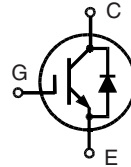


High Voltage IGBT with optional Diode

Short Circuit SOA Capability
Square RBSOA

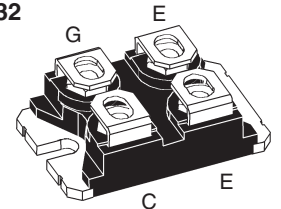


$$V_{CES} = 1200 \text{ V}$$

$$I_{C25} = 100 \text{ A}$$

$$V_{CE(sat) \text{ typ}} = 2.3 \text{ V}$$

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

- NPT IGBT technology
- low saturation voltage
- low switching losses
- square RBSOA, no latch up
- high short circuit capability
- positive temperature coefficient for easy paralleling
- MOS input, voltage controlled
- optional ultra fast diode
- International standard package miniBLOC

Advantages

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

Typical Applications

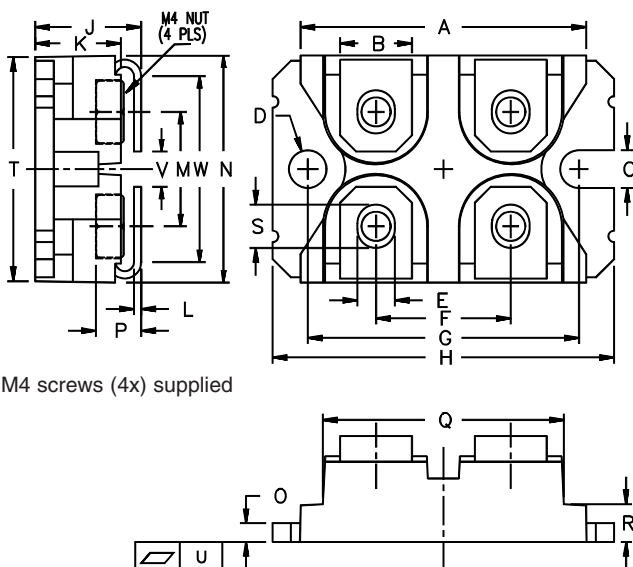
- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies

Symbol	Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C}$ to 150°C	1200	V
V_{CGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GE} = 20 \text{ k}\Omega$	1200	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$	100	A
I_{C90}	$T_C = 90^\circ\text{C}$	62	A
I_{CM}	$T_C = 90^\circ\text{C}$, $t_p = 1 \text{ ms}$	124	A
RBSOA	$V_{GE} = \pm 15 \text{ V}$, $T_J = 125^\circ\text{C}$, $R_G = 22 \Omega$ Clamped inductive load, $L = 30 \mu\text{H}$	$I_{CM} = 100$ $V_{CEK} < V_{CES}$	A
t_{SC} (SCSOA)	$V_{GE} = \pm 15 \text{ V}$, $V_{CE} = V_{CES}$, $T_J = 125^\circ\text{C}$ $R_G = 22 \Omega$, non repetitive	10	μs
P_C	$T_C = 25^\circ\text{C}$	IGBT Diode	450 220 W W
V_{ISOL}	50/60 Hz; $I_{ISOL} \leq 1 \text{ mA}$	2500	V~
T_J		-40 ... +150	$^\circ\text{C}$
T_{stg}		-40 ... +150	$^\circ\text{C}$
M_d	Mounting torque Terminal connection torque (M4)	1.5/13 1.5/13	Nm/lb.in. Nm/lb.in.
Weight		30	g

Symbol	Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
$V_{(BR)CES}$	$V_{GE} = 0 \text{ V}$	1200		V
$V_{GE(th)}$	$I_C = 2 \text{ mA}$, $V_{CE} = V_{GE}$	4.5		6.5 V
I_{CES}	$V_{CE} = V_{CES}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$		6	3.8 mA mA
I_{GES}	$V_{CE} = 0 \text{ V}$, $V_{GE} = \pm 20 \text{ V}$			$\pm 500 \text{ nA}$
$V_{CE(sat)}$	$I_C = 55 \text{ A}$, $V_{GE} = 15 \text{ V}$	2.3	2.8	V

