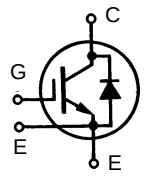
IXYS

IGBT with Diode IXSN 80N60AU1

V_{CES} = 600 V
I_{C25} = 160 A
$V_{CE(sat)}$ = 3 V

Short Circuit SOA Capability

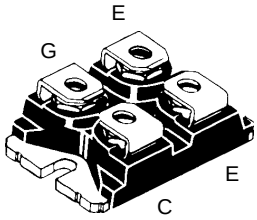


Symbol	Test Conditions		Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C		600	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ		600	A
V_{GES}	Continuous		±20	V
V_{GEM}	Transient		±30	V
I_{C25}	T_C = 25°C		160	A
I_{C90}	T_C = 90°C		80	A
I_{CM}	T_C = 25°C, 1 ms		320	A
SSOA (RBSOA)	V_{GE} = 15 V, T_{VJ} = 125°C, R_G = 22 Ω Clamped inductive load, L = 30 µH		I_{CM} = 160 @ 0.8 V_{CES}	A
t_{SC} **(SCSOA)**	V_{GE} = 15 V, V_{CE} = 360 V, T_J = 125°C R_G = 22 Ω, non repetitive		10	µs
P_C	T_C = 25°C		500	W
V_{ISOL}	50/60 Hz I_{ISOL} ≤ 1 mA	t = 1 min t = 1 s	2500 3000	V~ V~
T_J			-55 ... +150	°C
T_{JM}			150	°C
T_{stg}			-55 ... +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 = 3 mA, V_{GE} = 0 V		600			V
$V_{GE(th)}$	I_C = 8 mA, V_{CE} = V_{GE}		4		8	V
I_{CES}	V_{CE} = 0.8 • V_{CES} V_{GE} = 0 V	T_J = 25°C T_J = 125°C			1 15	mA mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±100	ns
$V_{CE(sat)}$	I_C = I_{C90}, V_{GE} = 15 V				3	V

miniBLOC, SOT-227 B

E153432



E = Emitter ①, C = Collector
G = Gate, E = Emitter ①

① Either Emitter terminal can be used as Main or Kelvin Emitter

Features
- International standard package miniBLOC
- Aluminium-nitride isolation
  - high power dissipation
- Isolation voltage 3000 V~
- UL registered E 153432
- Low $V_{CE(sat)}$
  - for minimum on-state conduction losses
- Fast Recovery Epitaxial Diode
  - short t_{rr} and I_{RM}
- Low collector-to-case capacitance (< 60 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

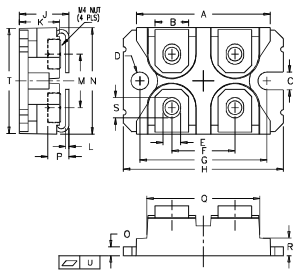
Advantages
- Space savings
- Easy to mount with 2 screws
- High power density

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
g_{fs}	I_C = 60 A; V_{CE} = 10 V, Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %		46		S
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		8500		pF
C_{oes}			650		pF
C_{res}			120		pF
Q_g	$I_C = I_{C90}$, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}		335		nC
Q_{ge}			88		nC
Q_{gc}			158		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		140		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V, L = 100 µH,		220		ns
$t_{d(off)}$	V_{CE} = 0.8 V_{CES}, R_G = 2.7 Ω		300	600	ns
t_{fi}	Remarks: Switching times may increase		450	600	ns
E_{off}	for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or increased R_G		10		mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		140		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V, L = 100 µH		220		ns
E_{on}	V_{CE} = 0.8 V_{CES}, R_G = 2.7 Ω		8		mJ
$t_{d(off)}$	Remarks: Switching times may increase		520		ns
t_{fi}	for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or		550		ns
E_{off}	increased R_G		13		mJ
R_{thJC}				0.25	K/W
R_{thCK}			0.05		K/W

Reverse Diode (FRED)

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
V_F	I_F = 50 A, V_{GE} = 0 V, Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %			1.8	V
I_{RM}	I_F = 50 A, V_{GE} = 0 V, -di_F/dt = 480 A/µs		19		A
t_{rr}	V_R = 360 V T_J = 125°C		175		ns
	I_F = 1 A; -di/dt = 200 A/µs; V_R = 30 V T_J = 25°C		35	50	ns
R_{thJC}				0.80	K/W

miniBLOC, SOT-227 B



M4 screws (4x) supplied

Dim.	Millimeter Min.	Max.	Inches 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	38.00	38.23	1.496	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.76	0.84	0.030	0.033
M	12.60	12.85	0.496	0.506
N	25.15	25.42	0.990	1.001
O	1.98	2.13	0.078	0.084
P	4.95	5.97	0.195	0.235
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.174
S	4.72	4.85	0.186	0.191
T	24.59	25.07	0.968	0.987
U	-0.05	0.1	-0.002	0.004

