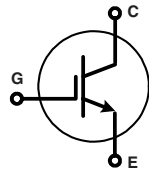


NPT³ IGBT

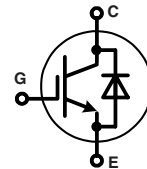
$$I_{C25} = 36 \text{ A}$$

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

$$V_{CE(sat)typ} = 2.6 \text{ V}$$

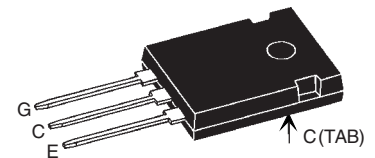


IXEH 25N120



IXEH 25N120D1

TO-247 AD



IGBT

Symbol	Conditions	Maximum Ratings	
V_{CES}	$T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$	1200	V
V_{GES}		± 20	V
I_{C25}	$T_C = 25^{\circ}\text{C}$	36	A
I_{C90}	$T_C = 90^{\circ}\text{C}$	24	A
I_{CM} V_{CEK}	$V_{GE} = \pm 15 \text{ V}; R_G = 68 \Omega; T_{VJ} = 125^{\circ}\text{C}$ RBSOA, Clamped inductive load; $L = 100 \mu\text{H}$	60 V_{CES}	A
t_{SC} (SCSOA)	$V_{CE} = 900\text{V}; V_{GE} = \pm 15 \text{ V}; R_G = 68 \Omega; T_{VJ} = 125^{\circ}\text{C}$ non-repetitive	10	μs
P_{tot}	$T_C = 25^{\circ}\text{C}$	200	W

Features

- NPT³ IGBT
 - positive temperature coefficient of saturation voltage for easy paralleling
 - fast switching
 - short tail current for optimized performance in resonant circuits
- optional HiPerFRED™ diode
 - fast reverse recovery
 - low operating forward voltage
 - low leakage current
- TO-247 package
 - industry standard outline
 - epoxy meets UL 94V-0

Applications

- AC drives
- DC drives and choppers
- Uninterruptible power supplies (UPS)
- switched-mode and resonant-mode power supplies
- inductive heating, cookers

Symbol	Conditions	Characteristic Values ($T_{VJ} = 25^{\circ}\text{C}$, unless otherwise specified)		
		min.	typ.	max.
$V_{CE(sat)}$	$I_C = 25 \text{ A}; V_{GE} = 15 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		2.6 3.2	V V
$V_{GE(th)}$	$I_C = 0.6 \text{ mA}; V_{GE} = V_{CE}$	4.5		6.5 V
I_{CES}	$V_{CE} = V_{CES}; V_{GE} = 0 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		0.2	mA mA
I_{GES}	$V_{CE} = 0 \text{ V}; V_{GE} = \pm 20 \text{ V}$			200 nA
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off}	Inductive load, $T_{VJ} = 125^{\circ}\text{C}$ $V_{CE} = 600 \text{ V}; I_C = 20 \text{ A}$ $V_{GE} = \pm 15 \text{ V}; R_G = 68 \Omega$		205 105 320 175 4.1 1.5	ns ns ns ns mJ mJ
C_{ies}			1.2	nF
Q_{Gon}			100	nC
R_{thJC}				0.63 K/W

Diode [D1 version only]

Symbol	Conditions	Maximum Ratings	
I_{F25}	$T_C = 25^\circ\text{C}$	31	A
I_{F90}	$T_C = 90^\circ\text{C}$	19	A

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
V_F	$I_F = 25\text{ A}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$		2.7 2.1	3.2 V
I_{RM} t_{rr}	$I_F = 15\text{ A}; di_F/dt = -400\text{ A}/\mu\text{s}; T_{VJ} = 125^\circ\text{C}$ $V_R = 600\text{ V}; V_{GE} = 0\text{ V}$		16 130	A ns
R_{thJC}				1.6 K/W

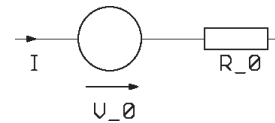
Component

Symbol	Conditions	Maximum Ratings	
T_{VJ}		-55...+150	$^\circ\text{C}$
T_{stg}		-55...+150	$^\circ\text{C}$
M_d	mounting torque	0.8...1.2	Nm

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
R_{thCH}	with heatsink compound	0.25		K/W
Weight		6		g

Equivalent Circuits for Simulation

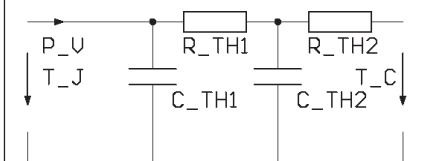
Conduction



IGBT (typ. at $V_{GE} = 15\text{ V}; T_J = 125^\circ\text{C}$)
 $V_0 = 1.09\text{ V}; R_0 = 85\text{ m}\Omega$

