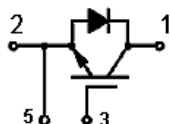


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IGBT modules



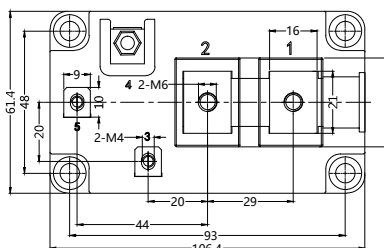
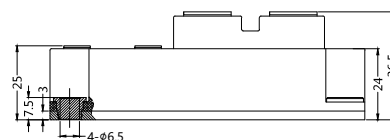
$V_{CES}=1200V$

$I_{C100}=600A$

$V_{CE(sat)}\leq 1.9V$

$t_{fi(typ)}=0.18\mu s$

Dimensions in mm (1mm = 0.0394")



IGBT

Symbol	Test Conditions	Maximum Ratings	Unit
V_{CES} V_{CGR}	$T_J=25^{\circ}C$ to $150^{\circ}C$ $T_J=25^{\circ}C$ to $150^{\circ}C$; $R_{GE}=1 M\Omega$;	1200 1200	V
V_{GES} V_{GEM}	Continuous Transient	± 20 ± 30	V
I_{C25} I_{C100} I_{CM}	$T_C=25^{\circ}C$; limited by leads $T_C=100^{\circ}C$ $T_C=25^{\circ}C$, 1 ms	900 600 1200	A
P_{tot}	$T_C=25^{\circ}C$	2800	W
T_J T_{JM} T_{stg}		-40...+150 150 -40...+125	$^{\circ}C$
V_{ISO}	AC; 50Hz; $t=1min$	3000	V
M_d	Mounting torque (M6) Mounting torque (M4)	2.5~5.0 1.1~2.0	Nm
Weight	Typical	340	g

($T_J=25^{\circ}C$, unless otherwise specified)

Symbol	Test Conditions	Characteristic Values			Unit
		min.	typ.	max.	
BV_{CES}	$I_C=1mA$; $V_{GE}=0V$	1200			V
$V_{GE(th)}$	$I_C=24mA$; $V_{CE}=V_{GE}$	5.0	5.8	6.5	V
I_{CES}	$V_{CE}=V_{CES}$; $T_J=25^{\circ}C$			0.50	mA
	$V_{GE}=0V$; $T_J=125^{\circ}C$			5.00	mA
I_{GES}	$V_{CE}=0V$; $V_{GE}=\pm 20V$			± 400	nA
$V_{CE(sat)}$	$I_C=I_{C100}=600A$; $V_{GE}=15V$		1.70	2.15	V

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(T_J=25°C, unless otherwise specified)

Symbol	Test Conditions	Characteristic Values			Unit
		min.	typ.	max.	
I _{C(ON)}	V _{GE} =10V; V _{CE} =10V		600		A
C _{ies} C _{oes} C _{res}	V _{CE} =25V; V _{GE} =0V; f=1MHz		37200 2320 2040		pF
Q _g	I _C =I _{C90} ; V _{GE} =15V; V _{CE} =0.5V _{CES}		3400		nC
t _{d(on)} t _{ri} E _{on} t _{d(off)} t _{fi} E _{off}	Inductive load, T _J =25°C I _C =I _{C90} ; V _{GE} =15V; V _{CE} =0.8V _{CES} ; R _G =R _{off} =5Ω Remarks: Switching times may increase for V _{CE} (Clamp) > 0.8V _{CES} higher T _J or increased R _G		0.25 0.09 33 0.55 0.13 58		us us mJ us us mJ
t _{d(on)} t _{ri} E _{on} t _{d(off)} t _{fi} E _{off}	Inductive load, T _J =125°C I _C =I _{C90} ; V _{GE} =15V; V _{CE} =0.8V _{CES} ; R _G =R _{off} =5Ω Remarks: Switching times may increase for V _{CE} (Clamp) > 0.8V _{CES} higher T _J or increased R _G		0.30 0.10 50 0.65 0.18 88		us us mJ us us mJ
R _{thJC}				0.045	K/W
R _{thCK}			0.016		K/W

Reverse Diode (FRED)

(T_J=25°C, unless otherwise specified)

Symbol	Test Conditions	Characteristic Values			Unit
		min.	typ.	max.	
V _F	I _F =600A; T _{VJ} =150°C T _{VJ} =25°C		1.65 1.65	2.15	V
I _{RM}	V _R =100V; I _F =50A; -di _F /dt=100A/us L≤0.05uH; T _{VJ} =100°C		540		A
Q _{rr}	I _F =600A; -di _F /dt=5500A/us; V _R =600V; T _J =150°C		92		uC
R _{thJC}	per diode			0.086	K/W

