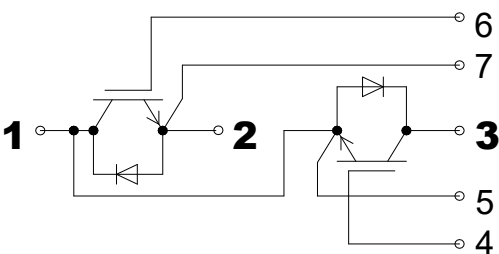


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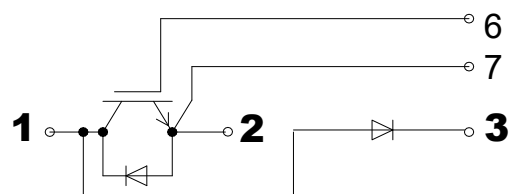
Ultra Fast IGBT Modules



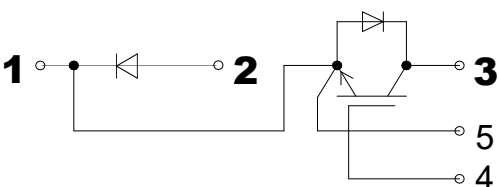
SGG75N125UC1



SGD75N125UC1



SDG75N125UC1



Symbol	Test Condition	Value	Unit
IGBT			
V_{CES}		1200	V
I_C	$T_C = 25(100)^{\circ}\text{C}$ per chip	75(50)	A
V_{GES}		± 20	V
$T_{vj} (T_{stg})$		$-40 \sim +150(125)$	$^{\circ}\text{C}$
P_{tot}		250	W
INVERSE DIODE			
I_F	$T_C=25(100)^{\circ}\text{C}$ per chip	100(50)	A
I_{FM}		150	A
V_{RRM}		1200	V
I^2t	$T_j=125^{\circ}\text{C}$, $t=10\text{ms}$, $V_R=0\text{V}$	1200	A^2s

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Ultra Fast IGBT Modules

Symbol	Test Conditions	Min	Typ	Max	Unit
IGBT Tc = 25°C unless otherwise specified					
VGE(th)	VGE=VCE, IC=1.7mA	4.5	5.5	6.5	V
ICES	VGE=0;VCE=VCES;Tj=25(125)°C		0.15	0.5	mA
VCE(TO)	Tj=25(125)°C		0.8(0.7)	0.9(0.8)	V
rCE	VGE=15V		21(30)	24(32)	mΩ
VCE(sat)	IC=50A; VGE=15V; chip level		3.2	3.7	V
Cies	VGE=0V, VCE=25V, f=1MHz		3.3		nF
Coes			0.20		
Cres			0.20		
LCE				30	nH
RCC'+EE'	Termial to Case, Tc=25°C		0.35		mΩ
td(on)	Vcc = 600V, IC = 50A RGON = RGOFF = 8.2Ω Tj=150°C VGE=±15V		118		ns
tr			28		ns
td(off)			350		ns
tf			75		ns
Eon/Eoff			5.50/2.30		mJ
INVERSE DIODE Tc = 25°C unless otherwise specified					
VF	IF =50A; VGE=0V; Tj = 25°C		2.2	2.5	V
Qrr	IF=50A; VR=300V; Tj=25°C di/dt = 600A/us, VGE=-15V		2.2		μC
IRRM			25		A
Erec			3.30		mJ
THERMAL CHARACTERISTICS					
Rth(j-c)	per IGBT			0.35	K/W
Rth(j-c)D	per FRD			0.96	K/W
Mechanical Data					
Ms		2.5		4	Nm
Weight			158		g

Features

- NPT Technology IGBT
- Fast Recovery Free Wheeling Diode
- Low Switching Losses
- $V_{ce(sat)}$ with positive temperature coefficient
- Fast Switching and short tail current
- Switched mode power supplies at $f_{sw}>25KHz$
- Resonant inverters up to 100KHz
- Electronic Welders at $f_{sw}>25KHz$