Free Wheeling Diode (typ. at $T_J = 125^\circ\text{C}$)
 $V_0 = 1.3\text{ V}; R_0 = 32\text{ m}\Omega$

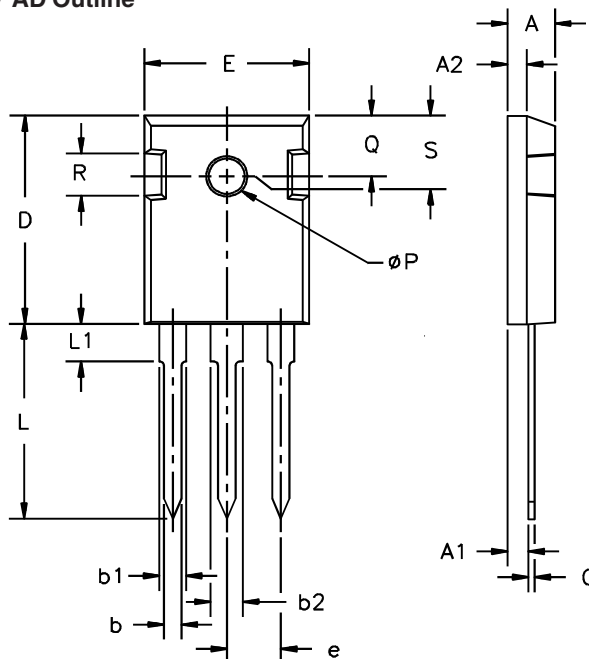
Thermal Response



IGBT (typ.)
 $C_{th1} = 0.004\text{ J/K}; R_{th1} = 0.335\text{ K/W}$
 $C_{th2} = 0.133\text{ J/K}; R_{th2} = 0.295\text{ K/W}$

Free Wheeling Diode (typ.)
 $C_{th1} = 0.004\text{ J/K}; R_{th1} = 1.076\text{ K/W}$
 $C_{th2} = 0.078\text{ J/K}; R_{th2} = 0.524\text{ K/W}$

TO-247 AD Outline



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A ₁	2.2	2.54	.087	.102
A ₂	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b ₁	1.65	2.13	.065	.084
b ₂	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
ØP	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15	BSC	.242	BSC

