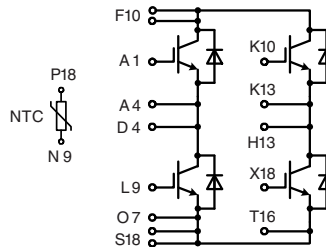


IGBT Modules in ECO-PAC 2

H-Bridge configuration

Short Circuit SOA Capability
Square RBSOA

$$\begin{aligned} I_{C25} &= 69 \text{ A} \\ V_{CES} &= 600 \text{ V} \\ V_{CE(sat) \text{ typ.}} &= 2.3 \text{ V} \end{aligned}$$



Pin arrangement see outlines

IGBTs

Symbol	Conditions	Maximum Ratings	
V_{CES}	$T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$	600	V
V_{GES}		± 20	V
I_{C25}	$T_C = 25^{\circ}\text{C}$	69	A
I_{C80}	$T_C = 80^{\circ}\text{C}$	48	A
I_{CM} V_{CEK}	$V_{GE} = \pm 15 \text{ V}; R_G = 22 \Omega; T_{VJ} = 125^{\circ}\text{C}$ RBSOA, Clamped inductive load; $L = 100 \mu\text{H}$	100	A
t_{SC} (SCSOA)	$V_{CE} = V_{CES}; V_{GE} = \pm 15 \text{ V}; R_G = 22 \Omega; T_{VJ} = 125^{\circ}\text{C}$ non-repetitive	10	μs
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.
$V_{CE(sat)}$	$I_C = 75 \text{ A}; V_{GE} = 15 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		2.3 2.8	2.8 V
$V_{GE(th)}$	$I_C = 1 \text{ mA}; V_{GE} = V_{CE}$	4.5		6.5 V
I_{CES}	$V_{CE} = V_{CES}; V_{GE} = 0 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$			0.8 mA 4.4 mA
I_{GES}	$V_{CE} = 0 \text{ V}; V_{GE} = \pm 20 \text{ V}$			100 nA
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off}	Inductive load, $T_{VJ} = 125^{\circ}\text{C}$ $V_{CE} = 300 \text{ V}; I_C = 40 \text{ A}$ $V_{GE} = 15/0 \text{ V}; R_G = 22 \Omega$		50 55 300 30 1.8 1.4	ns ns ns ns mJ mJ
C_{ies}	$V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}; f = 1 \text{ MHz}$		2.8	nF
R_{thJC} R_{thJH}	(per IGBT) with heatsink compound ($0.42 \text{ K/m.K}; 50 \mu\text{m}$)		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

Reverse diodes (FRED)

Symbol	Conditions	Maximum Ratings	
I_{F25}	$T_C = 25^\circ\text{C}$	56	A
I_{F80}	$T_C = 80^\circ\text{C}$	35	A

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
V_F	$I_F = 40\text{ A}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$		2.32 1.58	2.59 V
I_{RM} t_{rr}	$I_F = 30\text{ A}; di_F/dt = 500\text{ A}/\mu\text{s}; T_{VJ} = 125^\circ\text{C}$ $V_R = 300\text{ V}; V_{GE} = 0\text{ V}$	70	15	ns
R_{thJC} R_{thJH}	with heatsink compound (0.42 K/m.K; 50 μm)		2.6	1.3 K/W

Temperature Sensor NTC

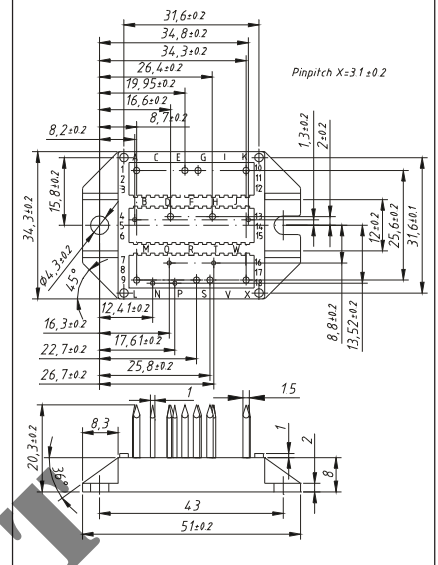
Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
R_{25}	$T = 25^\circ\text{C}$	455	470	485 k Ω
$B_{25/50}$			3474	K

