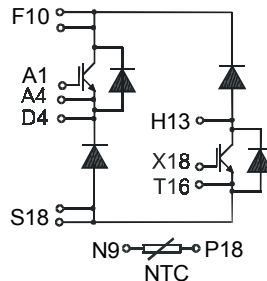


IGBT Module

PSHI 50D/12*

Preliminary Data Sheet

Short Circuit SOA Capability
Square RBSOA



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

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

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



PSHI 50D/12*

IGBTs

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}	$T_C = 25^{\circ}\text{C}$	49	A
I_{C80}	$T_C = 80^{\circ}\text{C}$	33	A
I_{CM}	$V_{GE} = \pm 15 \text{ V}; R_G = 47 \Omega; T_{VJ} = 125^{\circ}\text{C}$ RBSOA, Clamped inductive load; $L = 100 \mu\text{H}$	50	A
V_{CEK}		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	μs
P_{tot}	$T_C = 25^{\circ}\text{C}$	208	W

*NTC optional

Features

- NPT IGBT technology
- low saturation voltage
- low switching losses
- square RBSOA, no latch up
- high short circuit capability
- positive temperature coefficient for easy parallelling
- MOS input, voltage controlled
- ultra fast free wheeling diodes
- solderable pins for PCB mounting
- package with copper base plate
- Isolation voltage 3000 V~
- UL registered, E 148688

Advantages

- space and weight savings
- reduced protection circuits
- package designed for wave soldering
- High power density
- Easy to mount with two screws

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

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
$t_{d(on)}$	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
t_r		70		ns
$t_{d(off)}$		500		ns
t_f		70		ns
E_{on}		4.6		mJ
E_{off}		3.4		mJ
C_{ies}	$V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}; f = 1 \text{ MHz}$	1.65		nF
R_{thJC}	(per IGBT)		0.6	K/W
R_{thJH}	with heatsink compound (0.42 K/m.K; 50 μm)	1.2		K/W

Caution: These Devices are sensitive to electrostatic discharge. Users should observe proper ESD handling precautions.

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 1.77	V V
I_{RM} t_{tr}	$I_F = 30\text{ A}; di_F/dt = 500\text{ A}/\mu\text{s}; T_{VJ} = 125^\circ\text{C}$ $V_R = 600\text{ V}; V_{GE} = 0\text{ V}$		27 150	A ns
R_{thJC} R_{thJH}	with heatsink compound (0.42 K/m.K; 50 μm)		2.6	1.3 K/W K/W

Temperature Sensor NTC

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

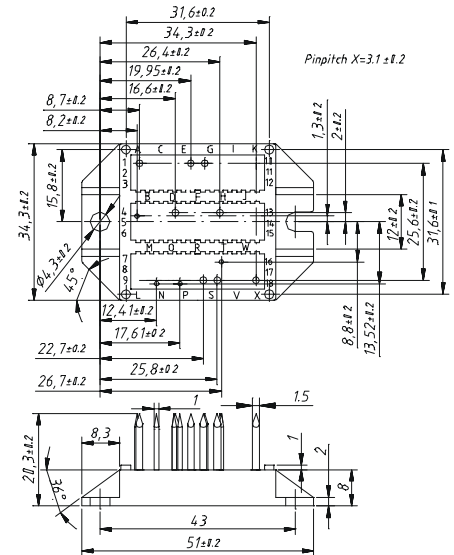
Module

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

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

Package style and outline

Dimensions in mm (1mm = 0.0394")