Symbol	Conditions	Characteristic Values		
		$(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$		
		min.	typ.	max.
C_{ies}	} $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$		3300	pF
C_{oes}			500	pF
C_{res}			220	pF
Q_g	$I_C = 50\text{ A}, V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$		240	nC
$t_{d(on)}$	} Inductive load, $T_J = 125^\circ\text{C}$ $I_C = 55\text{ A}, V_{GE} = \pm 15\text{ V},$ $V_{CE} = 600\text{ V}, R_G = 22\ \Omega$		100	ns
t_r			70	ns
$t_{d(off)}$			500	ns
t_f			70	ns
E_{on}			8.4	mJ
E_{off}			6.2	mJ
R_{thJC}				0.28 K/W
R_{thCK}	Package with heatsink compound		0.1	K/W

Symbol	Conditions	Characteristic Values		
		$(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$		
		min.	typ.	max.
V_F	$I_F = 55\text{ A}, V_{GE} = 0\text{ V}$		2.4	V
	$I_F = 55\text{ A}, V_{GE} = 0\text{ V}, T_J = 125^\circ\text{C}$		1.9	V
I_F	$T_C = 25^\circ\text{C}$			110 A
	$T_C = 90^\circ\text{C}$			60 A
I_{RM}	$I_F = 55\text{ A}, -di_F/dt = 400\text{ A}/\mu\text{s}, V_R = 600\text{ V}$		40	A
t_{rr}	$V_{GE} = 0\text{ V}, T_J = 125^\circ\text{C}$		200	ns
t_{rr}	$I_F = 1\text{ A}, -di_F/dt = 100\text{ A}/\mu\text{s}, V_R = 30\text{ V}, V_{GE} = 0\text{ V}$		40	ns
R_{thJC}				0.6 K/W

miniBLOC, SOT-227 B


Dim.	Millimeter		Inches	
	Min.	Max.	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	37.80	38.20	1.489	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
V	3.30	4.57	0.130	0.180
W	0.780	0.830	0.031	0.033

