

## IGBT Modules in ECO-PAC 2

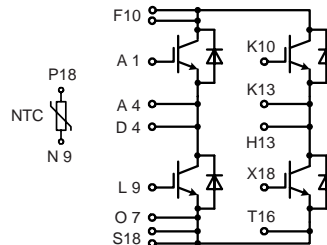
### H-Bridge configuration

Short Circuit SOA Capability  
Square RBSOA

$$I_{C25} = 49 \text{ A}$$

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

$$V_{CE(sat) \text{ typ.}} = 3.1 \text{ V}$$



Pin arrangement see outlines

IGBTs					
Symbol	Conditions	Maximum Ratings			
$V_{CES}$	$T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$	1200	V		
$V_{GES}$		$\pm 20$	V		
$I_{C25}$	$T_C = 25^{\circ}\text{C}$	49	A		
$I_{C80}$	$T_C = 80^{\circ}\text{C}$	33	A		
$I_{CM}$ $V_{CEK}$	$V_{GE} = \pm 15 \text{ V}; R_G = 47 \Omega; T_{VJ} = 125^{\circ}\text{C}$ RBSOA, Clamped inductive load; $L = 100 \mu\text{H}$	50	A		
		$V_{CES}$			
$t_{SC}$ (SCSOA)	$V_{CE} = V_{CES}; V_{GE} = \pm 15 \text{ V}; R_G = 47 \Omega; T_{VJ} = 125^{\circ}\text{C}$ non-repetitive	10	$\mu\text{s}$		
$P_{tot}$	$T_C = 25^{\circ}\text{C}$	208	W		
Symbol	Conditions	Characteristic Values ( $T_{VJ} = 25^{\circ}\text{C}$ , unless otherwise specified)			
		min.	typ.	max.	
$V_{CE(sat)}$	$I_C = 50 \text{ A}; V_{GE} = 15 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		3.1	3.7 V	
				3.5	V
$V_{GE(th)}$	$I_C = 1 \text{ mA}; V_{GE} = V_{CE}$	4.5		6.5 V	
$I_{CES}$	$V_{CE} = V_{CES}; V_{GE} = 0 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$			1.1 mA 4.2 mA	
$I_{GES}$	$V_{CE} = 0 \text{ V}; V_{GE} = \pm 20 \text{ V}$			180 nA	
$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_f$ $E_{on}$ $E_{off}$	Inductive load, $T_{VJ} = 125^{\circ}\text{C}$ $V_{CE} = 600 \text{ V}; I_C = 30 \text{ A}$ $V_{GE} = 15/0 \text{ V}; R_G = 47 \Omega$		100	ns	
				70	ns
				500	ns
				70	ns
				4.6	mJ
				3.4	mJ
$C_{ies}$	$V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}; f = 1 \text{ MHz}$		1.65	nF	
$R_{thJC}$ $R_{thJH}$	(per IGBT) with heatsink compound (0.42 K/m.K; 50 $\mu\text{m}$ )		1.2	0.6 K/W K/W	

### 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
- ultra fast free wheeling diodes
- solderable pins for PCB mounting
- package with copper base plate

### Advantages

- space savings
- reduced protection circuits
- package designed for wave soldering

### Typical Applications

- motor control
  - DC motor armature winding
  - DC motor excitation winding
  - synchronous motor excitation winding
- supply of transformer primary winding
  - power supplies
  - welding
  - X-ray
  - UPS
  - battery charger

IXYS reserves the right to change limits, test conditions and dimensions.

### Reverse diodes (FRED)

Symbol	Conditions	Maximum Ratings	
$I_{F25}$	$T_C = 25^\circ\text{C}$	49	A
$I_{F80}$	$T_C = 80^\circ\text{C}$	31	A

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
$V_F$	$I_F = 30\text{ A}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$	2.4	2.7	V
		1.77		V
$I_{RM}$	$I_F = 30\text{ A}; di_F/dt = 500\text{ A}/\mu\text{s}; T_{VJ} = 125^\circ\text{C}$ $V_R = 600\text{ V}; V_{GE} = 0\text{ V}$	27		A
$t_{rr}$		150		ns
$R_{thJC}$	with heatsink compound (0.42 K/m.K; 50 $\mu\text{m}$ )		1.3	K/W
$R_{thJH}$		2.6		K/W