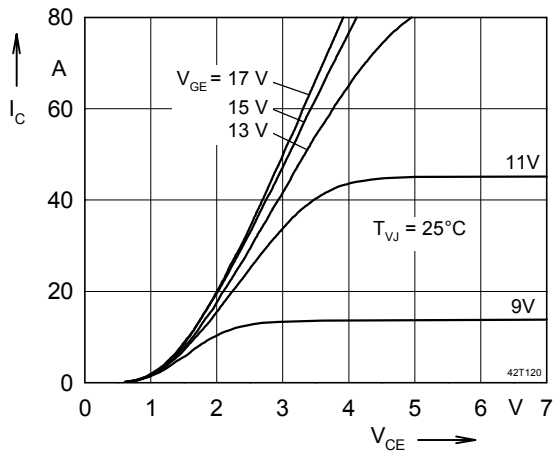


Fig. 1 Typ. output characteristics

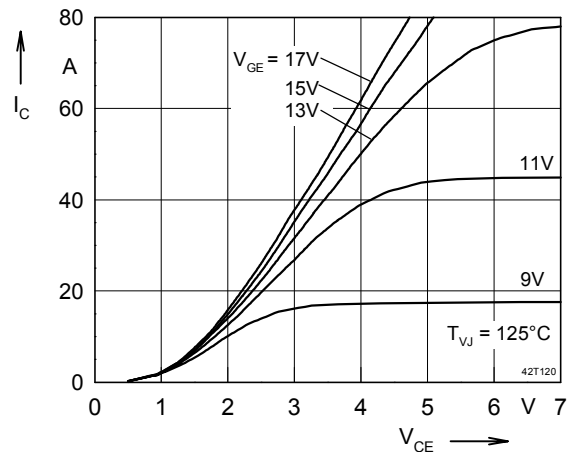


Fig. 2 Typ. output characteristics

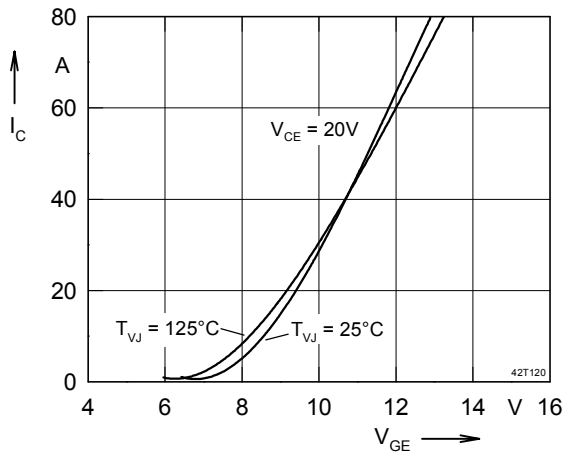


Fig. 3 Typ. transfer characteristics

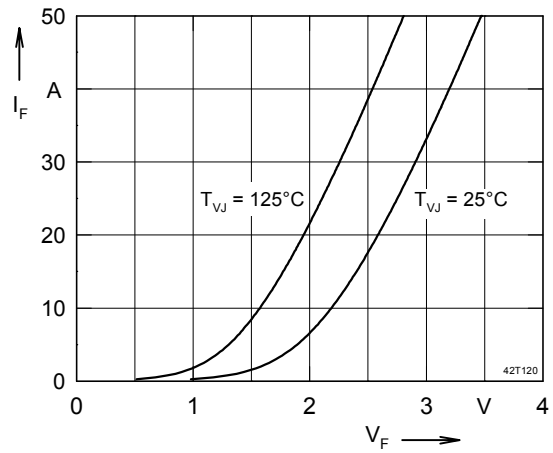


Fig. 4 Typ. forward characteristics of free wheeling diode

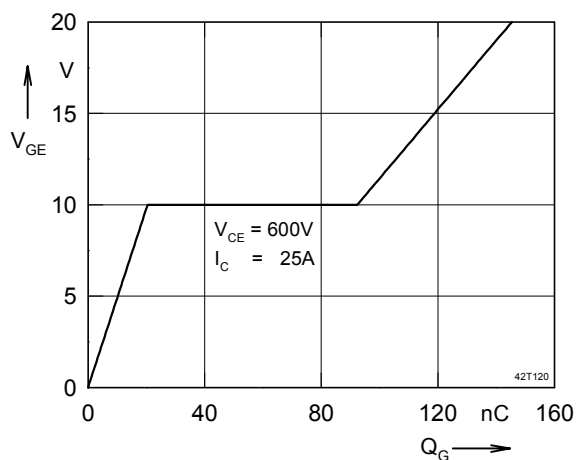


Fig. 5 Typ. turn on gate charge

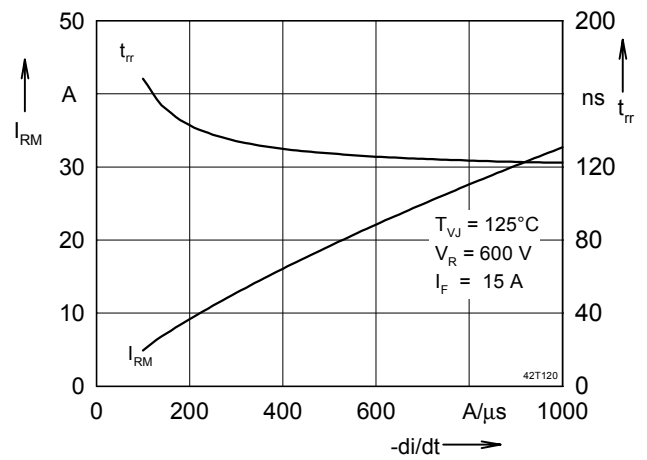


Fig. 6 Typ. turn off characteristics of free wheeling diode

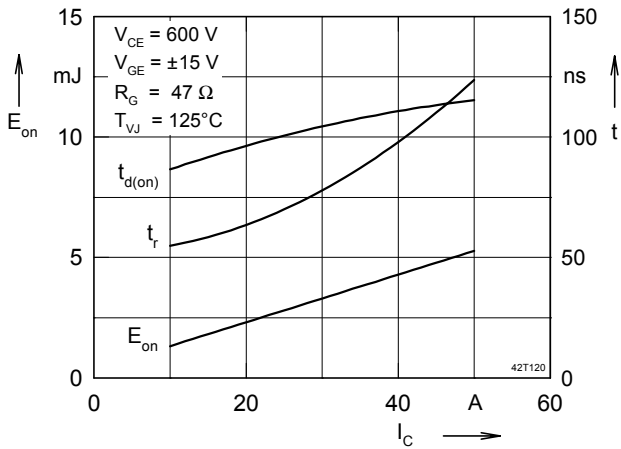


