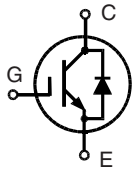
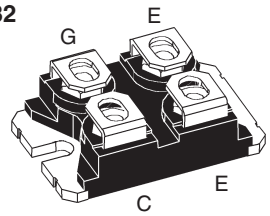
High Voltage IGBT with optional Diode

V_{CES} = 1200 V
I_{C25} = 100 A
$V_{CE(sat)\ typ}$ = 2.3 V

Short Circuit SOA Capability
Square RBSOA



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

Symbol	Conditions		Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C		1200	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 20 kΩ		1200	V
V_{GES}	Continuous		±20	V
V_{GEM}	Transient		±30	V
I_{C25}	T_C = 25°C		100	A
I_{C90}	T_C = 90°C		62	A
I_{CM}	T_C = 90°C, t_p = 1 ms		124	A
RBSOA	V_{GE} = ±15 V, T_J = 125°C, R_G = 22 Ω Clamped inductive load, L = 30 µH		I_{CM} = 100 $V_{CEK} < V_{CES}$	A
t_{SC} (SCSOA)	V_{GE} = ±15 V, V_{CE} = V_{CES}, T_J = 125°C R_G = 22 Ω, non repetitive		10	µs
P_C	T_C = 25°C	IGBT Diode	450 220	W W
V_{ISOL}	50/60 Hz; $I_{ISOL} \leq$ 1 mA		2500	V~
T_J			-40 ... +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	Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
$V_{(BR)CES}$	V_{GE} = 0 V		1200			V
$V_{GE(th)}$	I_C = 2 mA, V_{CE} = V_{GE}		4.5		6.5	V
I_{CES}	V_{CE} = V_{CES}	T_J = 25°C T_J = 125°C		 6	3.8	mA mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				± 500	nA
$V_{CE(sat)}$	I_C = 55 A, V_{GE} = 15 V			2.3	2.8	V

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
- Uninteruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies

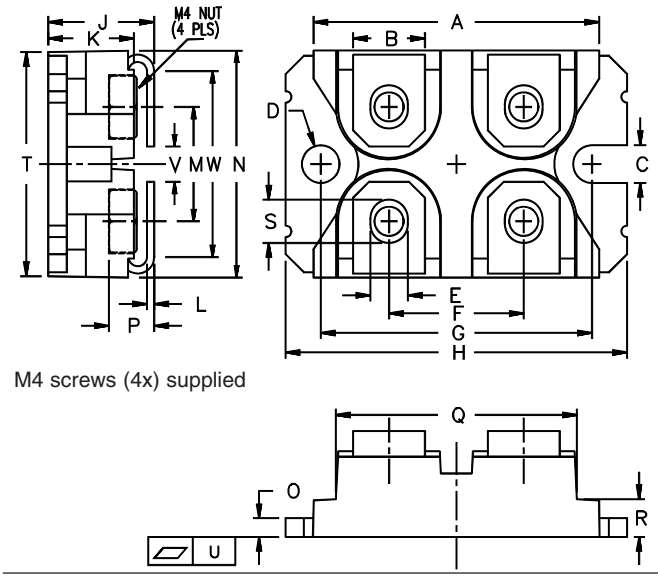
203

Symbol	Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		3300		pF
C_{oes}			500		pF
C_{res}			220		pF
Q_g	I_C = 50 A, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}		240		nC
$t_{d(on)}$	**Inductive load, T_J = 125°C** I_C = 55 A, V_{GE} = ±15 V, V_{CE} = 600 V, R_G = 22 Ω		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

Reverse Diode (FRED)

Symbol	Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
V_F	I_F = 55 A, V_{GE} = 0 V		2.4	2.6	V
	I_F = 55 A, V_{GE} = 0 V, T_J = 125°C		1.9		V
I_F	T_C = 25°C			110	A
	T_C = 90°C			60	A
I_{RM}	I_F = 55 A, -di_F/dt = 400 A/µs, V_R = 600 V		40		A
t_{rr}	V_{GE} = 0 V, T_J = 125°C		200		ns
t_{rr}	I_F = 1 A, -di_F/dt = 100 A/µs, V_R = 30 V, V_{GE} = 0 V		40		ns
R_{thJC}				0.6	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	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	19.81	21.08

