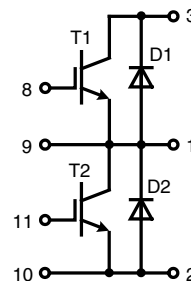


# IGBT Module phaseleg

$I_{C25} = 280 \text{ A}$   
 $V_{CES} = 1200 \text{ V}$   
 $V_{CE(sat) \text{ typ.}} = 2.2 \text{ V}$

Preliminary data



IGBTs T1 - T2		Maximum Ratings	
Symbol	Conditions		
$V_{CES}$	$T_{VJ} = 25^\circ\text{C to } 125^\circ\text{C}$	1200	V
$V_{GES}$		$\pm 20$	V
$I_{C25}$	$T_C = 25^\circ\text{C}$	280	A
$I_{C80}$	$T_C = 80^\circ\text{C}$	200	A
$I_{CM}$	$V_{GE} = \pm 15 \text{ V}; R_G = 7.5 \Omega; T_{VJ} = 125^\circ\text{C}$	300	A
$V_{CEK}$	<b>RBSOA</b> Clamped inductive load; $L = 100 \mu\text{H}$	$V_{CES}$	
$t_{SC}$ (SCSOA)	$V_{CE} = 900 \text{ V}; V_{GE} = \pm 15 \text{ V}; R_G = 7.5 \Omega$ $T_{VJ} = 125^\circ\text{C};$ non-repetitive	10	$\mu\text{s}$
$P_{tot}$	$T_C = 25^\circ\text{C}$	1100	W

### Features

- NPT<sup>3</sup> IGBT
  - low saturation voltage
  - positive temperature coefficient
  - fast switching
  - short tail current for optimized performance in resonant circuits
- HiPerFRED™ diodes
  - fast and soft reverse recovery
  - low operating forward voltage
  - low leakage current
- Package
  - low inductive current path
  - screw connection to high current main terminals
  - use of non interchangeable connectors for auxiliary terminals possible
  - kelvin emitter terminal for easy drive
  - isolated ceramic base plate

Symbol	Conditions	Characteristic Values				
		$(T_{VJ} = 25^\circ\text{C}, \text{ unless otherwise specified})$				
		min.	typ.	max.		
$V_{CE(sat)}$	$I_C = 200 \text{ A}; V_{GE} = 15 \text{ V};$ $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$		2.2 2.6	2.8	V V	
$V_{GE(th)}$	$I_C = 6 \text{ mA}; V_{GE} = V_{CE}$	4.5	5.5	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 3.5	3.3	mA mA	
$I_{GES}$	$V_{CE} = 0 \text{ V}; V_{GE} = \pm 20 \text{ V}$			400	nA	
$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_f$ $E_{on}$ $E_{off}$	Inductive load, $T_{VJ} = 125^\circ\text{C}$ $V_{CE} = 600 \text{ V}; I_C = 200 \text{ A}$ $V_{GE} = \pm 15 \text{ V}; R_G = 7.5 \Omega$		170 60 680 50 29 20		ns ns ns ns mJ mJ	
$C_{ies}$		$V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}; f = 1 \text{ MHz}$		11		nF
$Q_{Gon}$		$V_{CE} = 600 \text{ V}; V_{GE} = 15 \text{ V}; I_C = 200 \text{ A}$		1.16		$\mu\text{C}$
$R_{thJC}$		(per IGBT)			0.11	K/W
$R_{thJH}$		with heatsink compound		0.22		K/W

### Applications

- drives
  - AC
  - DC
- power supplies
  - rectifiers with power factor correction and recuperation capability
  - UPS