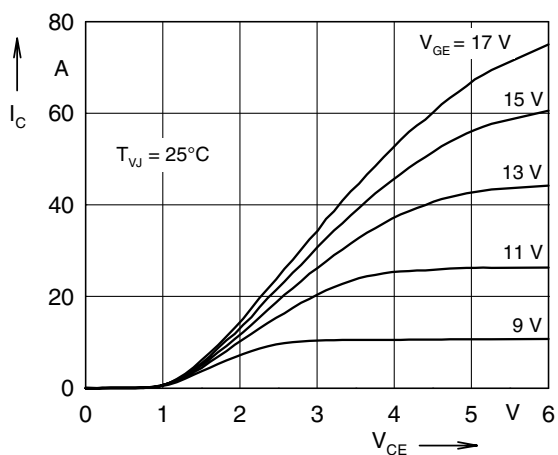


Fig. 1 Typ. output characteristics

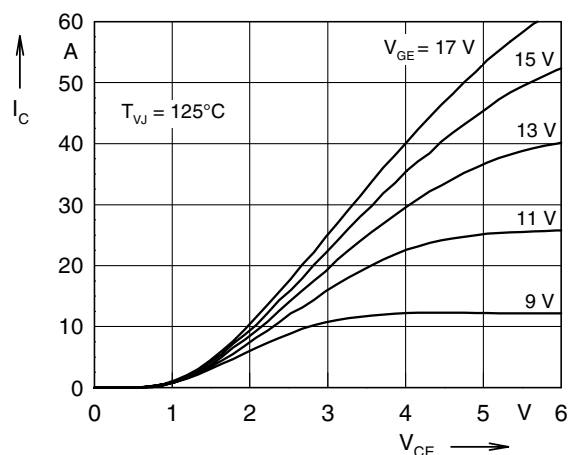


Fig. 2 Typ. output characteristics

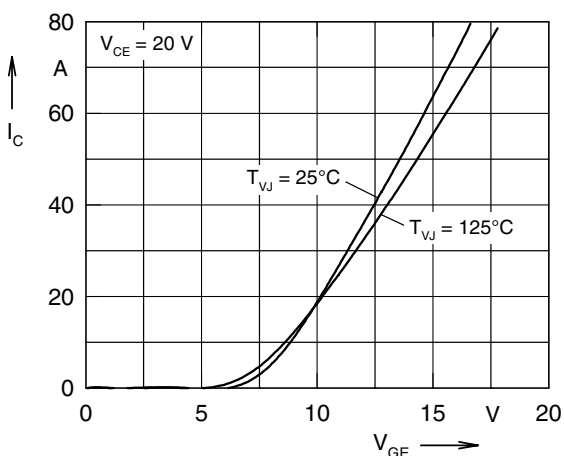


Fig. 3 Typ. transfer characteristics

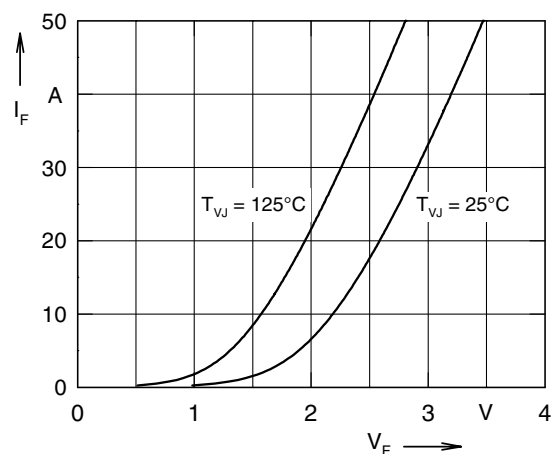


Fig. 4 Typ. forward characteristics of free wheeling diode

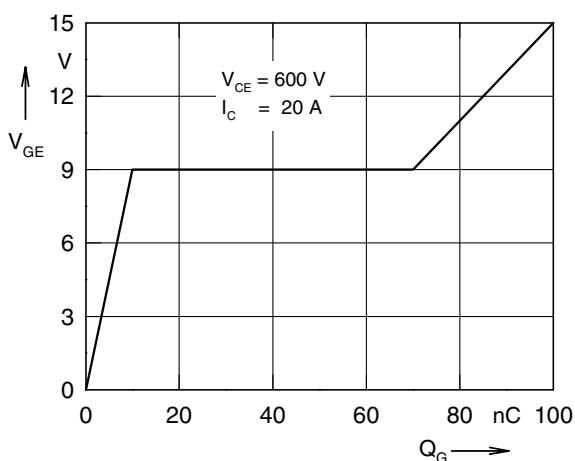


Fig. 5 Typ. turn on gate charge

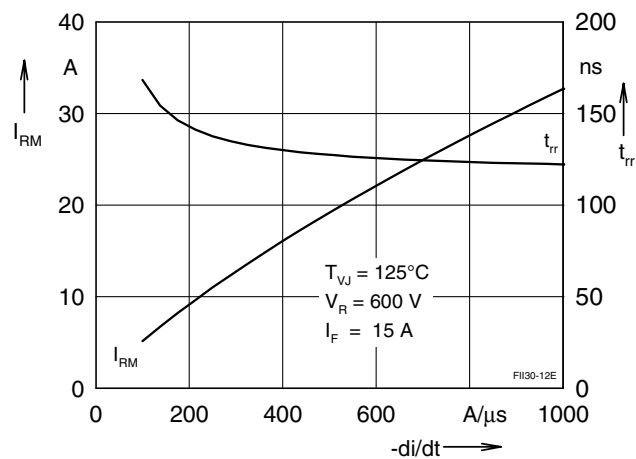


Fig. 6 Typ. turn off characteristics of free wheeling diode

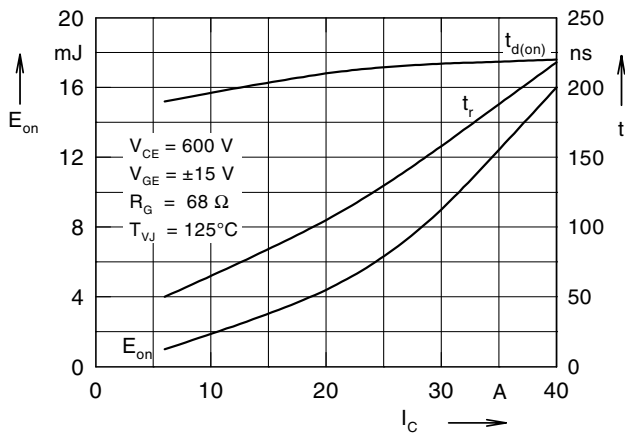