203

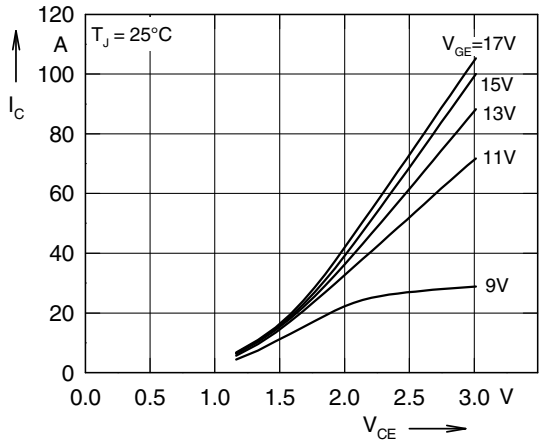


Fig. 1 Typ. output characteristics

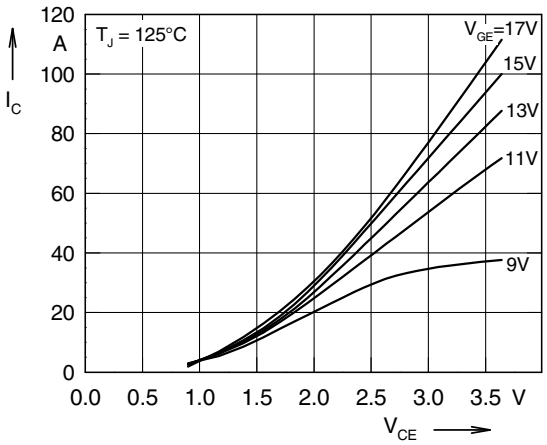


Fig. 2 Typ. output characteristics

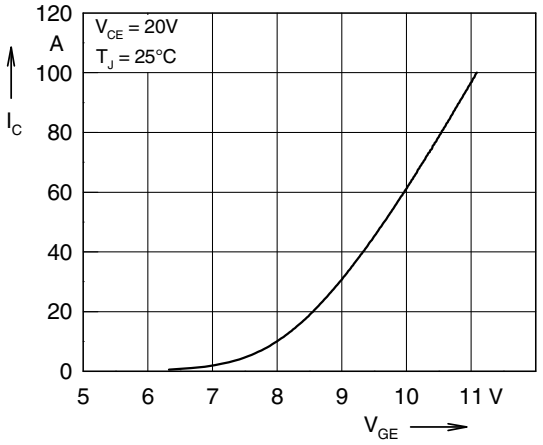


Fig. 3 Typ. transfer characteristics

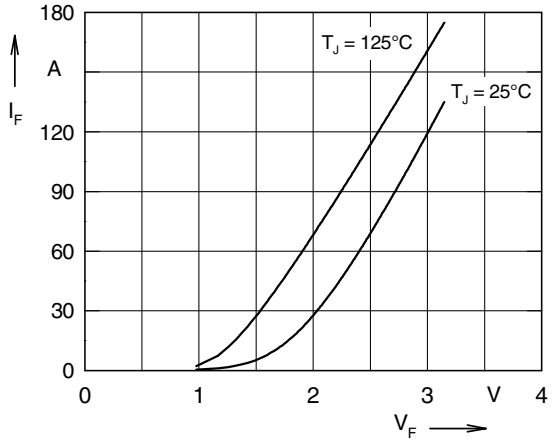


Fig. 4 Typ. forward characteristics of free wheeling diode

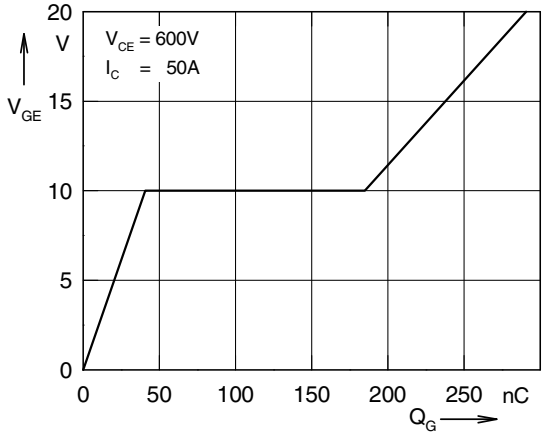


Fig. 5 Typ. turn on gate charge

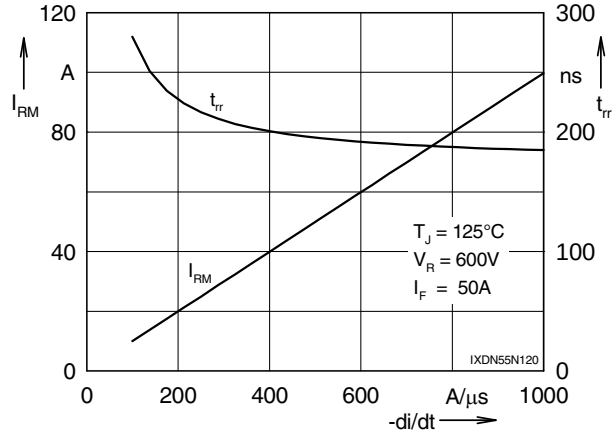


Fig. 6 Typ. turn off characteristics of free wheeling diode

203

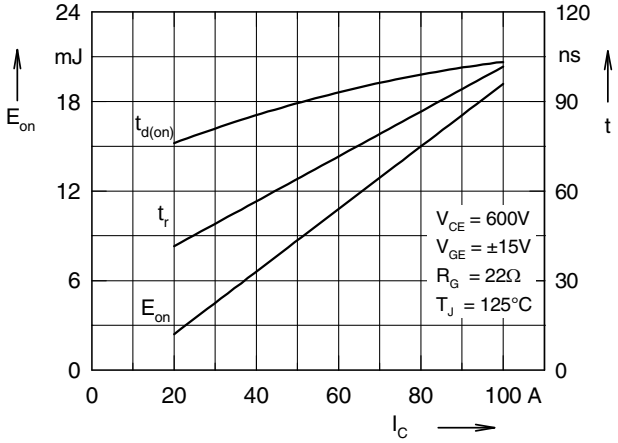


