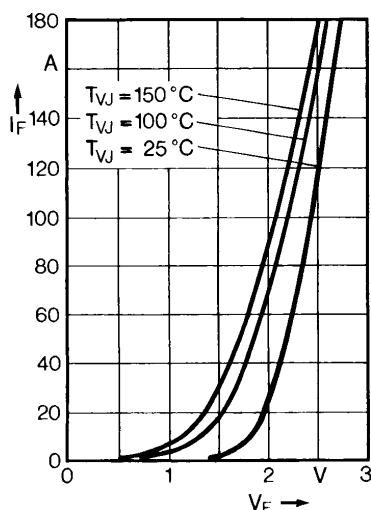


Fig. 14 Forward characteristic of reverse diode

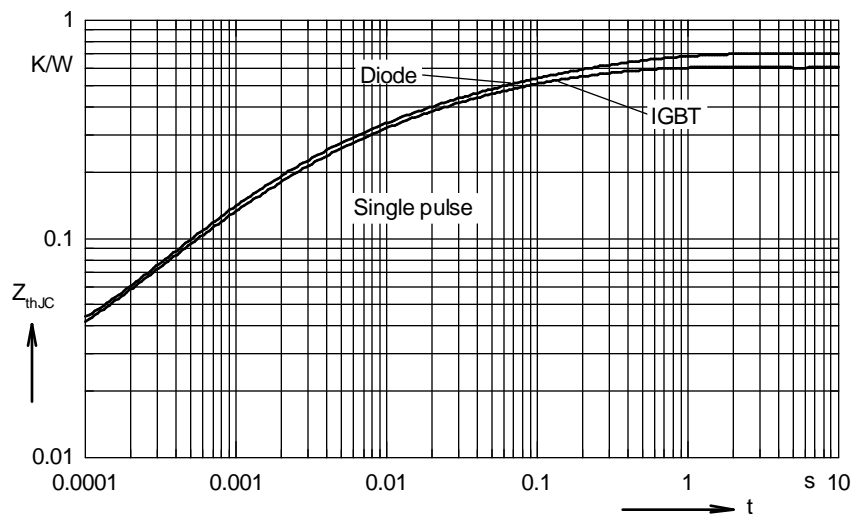


Fig. 15 Transient thermal resistance junction to case of IGBT and Diode

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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

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Edisonstr. 15, D-68623 Lampertheim
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