Application

- Welding inverters
- Inductive Heating

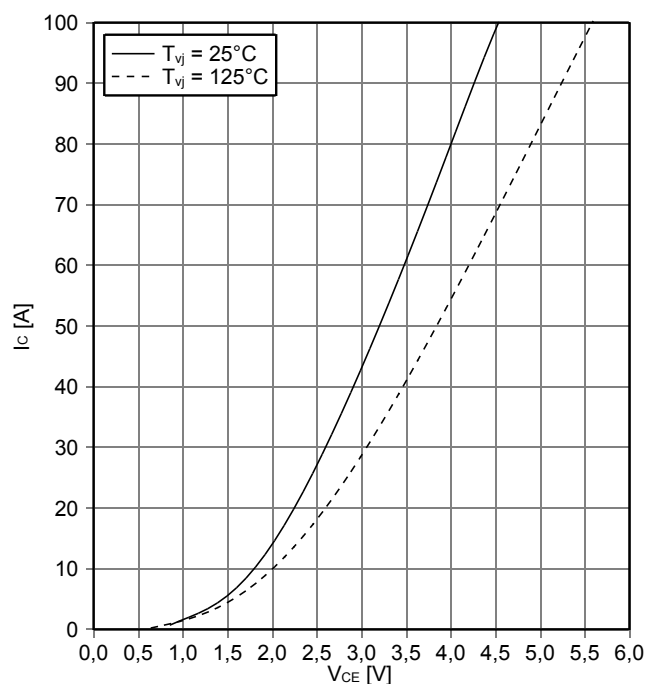
Advantages

- Space and weight savings
- Reduced protection circuits

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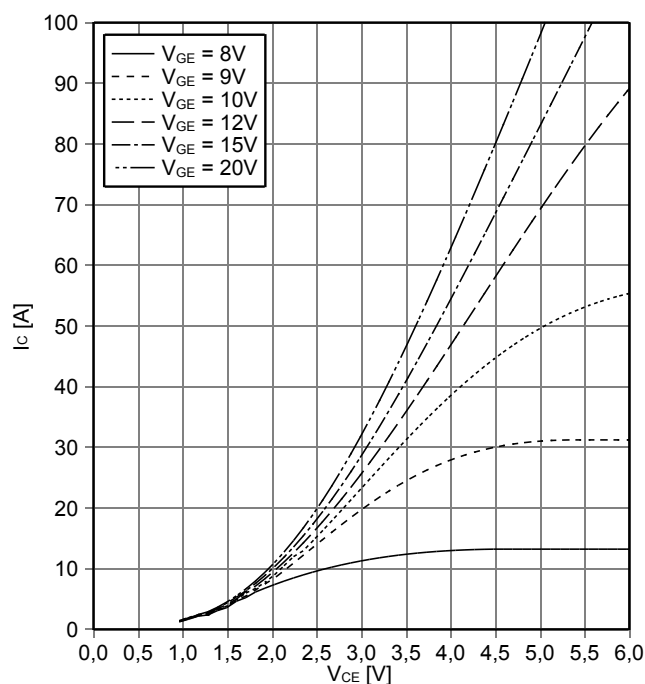
Ultra Fast IGBT Modules



Output characteristic IGBT, Inverter (typical)