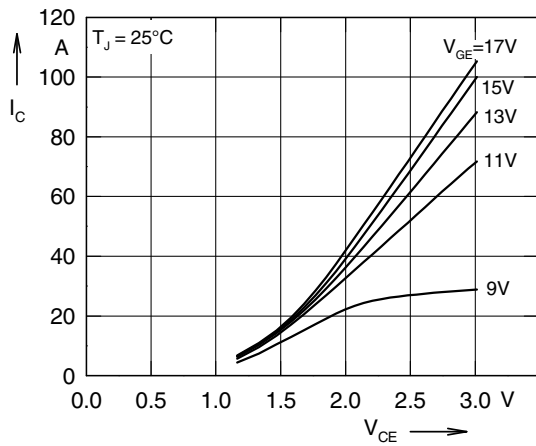


Fig. 1 Typ. output characteristics

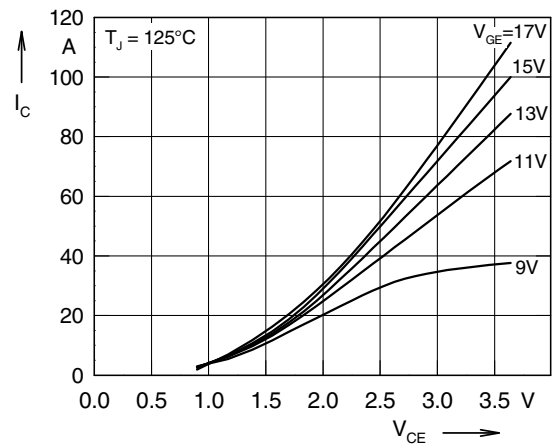


Fig. 2 Typ. output characteristics

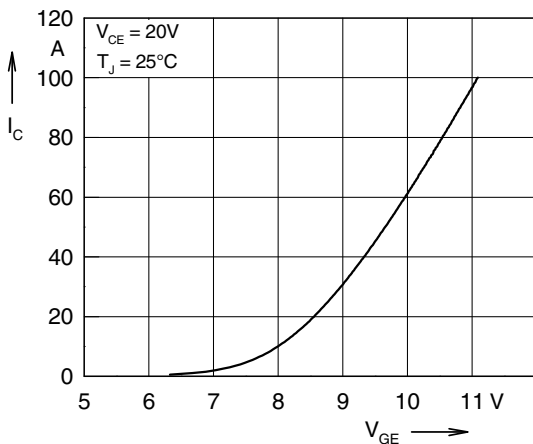


Fig. 3 Typ. transfer characteristics

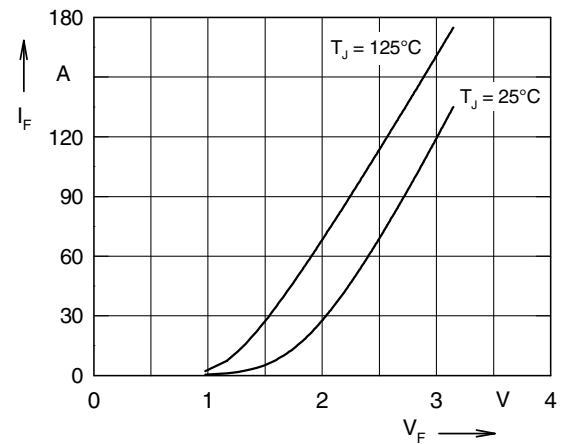


Fig. 4 Typ. forward characteristics of free wheeling diode

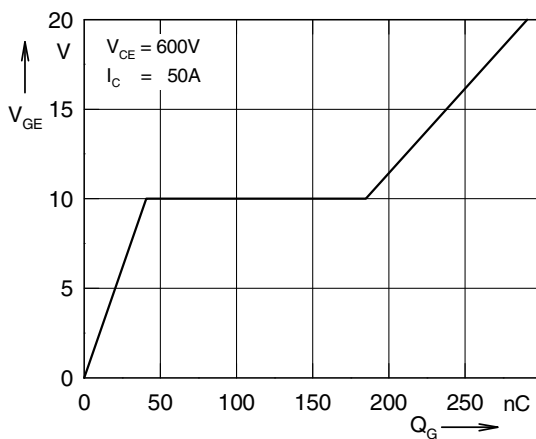


Fig. 5 Typ. turn on gate charge

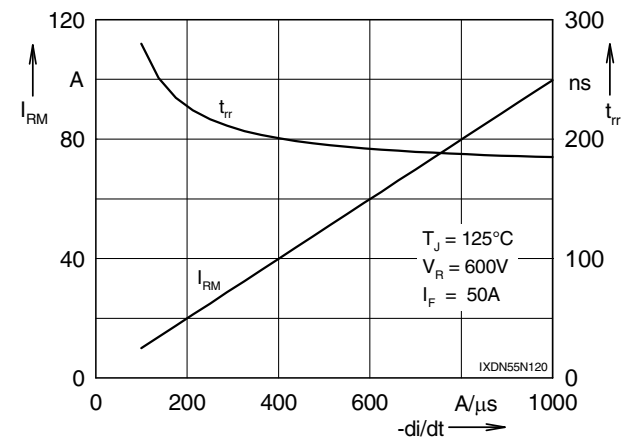


Fig. 6 Typ. turn off characteristics of free wheeling diode

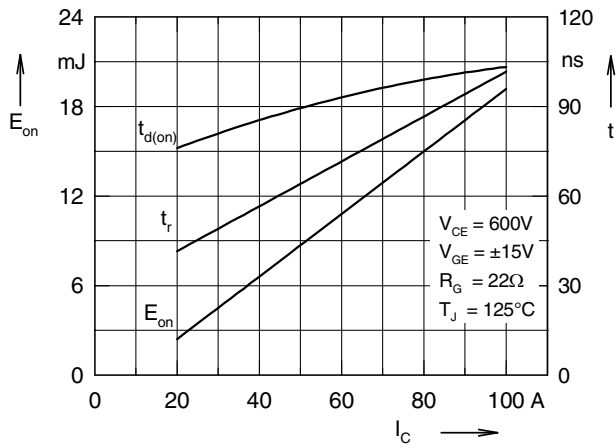