Fig. 7 Typ. turn on energy and switching times versus collector current

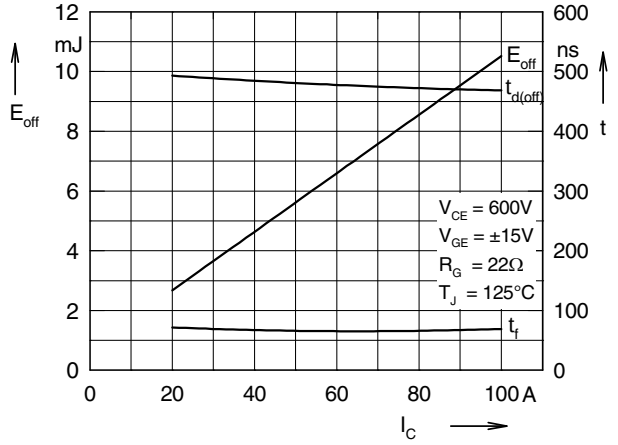


Fig. 8 Typ. turn off energy and switching times versus collector current

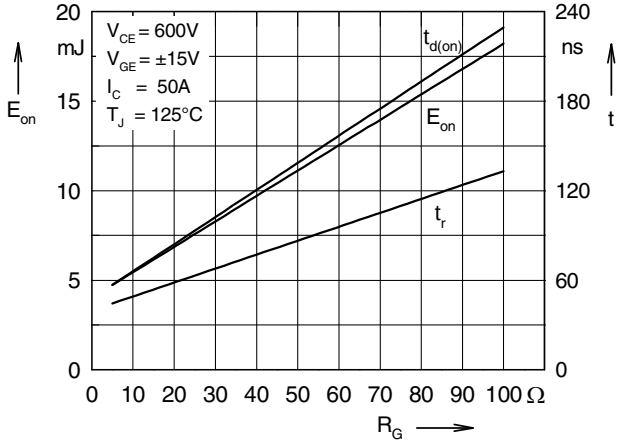


Fig. 9 Typ. turn on energy and switching times versus gate resistor

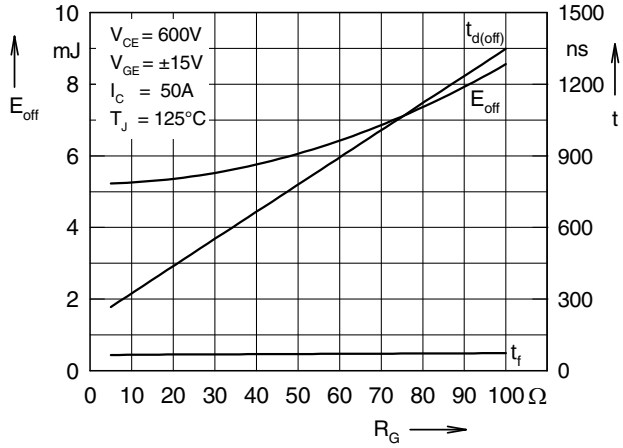


Fig.10 Typ. turn off energy and switching times versus gate resistor

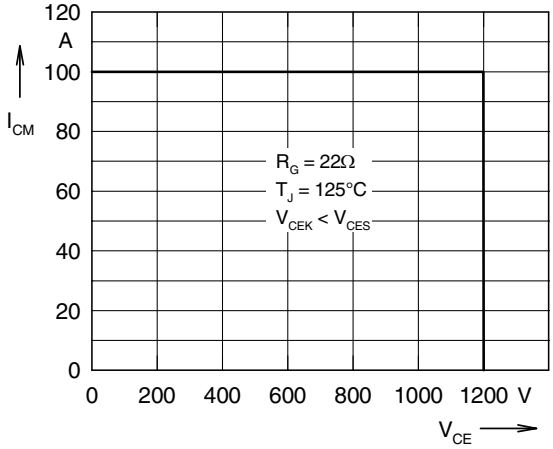


Fig. 11 Reverse biased safe operating area RBSOA

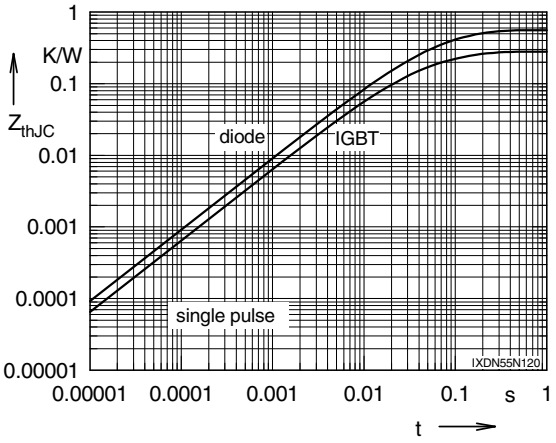


Fig. 12 Typ. transient thermal impedance

203