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IGBT modules

Features

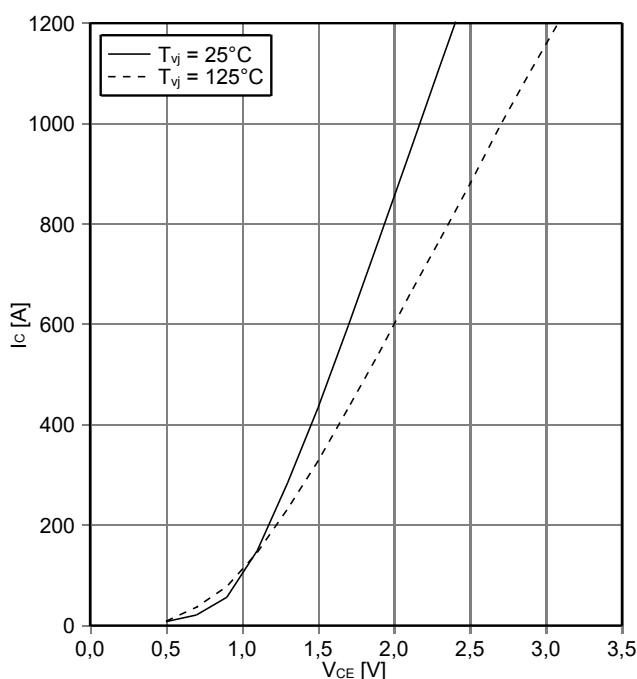
- Trench Field Stop IGBT technology
- Low switching losses
- Switching frequency up to 20 kHz
- High short circuit capability
- Positive temperature coefficient for easy parallelling
- MOS input, voltage controlled
- Ultra fast free wheeling diodes
- RoHS Compliant
- Plastic Material meets UL 94V-0

Application

- AC and DC motor control
- AC servo and robot drives
- power supplies
- welding inverters
- UPS

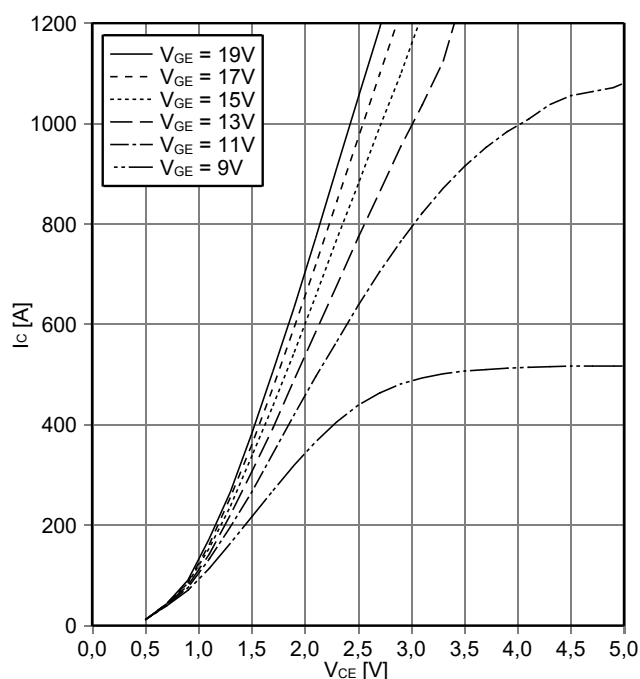
Advantages

- space and weight savings
- reduced protection circuits



Output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$
 $V_{GE} = 15\text{ V}$

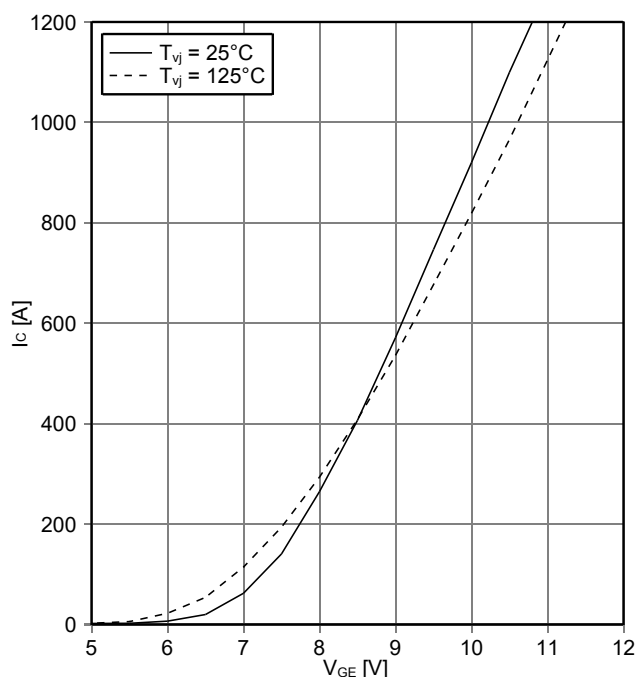


Output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$
 $T_{vj} = 125^\circ\text{C}$

