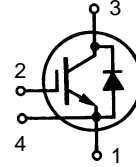


IGBT with Diode

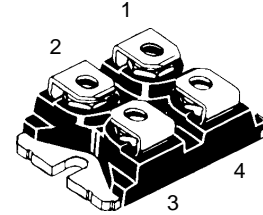
IXSN 35N100U1

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

High Short Circuit SOA Capability



miniBLOC, SOT-227 B



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

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

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)
 - reduces 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

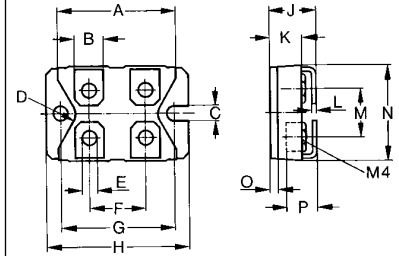
Advantages

- 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} (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_{tr}		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

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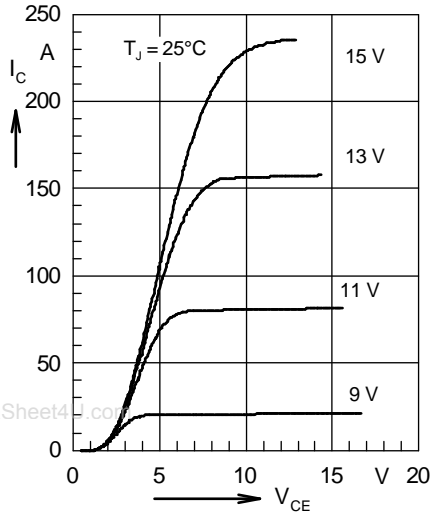