Fig.1 Saturation Characteristics

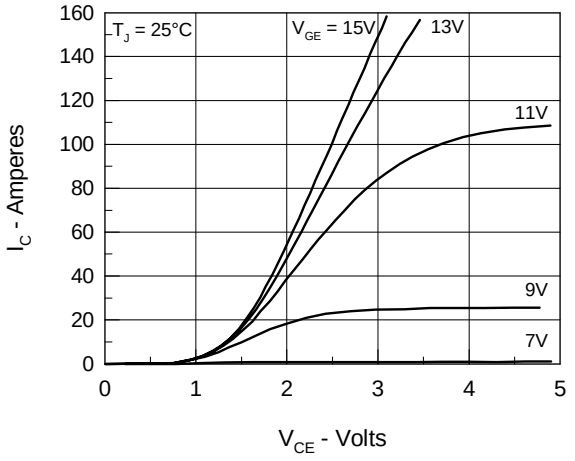


Fig.2 Output Characterstics

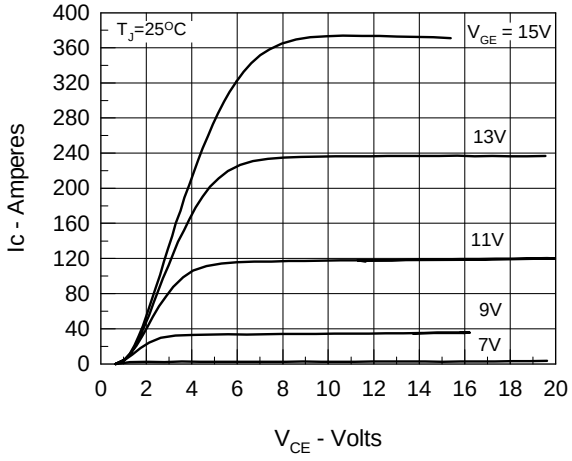


Fig.3 Collector-Emitter Voltage vs. Gate-Emitter Voltage

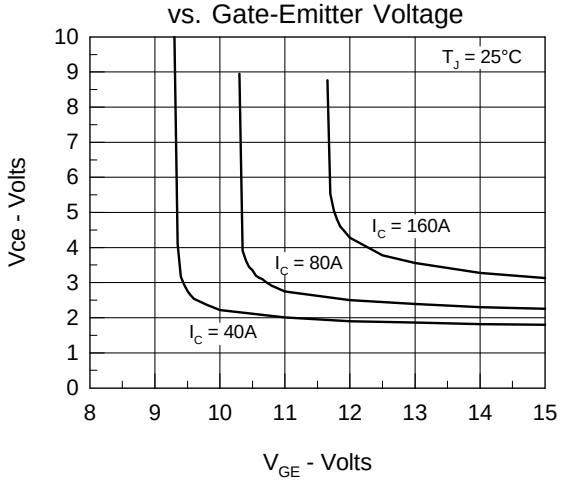


Fig.4 Temperature Dependence of Output Saturation Voltage

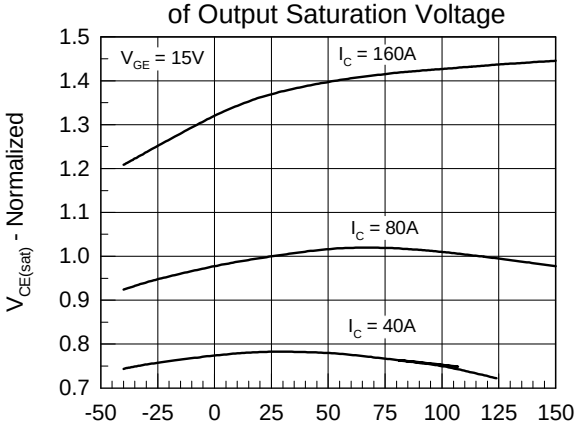


Fig.5 Input Admittance

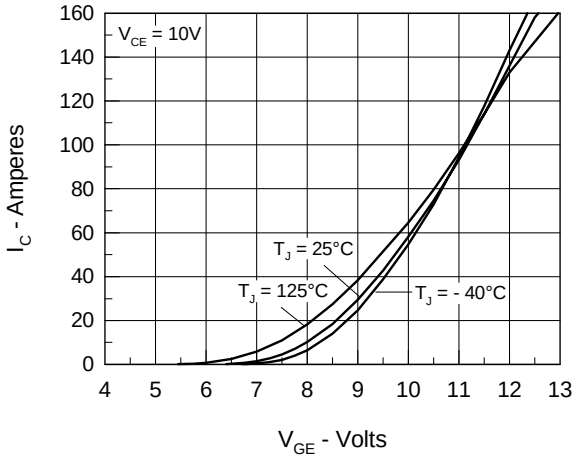


Fig.6 Temperature Dependence of Breakdown and Threshold Voltage