$$I_C = f(V_{CE})$$

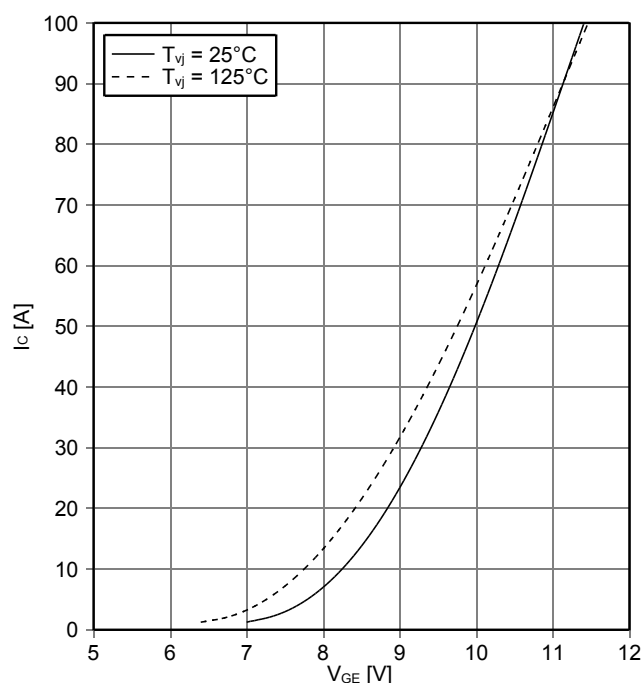
$$V_{GE} = 15\text{ V}$$



Output characteristic IGBT, Inverter (typical)

$$I_C = f(V_{CE})$$

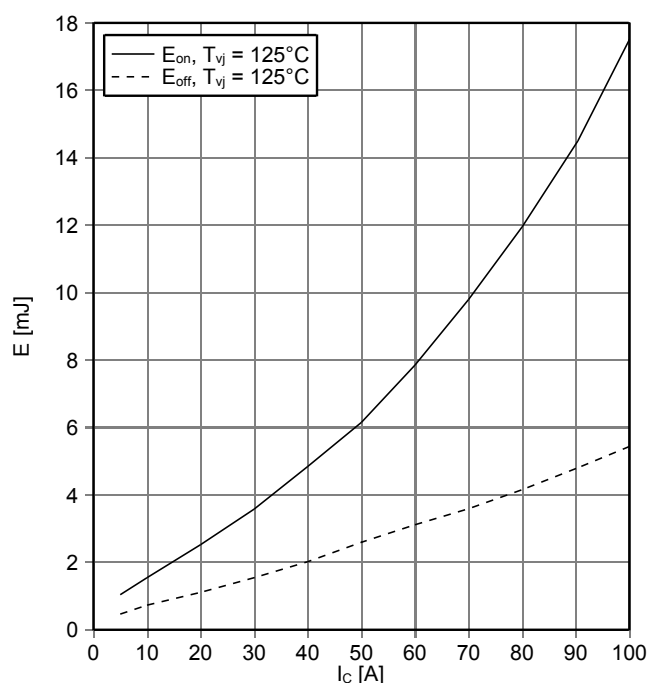
$$T_{vj} = 125^\circ\text{C}$$



Transfer characteristic IGBT, Inverter (typical)

$$I_C = f(V_{GE})$$

$$V_{CE} = 20\text{ V}$$



Switching losses IGBT, Inverter (typical)