### Temperature Sensor NTC

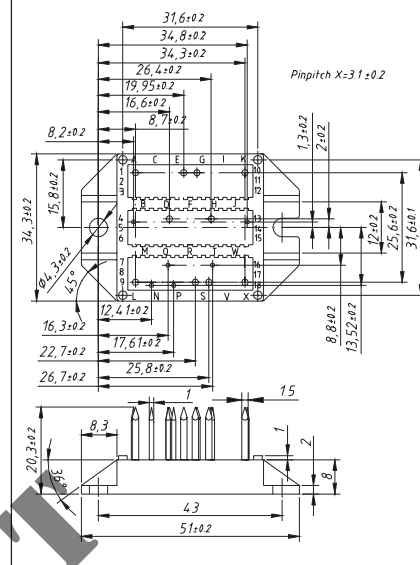
Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
$R_{25}$	$T = 25^\circ\text{C}$	455	470	k $\Omega$
$B_{25/50}$			3474	K

### Module

Symbol	Conditions	Maximum Ratings	
$T_{VJ}$		-40...+150	$^\circ\text{C}$
$T_{stg}$		-40...+150	$^\circ\text{C}$
$V_{ISOL}$	$I_{ISOL} \leq 1\text{ mA}; 50/60\text{ Hz}$	3000	V~
$M_d$	mounting torque (M4)	1.5 - 2.0	Nm
		14 - 18	lb.in.
$a$	Max. allowable acceleration	50	$\text{m/s}^2$

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
$d_s$	Creepage distance on surface (Pin to heatsink)	11.2		mm
$d_A$	Strike distance in air (Pin to heatsink)	11.2		mm
<b>Weight</b>		24		g

Dimensions in mm (1 mm = 0.0394")



Data according to IEC 60747 and refer to a single transistor or diode unless otherwise stated.

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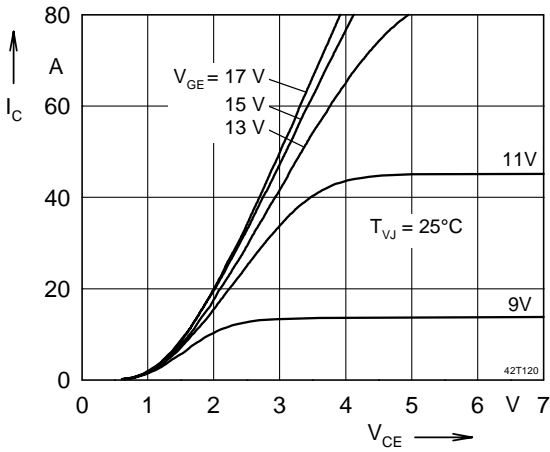