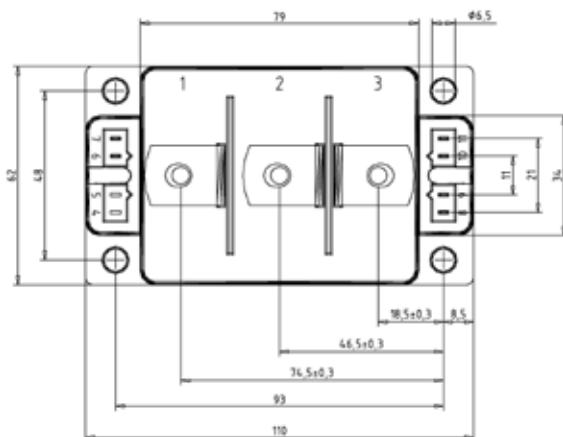
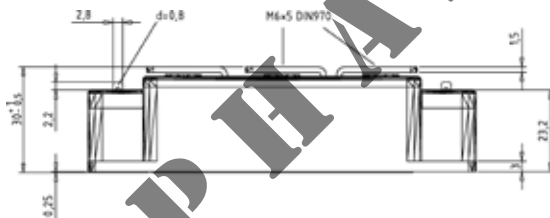
### Free wheeling diodes D1 - D2

Symbol	Conditions	Maximum Ratings			
$I_{F25}$	$T_C = 25^\circ\text{C}$	300	A		
$I_{F80}$	$T_C = 80^\circ\text{C}$	190	A		
Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
$V_F$	$I_F = 200\text{ A}; V_{GE} = 0\text{ V};$	$T_{VJ} = 25^\circ\text{C}$	2.3	2.7	V
		$T_{VJ} = 125^\circ\text{C}$	1.7		V
$I_{RM}$ $t_{rr}$	$I_F = 150\text{ A}; di_F/dt = 1500\text{ A}/\mu\text{s};$ $V_R = 600\text{ V}; V_{GE} = 0\text{ V};$	$T_{VJ} = 125^\circ\text{C}$	160		A
			220		ns
$R_{thJC}$ $R_{thJH}$	(per IGBT) with heatsink compound		0.45	0.23	K/W K/W

### Module

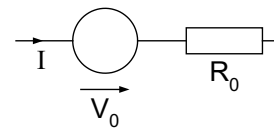
Symbol	Conditions	Maximum Ratings			
$T_{VJ}$	operating	-40...+150	$^\circ\text{C}$		
$T_{stg}$		-40...+125	$^\circ\text{C}$		
$V_{ISO}$	$I_{ISOL} \leq 1\text{ mA}; 50/60\text{ Hz}$	4000	V~		
$M_d$	Mounting torque (module, M6) (terminal, M6)	2.25 - 2.75	Nm		
		4.5 - 5.5	Nm		
Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
$d_s$	Creepage distance on surface	2			mm
$d_A$	Strike distance in air	2			mm
<b>Weight</b>		250	g		

Dimensions in mm (1 mm = 0.0394")



### Equivalent Circuits for Simulation

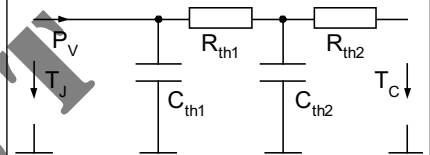
#### Conduction



IGBT (typ. at  $V_{GE} = 15\text{ V}; T_J = 125^\circ\text{C}$ )  
 $V_0 = 1.0\text{ V}; R_0 = 8\text{ m}\Omega$

Free Wheeling Diode D1-D2 (typ. at  $T_J = 125^\circ\text{C}$ )  
 $V_0 = 1.3\text{ V}; R_0 = 2\text{ m}\Omega$

#### Thermal Response



IGBT (typ.)

$C_{th1} = tbd\text{ J/K}; R_{th1} = tbd\text{ K/W}$   
 $C_{th2} = tbd\text{ J/K}; R_{th2} = tbd\text{ K/W}$

Free Wheeling Diode D1-D2 (typ.)

$C_{th1} = tbd\text{ J/K}; R_{th1} = tbd\text{ K/W}$   
 $C_{th2} = tbd\text{ J/K}; R_{th2} = tbd\text{ K/W}$

### Optional accessories for modules

keyed twin plugs  
(UL758, style 1385, CSA class 5851,  
guide 460-1-1)

- Type ZY180L with wire length 350mm  
– for pins 4 (yellow wire) and 5 (red wire)  
– for pins 11 (yellow wire) and 10 (red wire)
- Type ZY180R with wire length 350mm  
– for pins 7 (yellow wire) and 6 (red wire)  
– for pins 8 (yellow wire) and 9 (red wire)