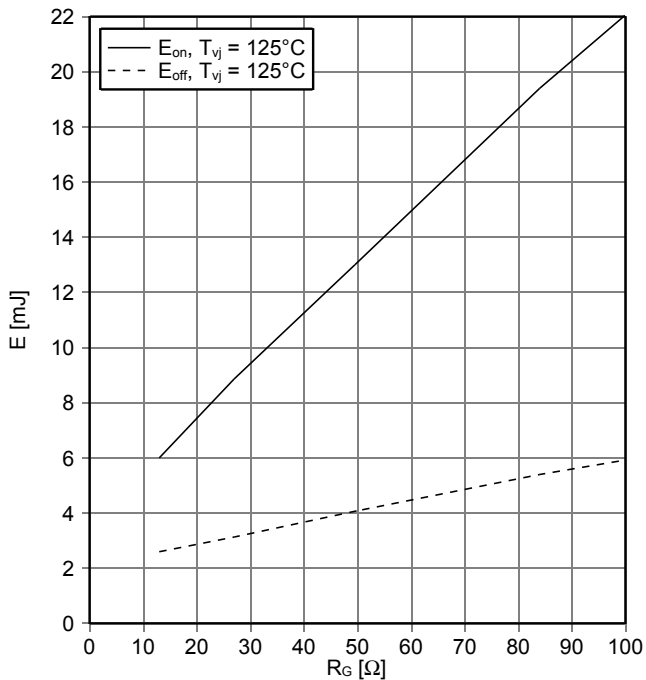
$$E_{on} = f(I_C), E_{off} = f(I_C)$$

$$V_{GE} = \pm 15\text{ V}, R_{Gon} = 13\Omega, R_{Goff} = 13\Omega, V_{CE} = 600\text{ V}$$

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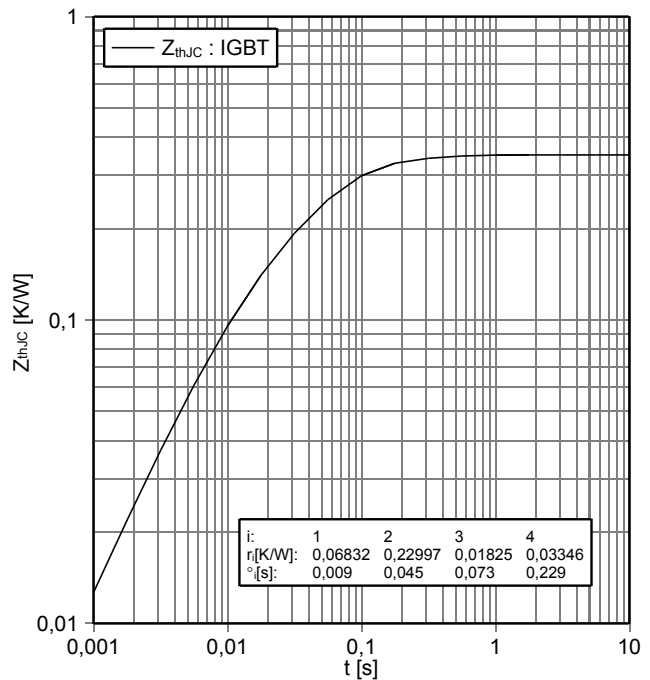
Ultra Fast IGBT Modules



Switching losses IGBT, Inverter (typical)