Fig. 7 Typ. turn on energy and switching

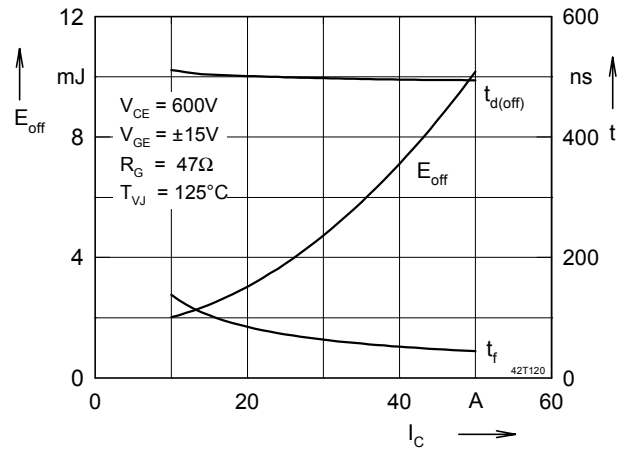


Fig. 8 Typ. turn off energy and switching times versus collector current times versus collector current

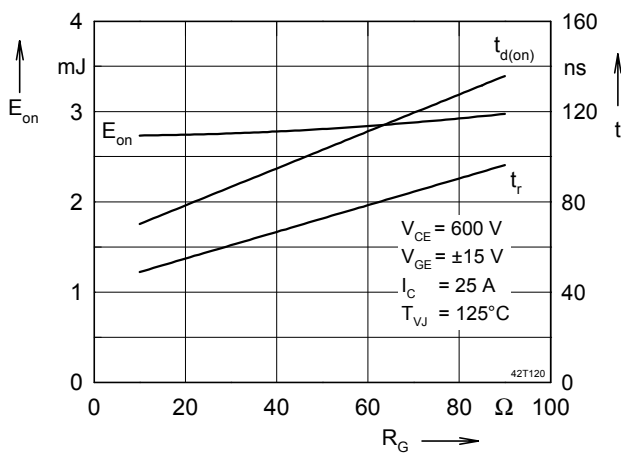


Fig. 9 Typ. turn on energy and switching

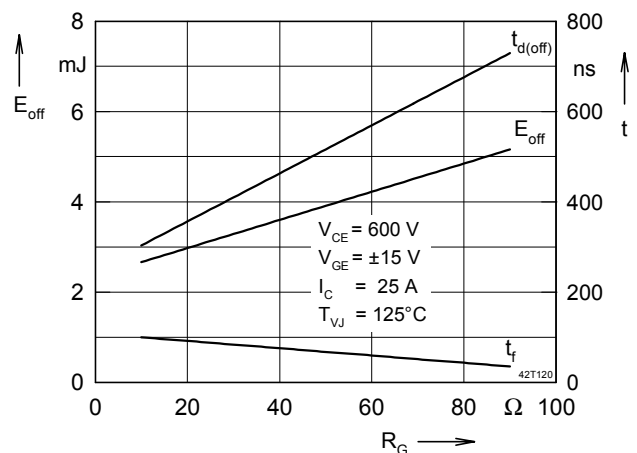


Fig. 10 Typ. turn off energy and switching times versus gate resistor times versus gate resistor

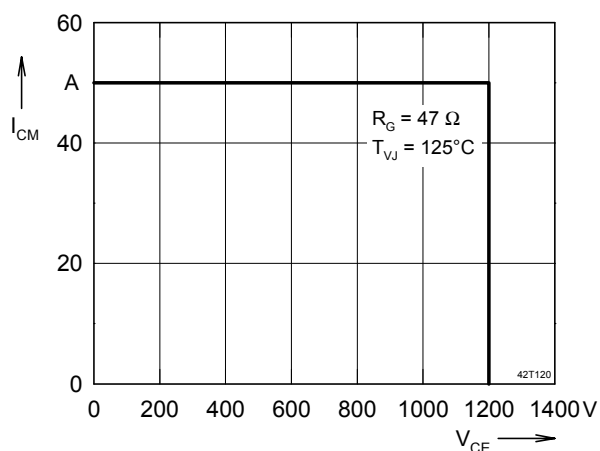


Fig. 11 Reverse biased safe operating area

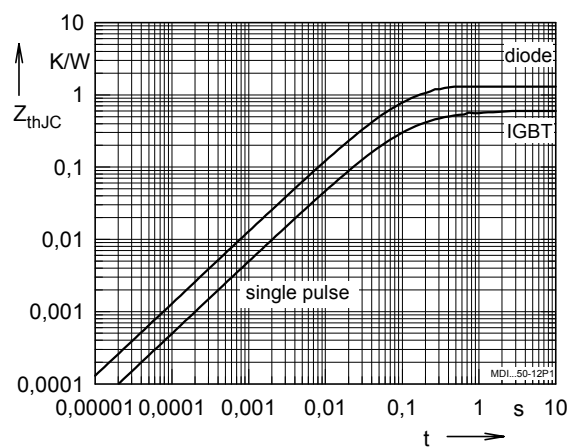


Fig. 12 Typ. transient thermal impedance RBSOA