Module

Symbol	Conditions	Maximum Ratings	
T_{VJ}		-40...+150	$^\circ\text{C}$
T_{stg}		-40...+150	$^\circ\text{C}$
V_{ISOL}	$I_{ISOL} \leq 1\text{ mA}; 50/60\text{ Hz}$	8000	V~
M_d	mounting torque (M4)	1.5 - 2.0 14 - 18	Nm lb.in.
a	Max. allowable acceleration	50	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
Weight		24		g

Dimensions in mm (1 mm = 0.0394")



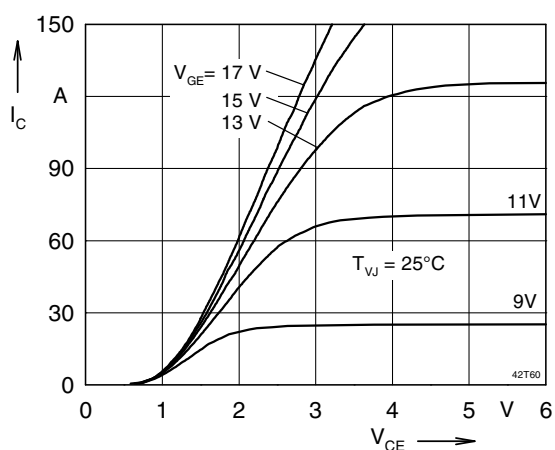


Fig. 1 Typ. output characteristics

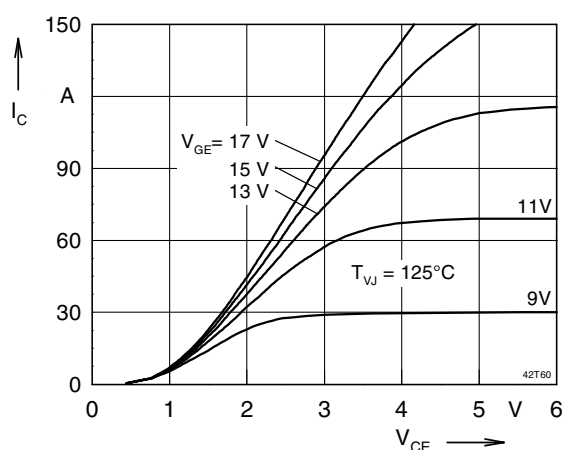


Fig. 2 Typ. output characteristics

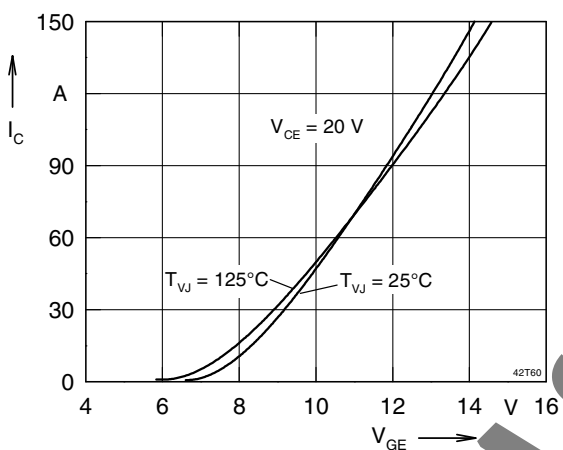