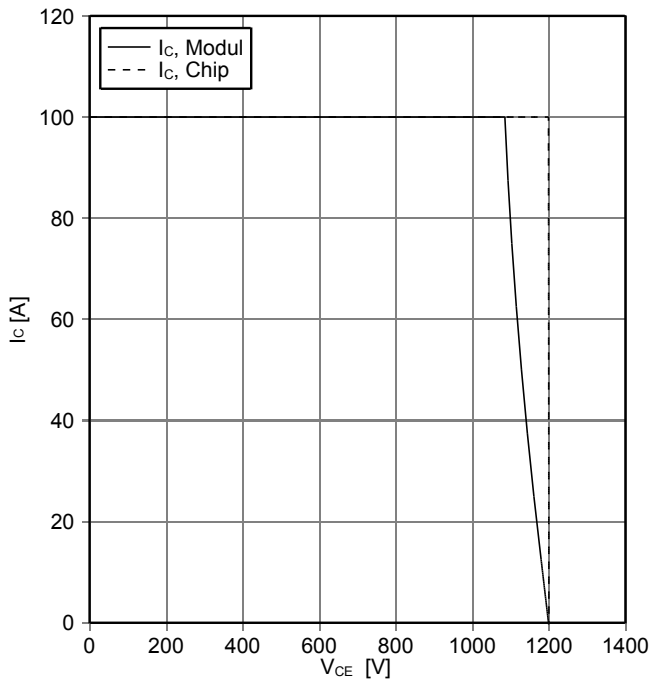
$E_{on} = f(R_G), E_{off} = f(R_G)$

$V_{GE} = \pm 15 \text{ V}, I_C = 50 \text{ A}, V_{CE} = 600 \text{ V}$



Transient thermal impedance IGBT, Inverter

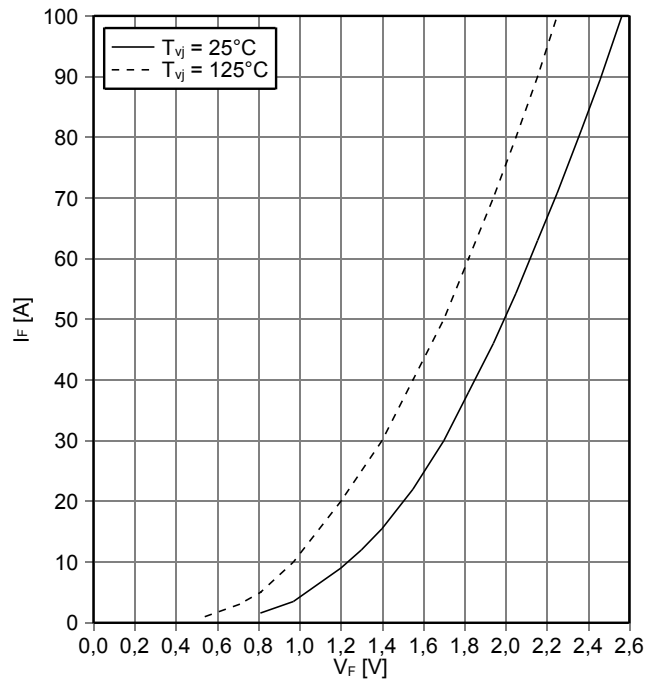
$Z_{thJC} = f(t)$



Reverse bias safe operating area IGBT, Inverter

(RBSOA) $I_C = f(V_{CE})$

$V_{GE} = \pm 15 \text{ V}, R_{Goff} = 13 \Omega, T_j = 125^{\circ}\text{C}$



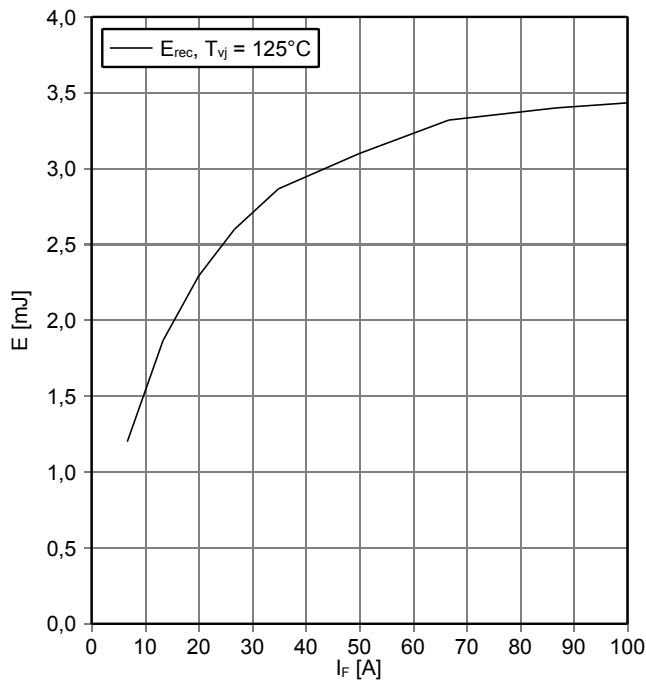
Forward characteristic of Diode, Inverter (typical)