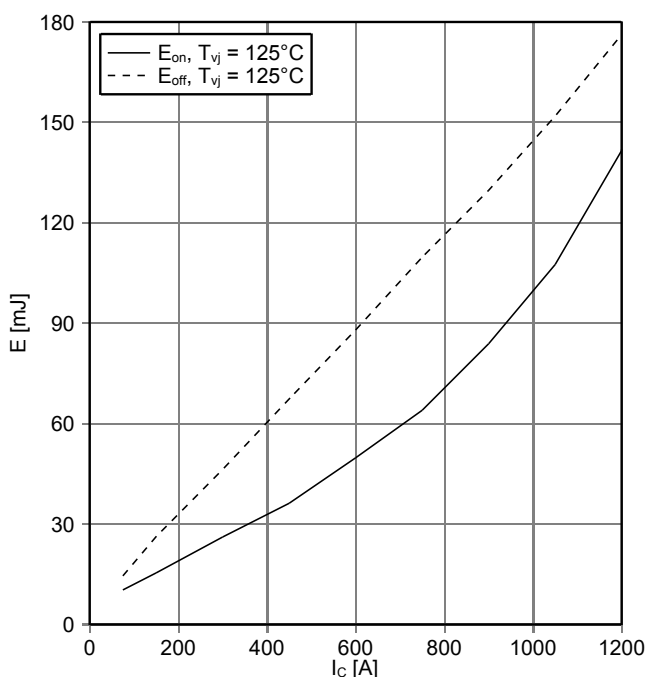
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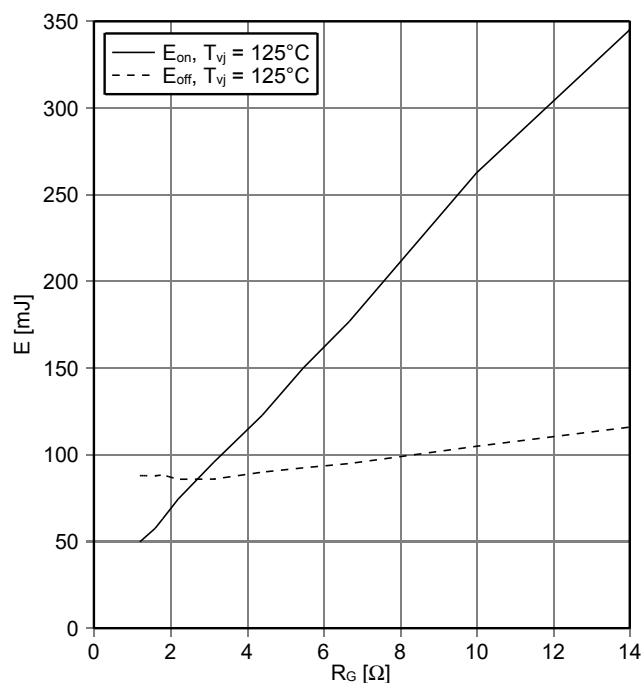
Transfer characteristic IGBT, Inverter (typical)

$I_C = f(V_{GE})$
 $V_{CE} = 20\text{ V}$



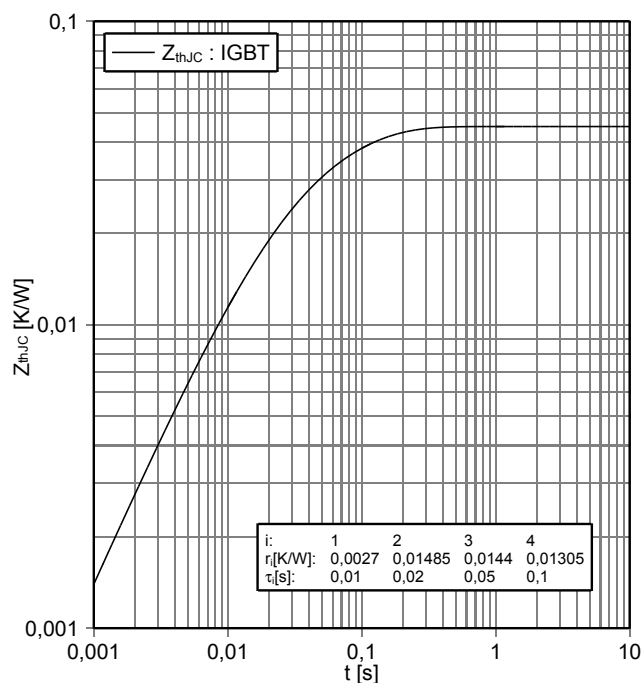
Switching losses IGBT, Inverter (typical)