Fig. 3 Typ. transfer characteristics

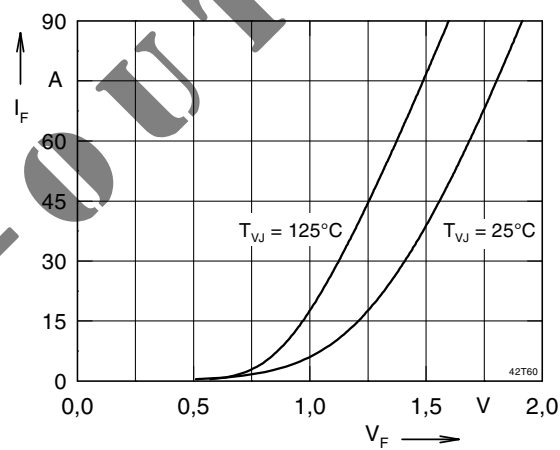


Fig. 4 Typ. forward characteristics of free wheeling diode

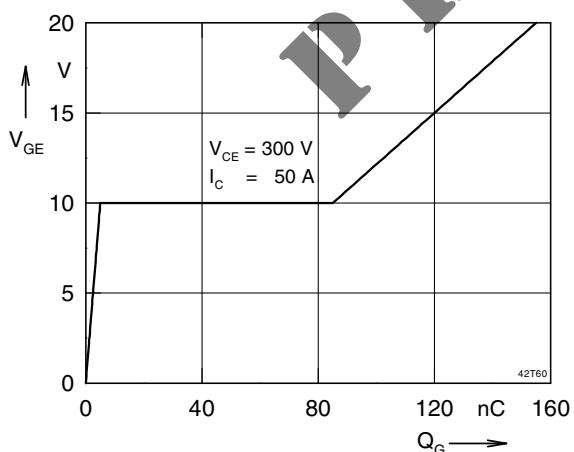


Fig. 5 Typ. turn on gate charge

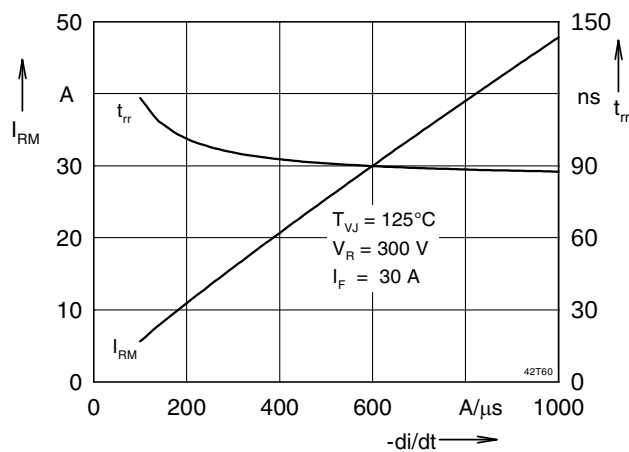


Fig. 6 Typ. turn off characteristics of free wheeling diode

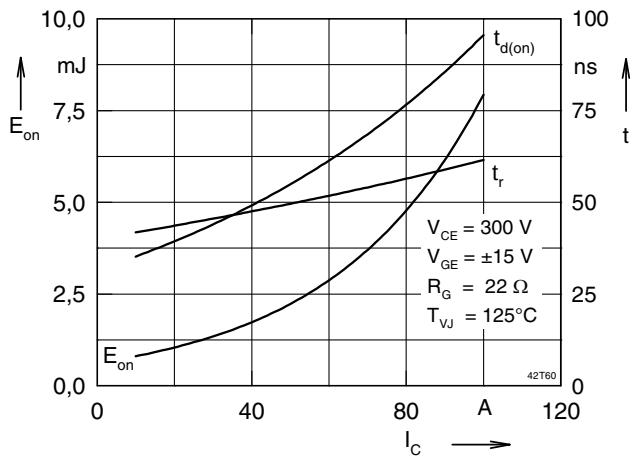


Fig. 7 Typ. turn on energy and switching

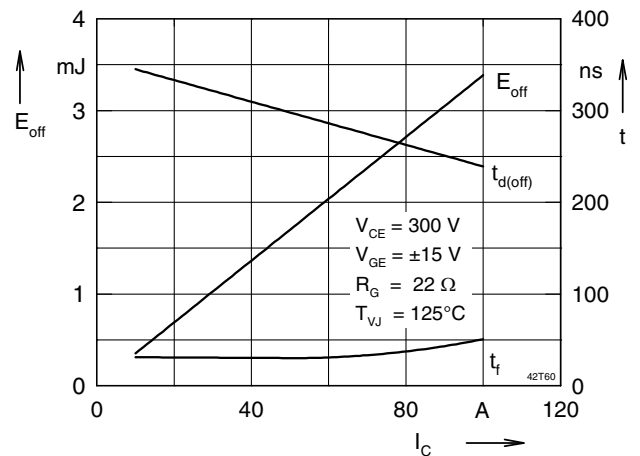


Fig. 8 Typ. turn off energy and switching times versus collector current times versus collector current