Fig. 7 Typ. turn on energy and switching times versus collector current

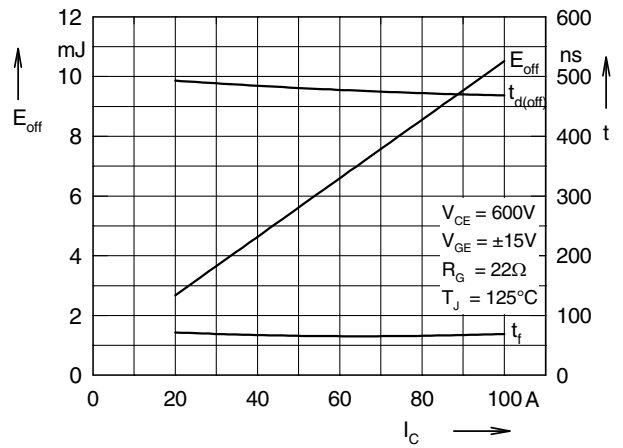


Fig. 8 Typ. turn off energy and switching times versus collector current

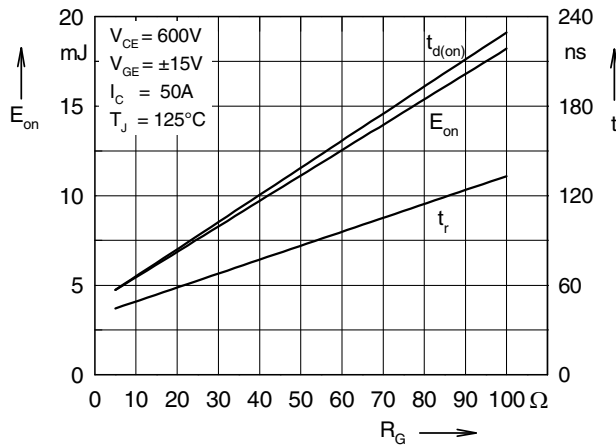


Fig. 9 Typ. turn on energy and switching times versus gate resistor

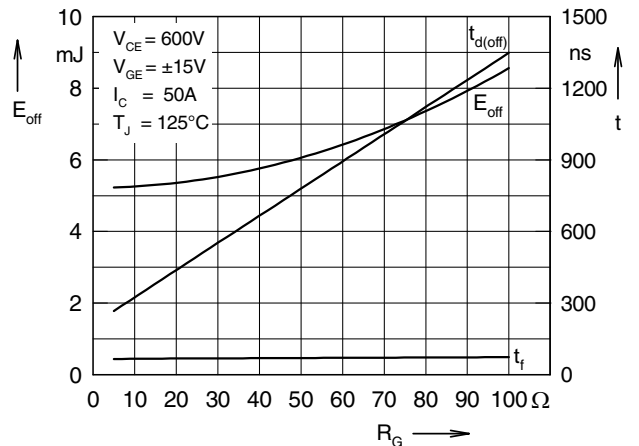


Fig. 10 Typ. turn off energy and switching times versus gate resistor

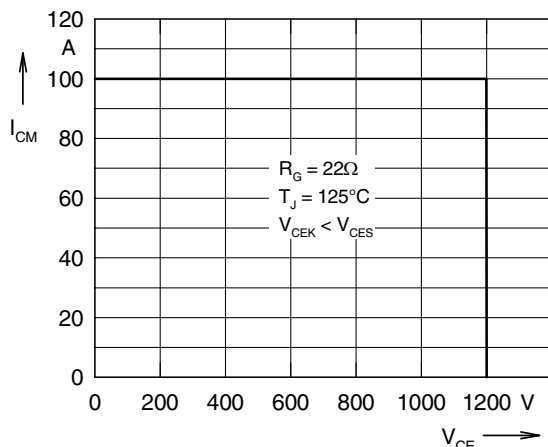


Fig. 11 Reverse biased safe operating area RBSOA

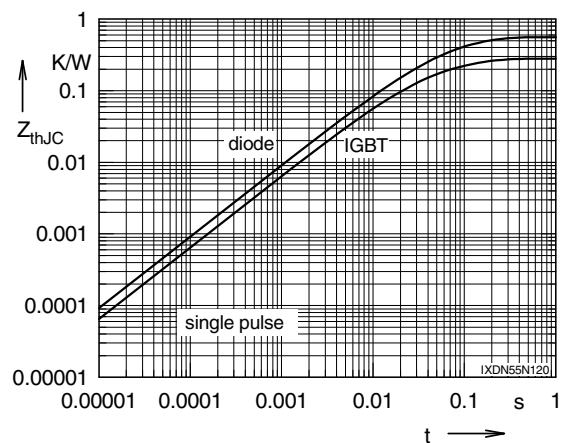


Fig. 12 Typ. transient thermal impedance