$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 1.2\ \Omega$, $R_{Goff} = 1.2\ \Omega$, $V_{CE} = 600\text{ V}$



Switching losses IGBT, Inverter (typical)

$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
 $V_{GE} = \pm 15\text{ V}$, $I_C = 600\text{ A}$, $V_{CE} = 600\text{ V}$

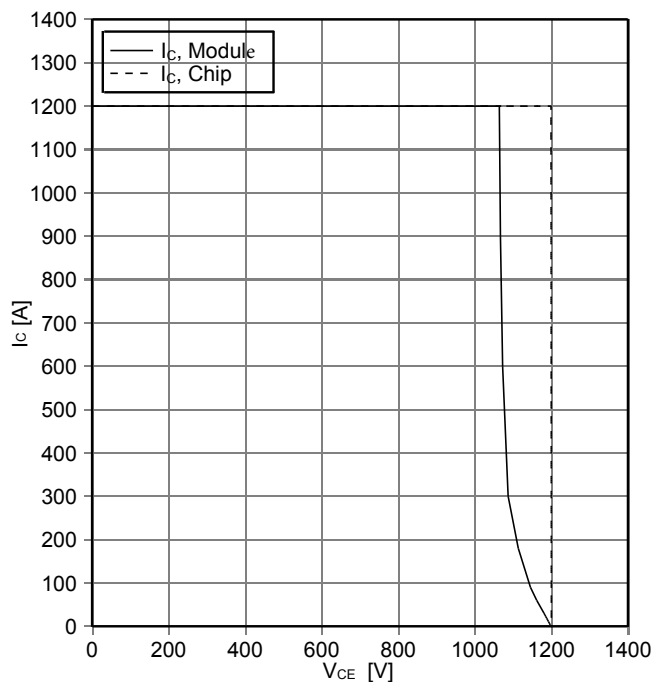


Transient thermal impedance IGBT, Inverter

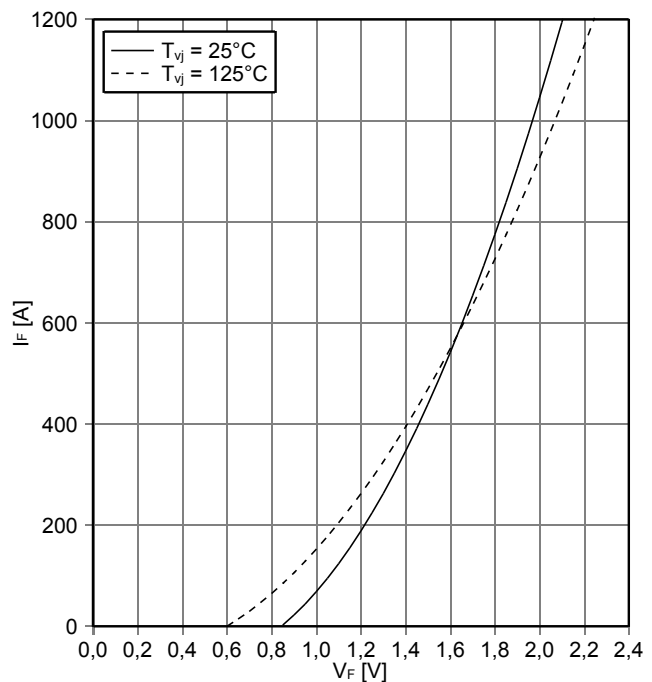
$Z_{thJC} = f(t)$

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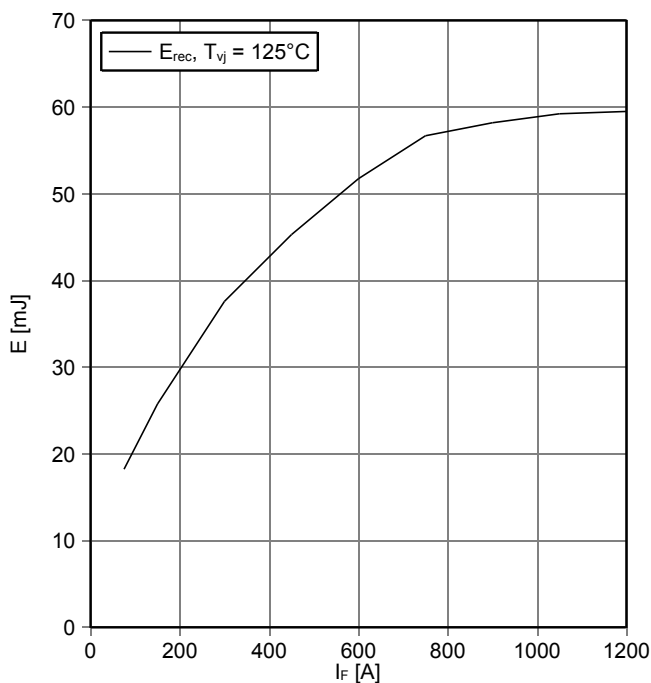
IGBT modules



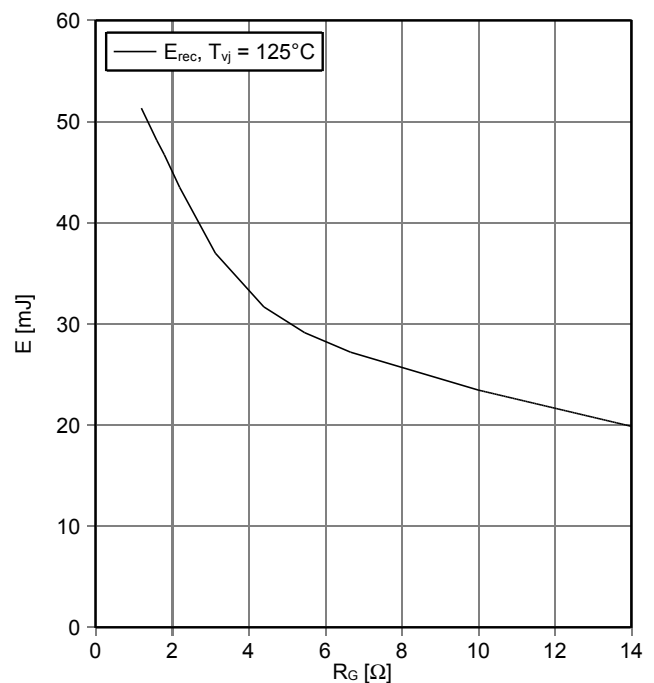