Fig. 1 Typ. output characteristics

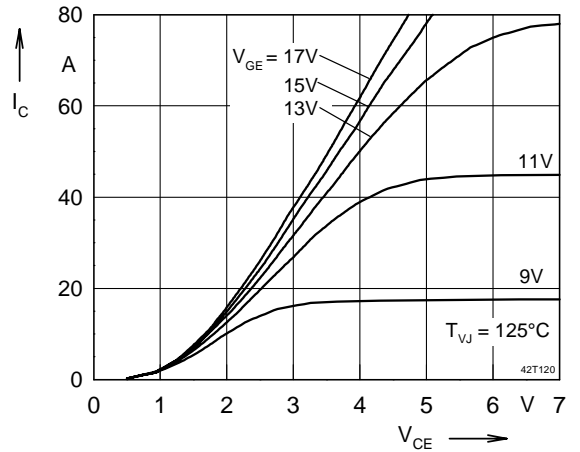


Fig. 2 Typ. output characteristics

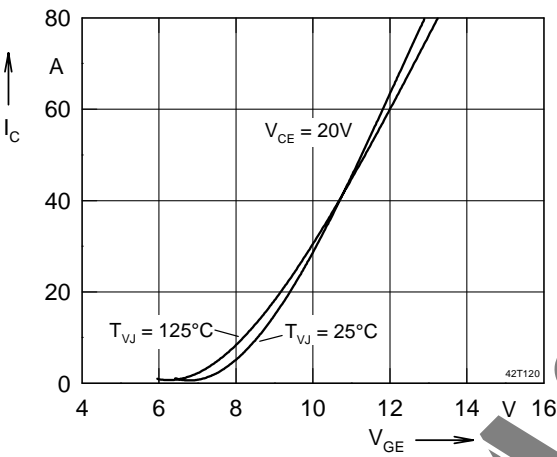


Fig. 3 Typ. transfer characteristics

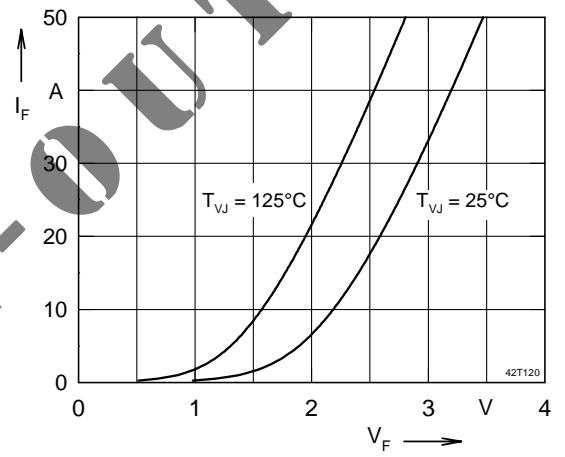


Fig. 4 Typ. forward characteristics of free wheeling diode

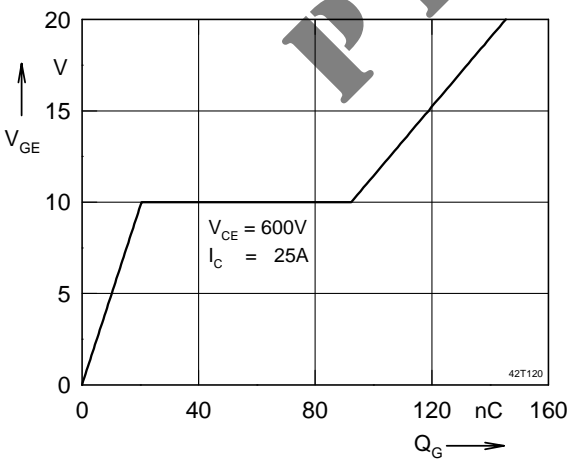


Fig. 5 Typ. turn on gate charge

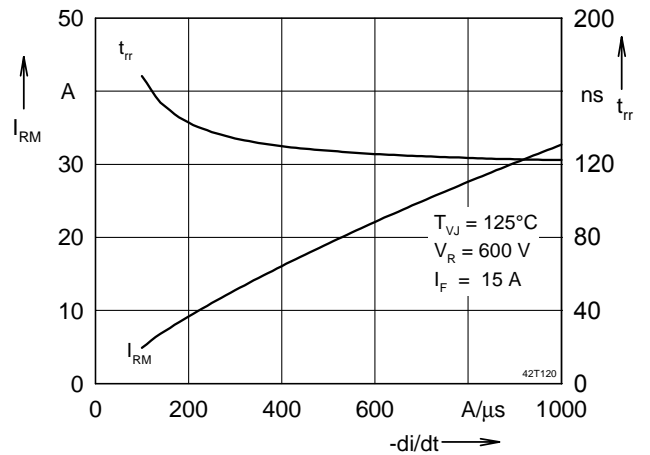


Fig. 6 Typ. turn off characteristics of free wheeling diode

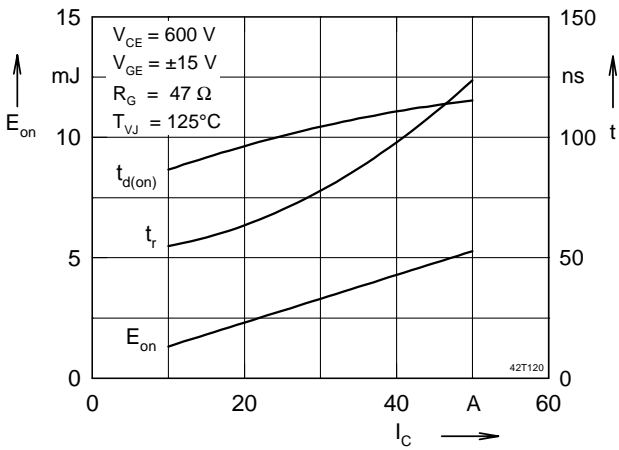