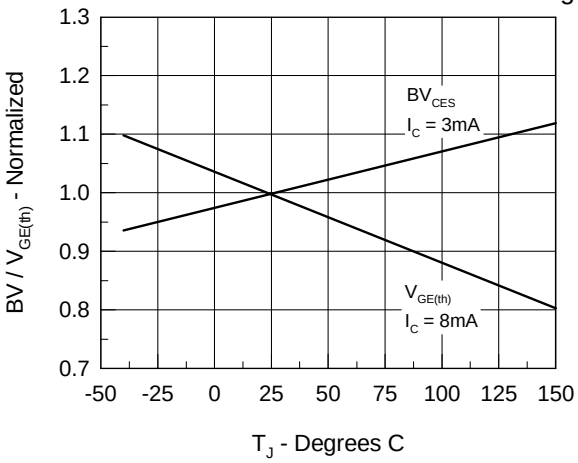


Fig.7 Turn-Off Energy per Pulse and Fall Time on Collector Current

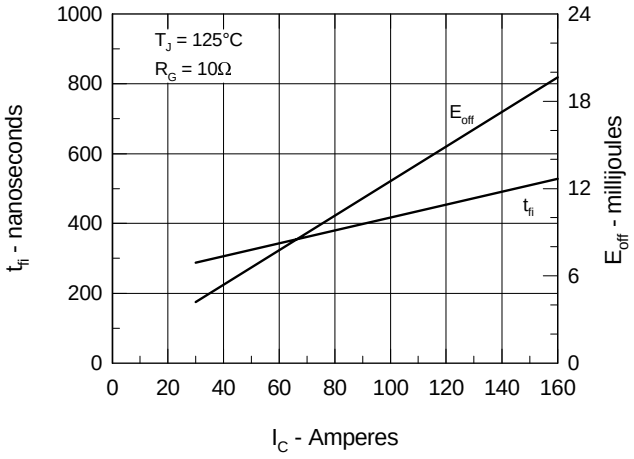


Fig.8 Dependence of Turn-Off Energy Per Pulse and Fall Time on R_G

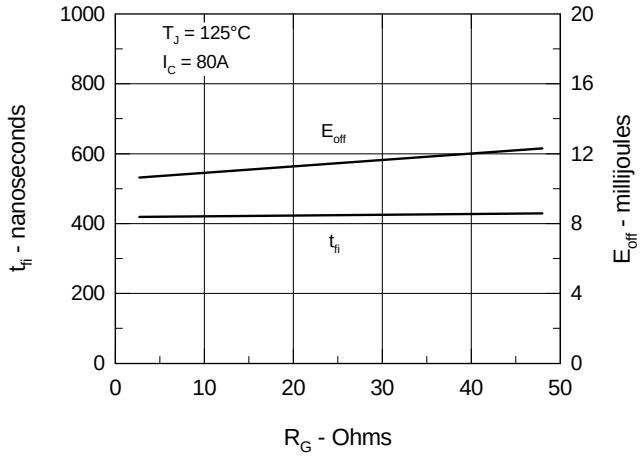


Fig.9 Gate Charge Characteristic Curve

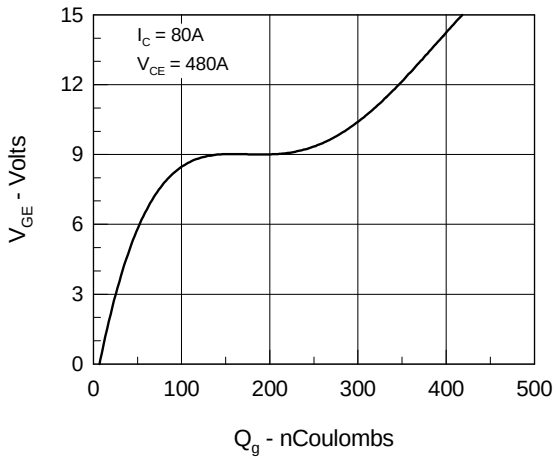


Fig.10 Turn-Off Safe Operating Area

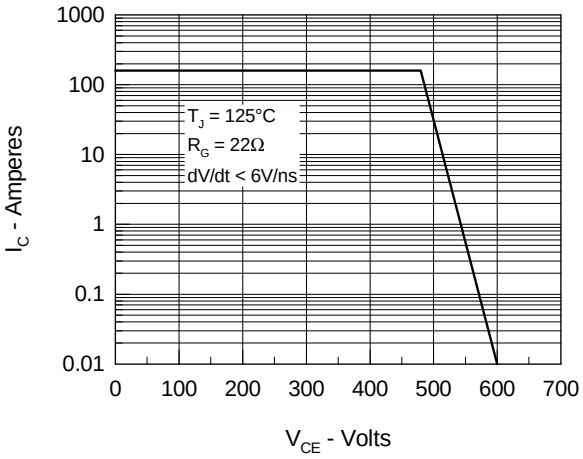


Fig.11 Transient Thermal Impedance