Fig. 1 Typ. output characteristics

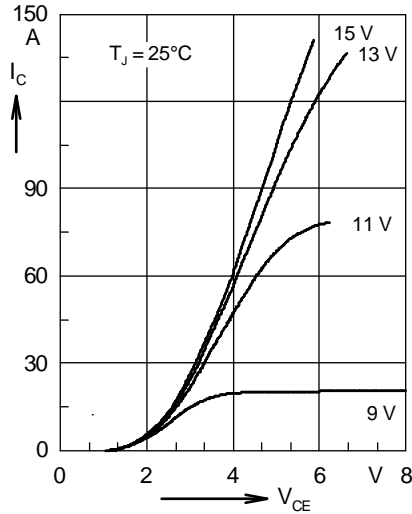


Fig. 2 Typ. output characteristics

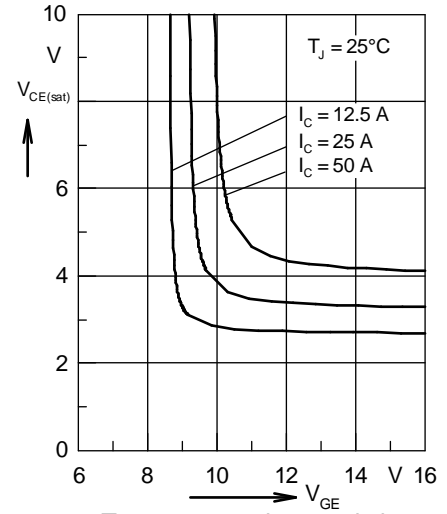


Fig. 3 Typ. on-state characteristics

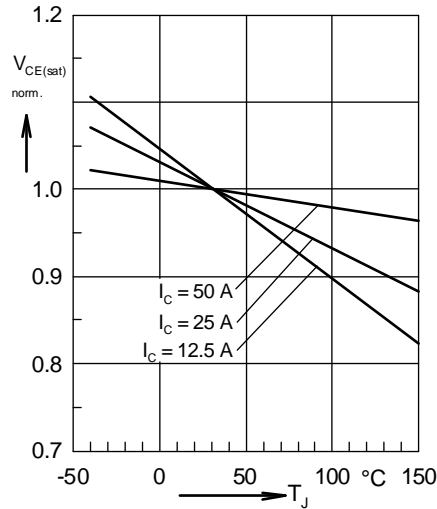


Fig. 4 Typ. temp. dependence of $V_{CE(sat)}$

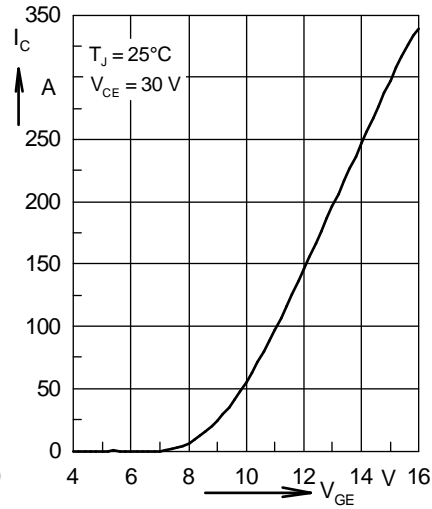


Fig. 5 Typ. transfer characteristics

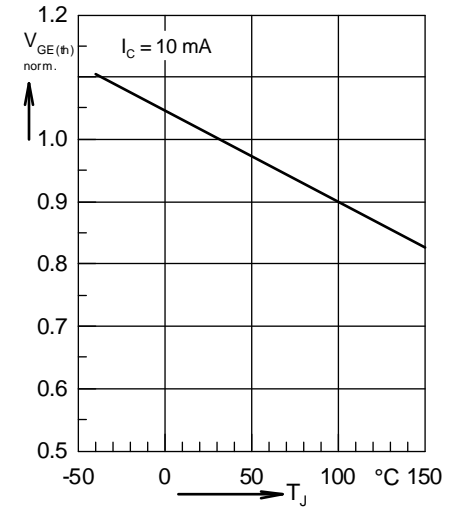


Fig. 6 Typ. temp. dependence of norm. $V_{GE(th)}$

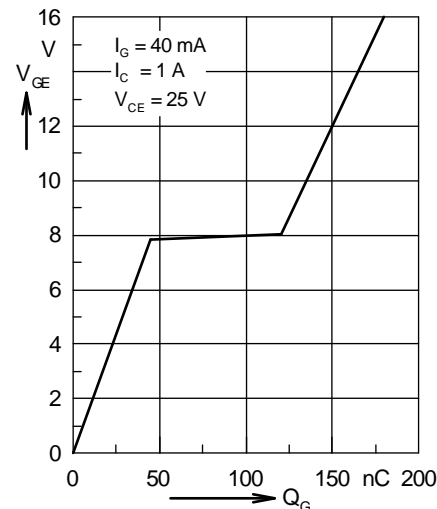


Fig. 7 Typ. turn-on gate charge characteristics, $V_{GE} = f(Q_G)$

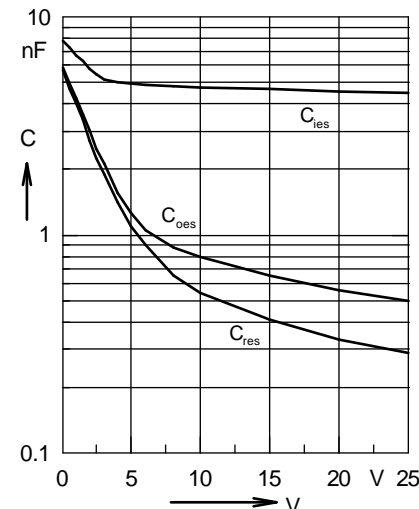


Fig. 8 Typ. capacitances

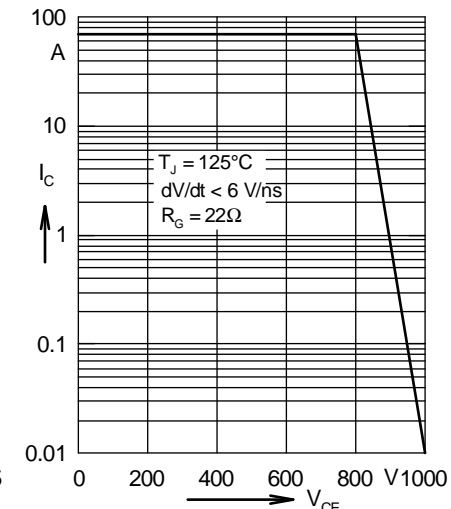


Fig. 9 Reverse biased safe operating area

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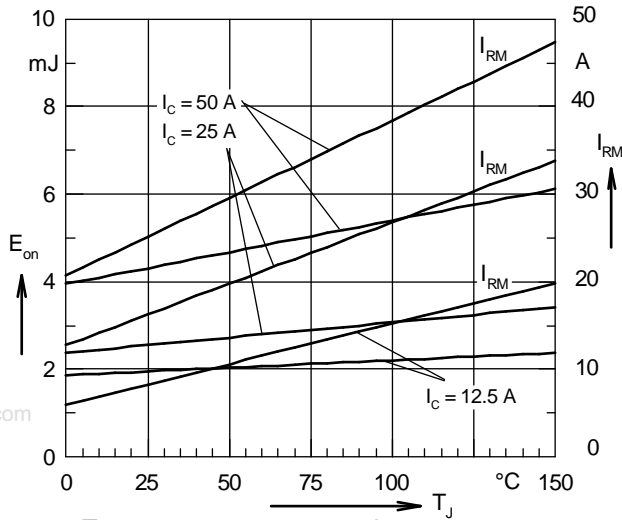