Fig. 7 Typ. turn on energy and switching times versus collector current

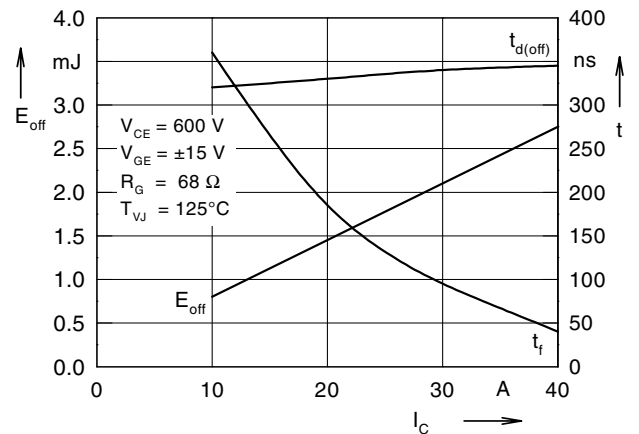


Fig. 8 Typ. turn off energy and switching times versus collector current

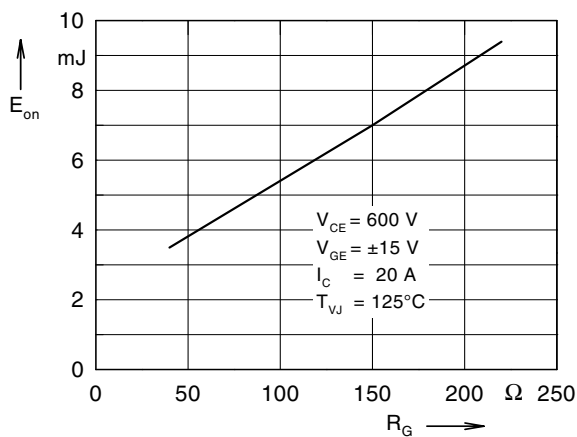


Fig. 9 Typ. turn on energy vs gate resistor

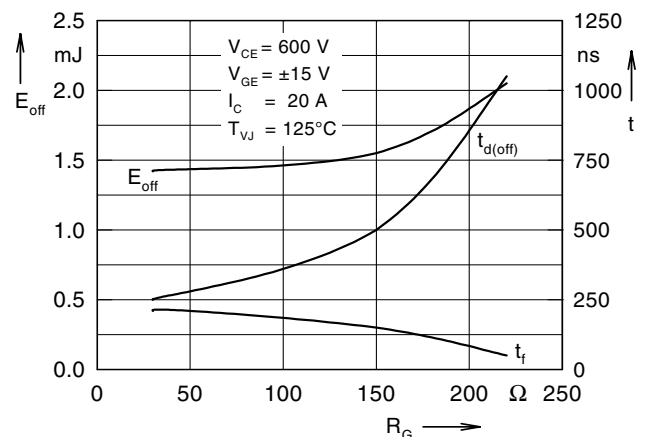


Fig. 10 Typ. turn off energy and switching times versus gate resistor

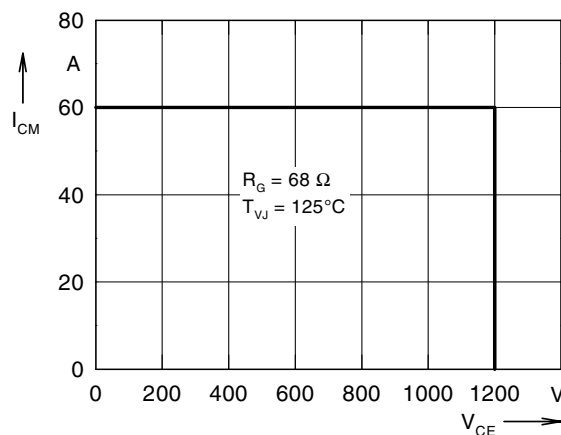


Fig. 11 Reverse biased safe operating area RBSOA

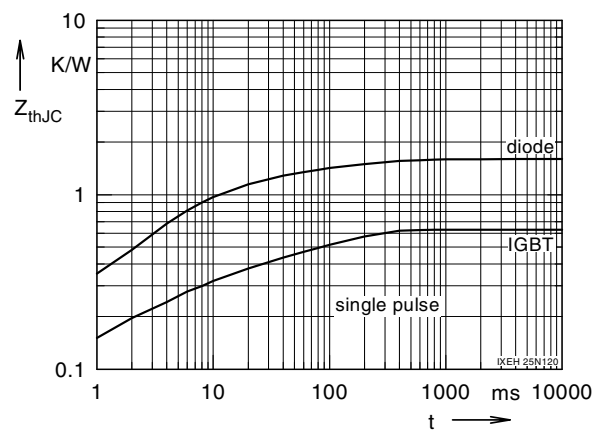


Fig. 12 Typ. transient thermal impedance