Fig. 7 Typ. turn on energy and switching

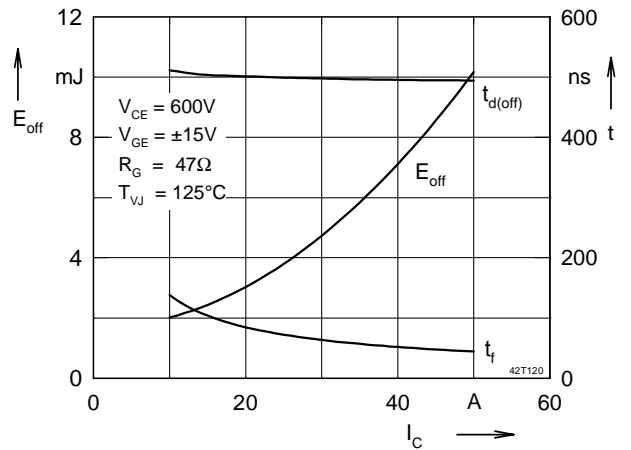


Fig. 8 Typ. turn off energy and switching times versus collector current

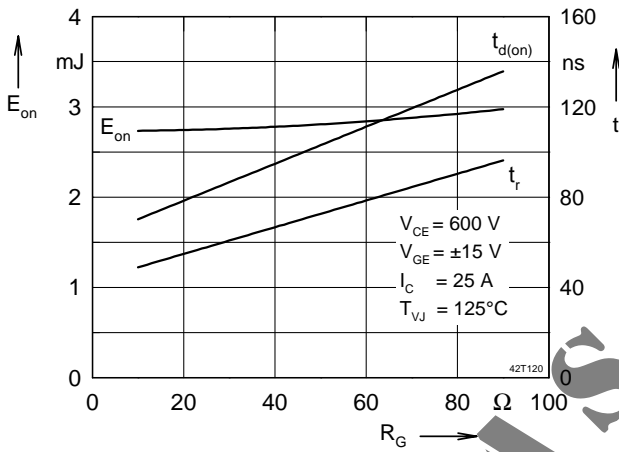


Fig. 9 Typ. turn on energy and switching

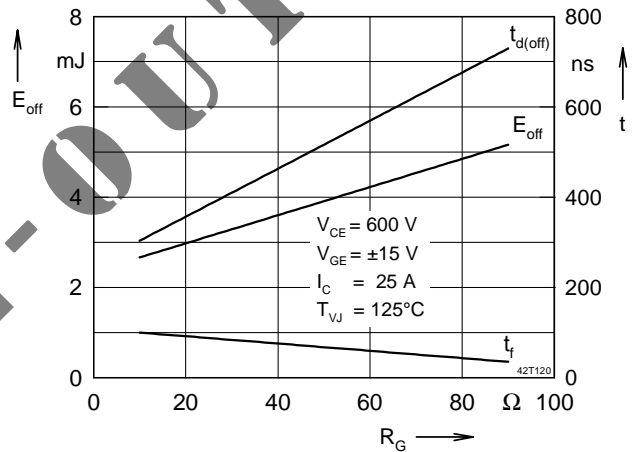


Fig. 10 Typ. turn off energy and switching times versus gate resistor

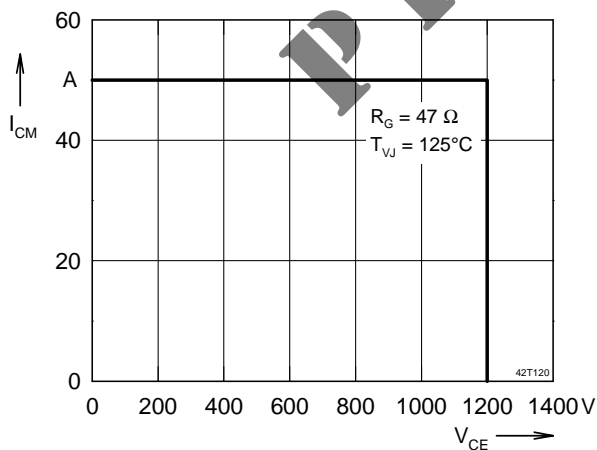


Fig. 11 Reverse biased safe operating area

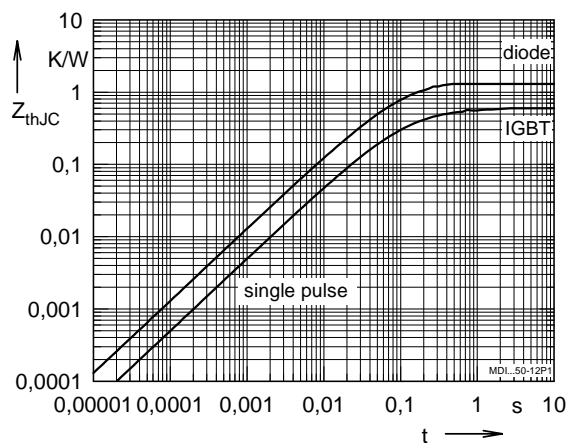


Fig. 12 Typ. transient thermal impedance RBSOA