Fig. 10 Typ. turn-on energy per pulse

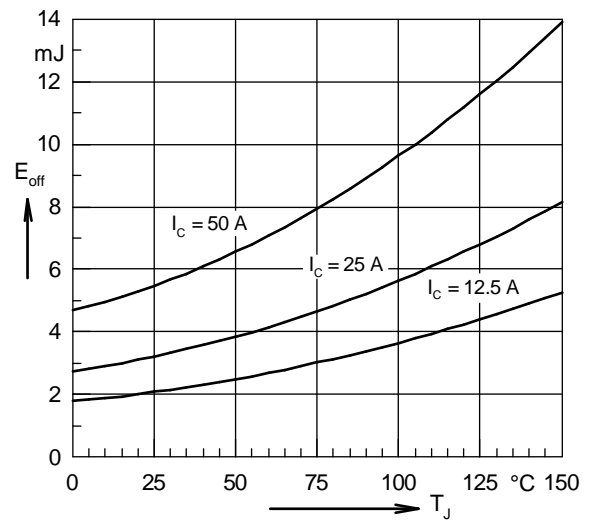


Fig. 11 Typ. turn-off energy per pulse

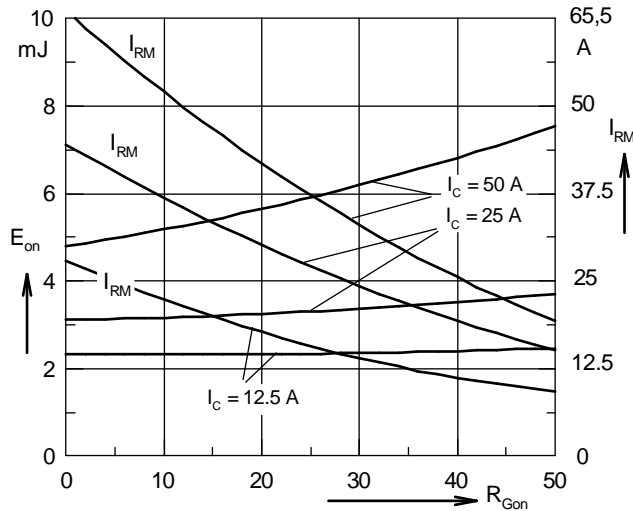


Fig. 12 Typ. turn-on energy per pulse

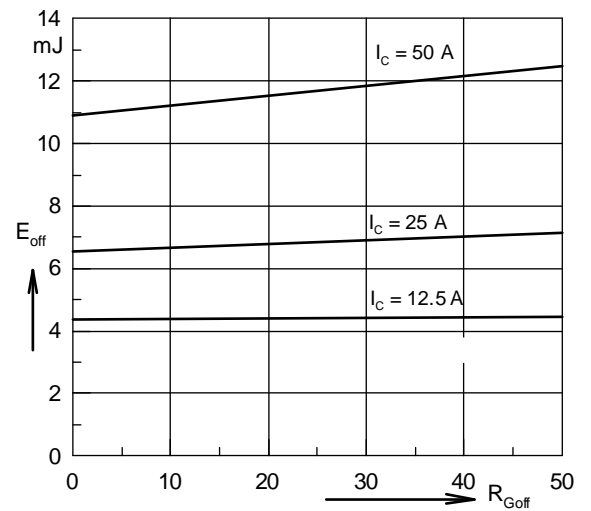


Fig. 13 Typ. turn-off energy per pulse

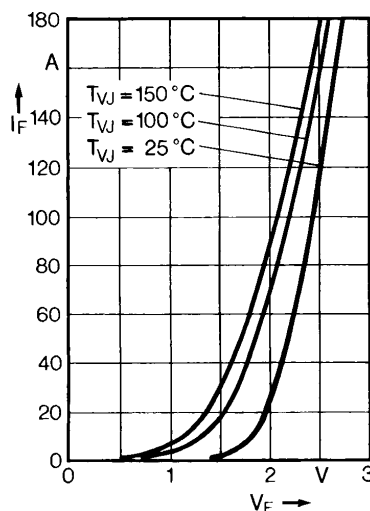


Fig. 14 Forward characteristic of reverse diode

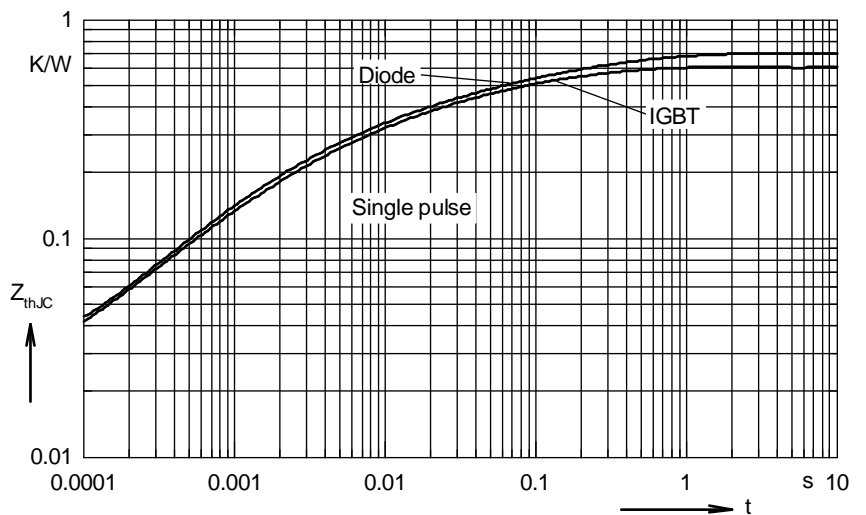


Fig. 15 Transient thermal resistance junction to case of IGBT and Diode

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