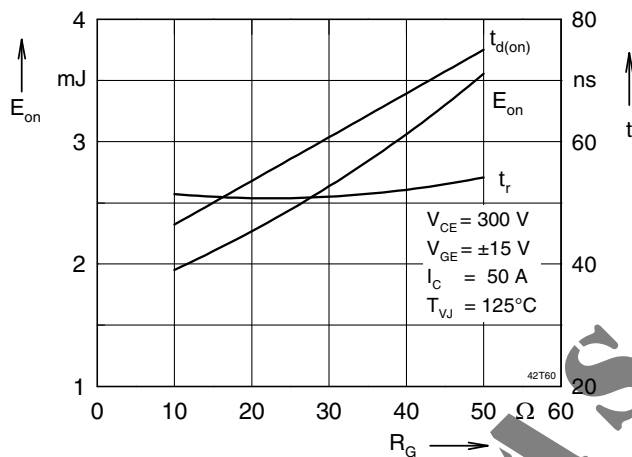


Fig. 9 Typ. turn on energy and switching

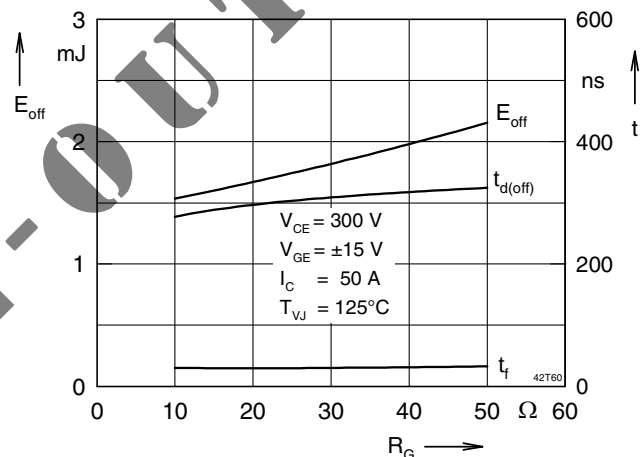


Fig. 10 Typ. turn off energy and switching times versus gate resistor times versus gate resistor

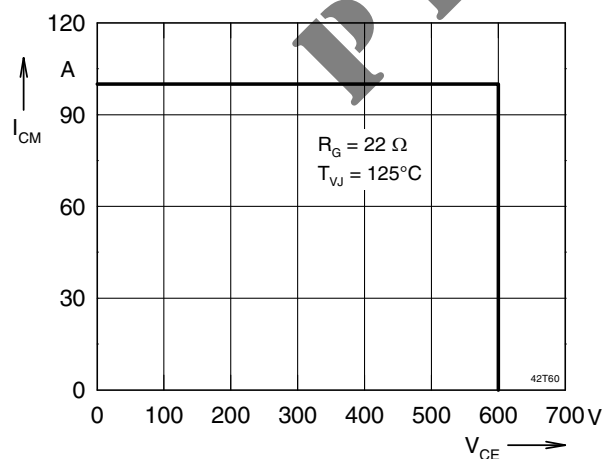


Fig. 11 Reverse biased safe operating area

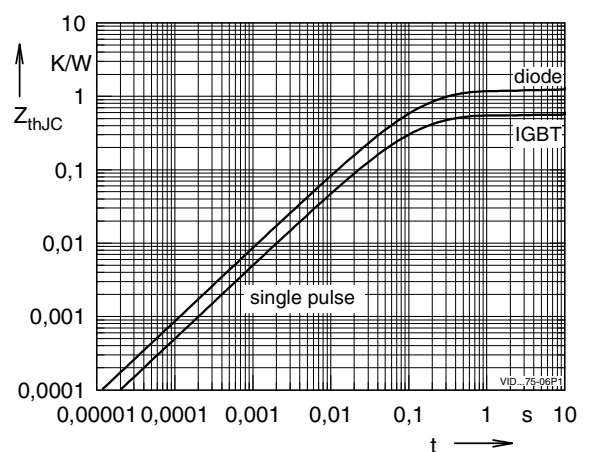


Fig. 12 Typ. transient thermal impedance RBSOA