Reverse bias safe operating area IGBT, Inverter (RBSOA) $I_C = f(V_{CE})$
 $V_{GE} = \pm 15 \text{ V}$, $R_{Goff} = 1.2 \Omega$, $T_{vj} = 125^\circ\text{C}$



Forward characteristic of Diode, Inverter (typical)
 $I_F = f(V_F)$



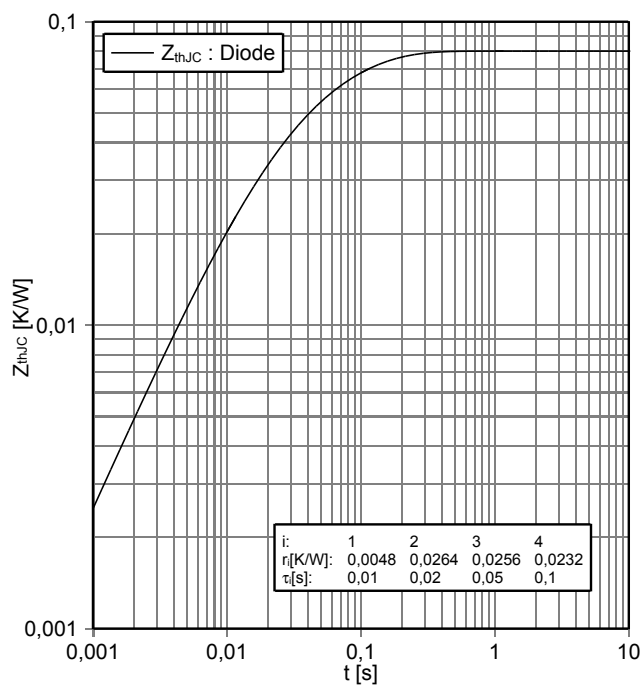
Switching losses Diode, Inverter (typical)
 $E_{rec} = f(I_F)$
 $R_{Gon} = 1.2 \Omega$, $V_{CE} = 600 \text{ V}$



Switching losses Diode, Inverter (typical)
 $E_{rec} = f(R_G)$
 $I_F = 600 \text{ A}$, $V_{CE} = 600 \text{ V}$

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IGBT modules



Transient thermal impedance Diode, Inverter
 $Z_{thJC} = f(t)$