$I_F = f(V_F)$

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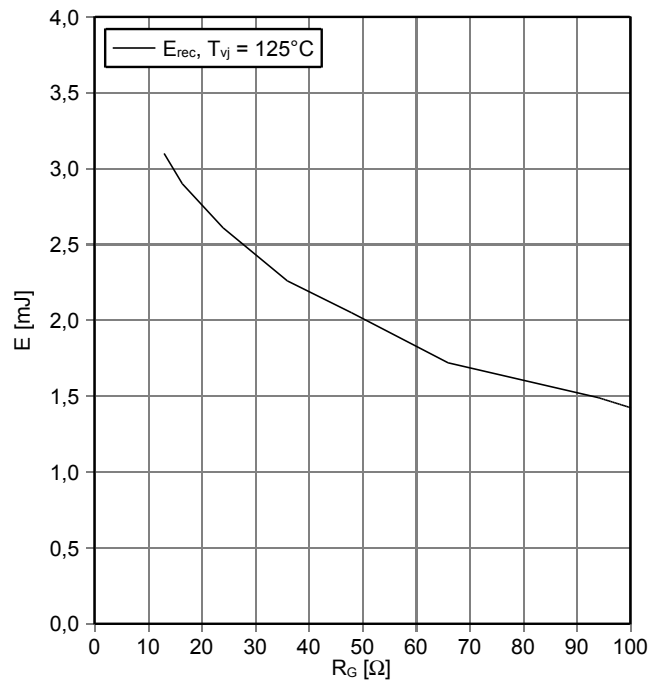
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Ultra Fast IGBT Modules



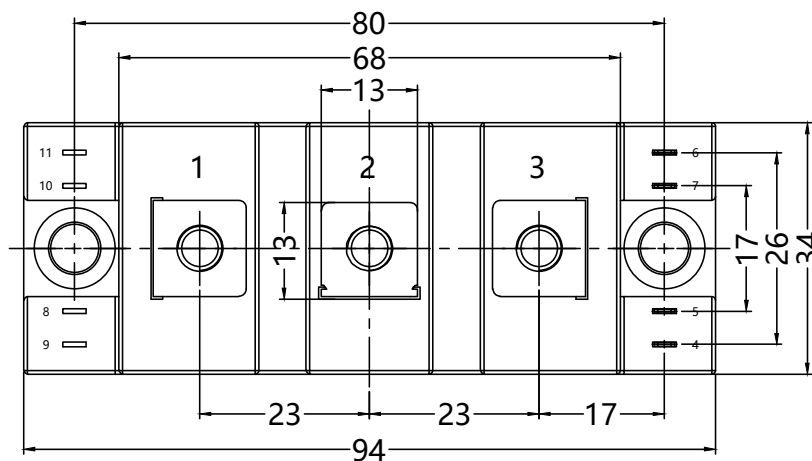
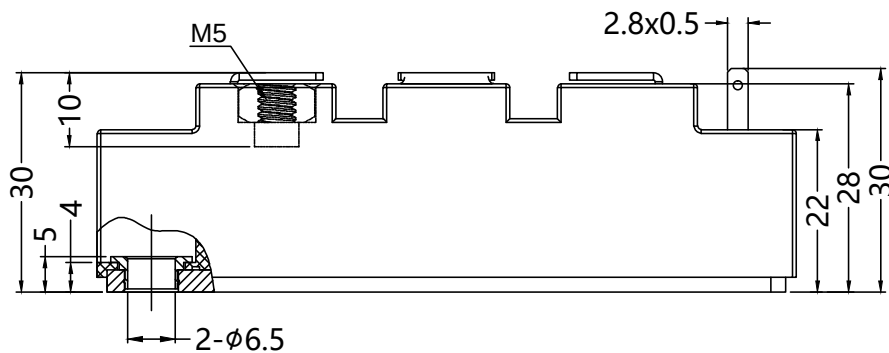
Switching losses Diode, Inverter (typical)

$E_{rec} = f(I_F)$
 $R_{Gon} = 13 \Omega$, $V_{CE} = 600 \text{ V}$



Switching losses Diode, Inverter (typical)

$E_{rec} = f(R_G)$
 $I_F = 50 \text{ A}$, $V_{CE} = 600 \text{ V}$



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