

Electrical Features

- Trench/Fieldstop IGBT
- Half-bridge
- Standard package
- High short circuit capability
- Including anti-parallel FWD



Typical Applications

- Frequency converter
- UPS System

IGBT, Inverter

Maximum Rated Values							
Symbol	Item	Conditions	Rating			Unit	
IGBT							
V_{CES}	Collector-emitter voltage	$T_{vj}=25^{\circ}\text{C}$	1200			V	
V_{GES}	Gate-emitter voltage	-	± 20			V	
I_C	Collector current,DC	$T_C=100^{\circ}\text{C}, T_{vj}=175^{\circ}\text{C}$	100			A	
I_{CRM}	Repetitive peak collector current	$t_p=1\text{ms}$	200			A	
t_{SC}	Short circuit withstand time	$V_{GE}=15\text{V}, V_{CC}=600\text{V}, T_{vj}\leq 150^{\circ}\text{C}$	10			μs	
P_{tot}	Total power dissipation	$T_C=25^{\circ}\text{C}, T_{vj}=175^{\circ}\text{C}$	535			W	
Characteristics Values							
Symbol	Item	Conditions	Values			Unit	
			Min.	Typ.	Max.		
I_{CES}	Collector-emitter cut-off current	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_{vj}=25^{\circ}\text{C}$	-	-	1	mA	
I_{GES}	Gate leakage current	$V_{CE}=0\text{V}, V_{GE}=20\text{V}, T_{vj}=25^{\circ}\text{C}$	-	-	250	nA	
$V_{GE(th)}$	Gate-emitter threshold voltage	$I_C=3.8\text{mA}, V_{CE}=V_{GE}, T_{vj}=25^{\circ}\text{C}$	5.0	6.0	7.0	V	
V_{CEsat}	Collector-emitter saturation voltage	$I_C=100\text{A}$ $V_{GE}=15\text{V}$	$T_{vj}=25^{\circ}\text{C}$	-	1.95		2.4
			$T_{vj}=125^{\circ}\text{C}$	-	2.25		-
			$T_{vj}=150^{\circ}\text{C}$	-	2.35	-	
C_{ies}	Input capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}$	-	6.45	-	nF	
C_{res}	Reverse transfer capacitance	$f=1\text{MHz}, T_{vj}=25^{\circ}\text{C}$	-	0.2	-		
Q_G	Gate charge	$V_{CC}=600\text{V}, I_C=100\text{A}, V_{GE}=15\text{V}$	-	357	-	μC	
R_g	Internal gate resistance	$T_{vj}=25^{\circ}\text{C}$		1.8		Ω	

t _{d(on)}	Turn-on delay time	V _{CC} =600V, I _C =100A, V _{GE} =±15V, R _{G(on)} =7.5 Ω , R _{G(off)} =7.5 Ω , Inductive load	T _{vj} =25°C	-	83	-	ns
			T _{vj} =125°C	-	-	-	
			T _{vj} =150°C	-	-	-	
t _r	Rise time		T _{vj} =25°C	-	43	-	
			T _{vj} =125°C	-	-	-	
			T _{vj} =150°C	-	-	-	
t _{d(off)}	Turn-off delay time		T _{vj} =25°C	-	259	-	
			T _{vj} =125°C	-	-	-	
			T _{vj} =150°C	-	-	-	
t _f	Fall time		T _{vj} =25°C	-	187	-	
			T _{vj} =125°C	-	-	-	
			T _{vj} =150°C	-	-	-	
E _{on}	Turn-on energy (per pulse)	T _{vj} =25°C	-	8.68	-	mJ	
		T _{vj} =125°C	-	-	-		
		T _{vj} =150°C	-	-	-		
E _{off}	Turn-off energy (per pulse)	T _{vj} =25°C	-	5.56	-		
		T _{vj} =125°C	-	-	-		
		T _{vj} =150°C	-	-	-		
R _{thJC}	Thermal resistance, junction to case	per IGBT	-	-	0.28	K/W	
R _{thCH}	Thermal resistance, case to heatsink	per IGBT/ λgrease=1W/(m·K)	-	0.04	-	K/W	
T _{vjop}	Temperature under switching conditions		-40		150	°C	
Diode, Inverter							
Maximum Rated Values							
Symbol	Item	Conditions			Rating	Unit	
V _{RRM}	Repetitive peak reverse voltage	T _{vj} =25°C			1200	V	
I _F	Forward current, DC	T _C =100°C, T _{vj} =175°C			100	A	
I _{FRM}	Repetitive peak forward current	t _p =1ms			200	A	
Characteristic Values							
V _F	Continuous forward voltage	I _F =100A V _{GE} =0V	T _{vj} =25°C	-	2.0	2.4	V
			T _{vj} =125°C	-	-	-	
			T _{vj} =150°C	-	-	-	
I _{RM}	Peak reverse recovery current	V _R =600V I _F =100A di _F /dt=-3000A/μs	T _{vj} =25°C	-	90	-	A
			T _{vj} =125°C	-	-	-	
			T _{vj} =150°C	-	-	-	
t _{rr}	Reverse recovery time		T _{vj} =25°C	-	253	-	ns
			T _{vj} =125°C	-	-	-	
			T _{vj} =150°C	-	-	-	
Q _r	Repetitive peak forward current	T _{vj} =25°C	-	7.7	-	μC	
		T _{vj} =125°C	-	-	-		
		T _{vj} =150°C	-	-	-		
E _{rec}	Recovered charge	T _{vj} =25°C	-	2.8	-	mJ	
		T _{vj} =125°C	-	-	-		
		T _{vj} =150°C	-	-	-		

R_{thJC}	Thermal resistance, junction to case	per diode	-	-	0.5	K/W
R_{thCH}	Thermal resistance, case to heatsink	per IGBT/ $\lambda_{grease}=1W/(m \cdot K)$	-	0.04	-	K/W
T_{vjop}	Temperature under switching conditions		-40		150	°C

Module

Symbol	Item	Conditions	Rating			Unit
V_{ISOL}	Isolation voltage	Terminals to baseplate, RMS, $f=50Hz, t=1min$	2500			V
-	Material of module baseplate	-	Cu			-
-	Internal isolation	Basic insulation(class 1, IEC 61140)	Al_2O_3			-
T_{stg}	Storage temperature	-	-40~125			°C
Symbol	Item	Conditions	Values			Unit
			Min.	Typ.	Max.	
M	Mounting torque for module mounting	Screw M6	3.0	-	5.0	Nm
	Terminal connection torque	Screw M5	2.5	-	5.0	Nm
ds	Creepage distance	Terminal to terminal	-	23	-	mm
		Terminal to base plate	-	29	-	
da	Clearance	Terminal to terminal	-	11	-	mm
		Terminal to base plate	-	23	-	
m	Weight	-	-	150	-	g

Figure 1 IGBT output characteristic
($T_{vj}=25^{\circ}\text{C}$)

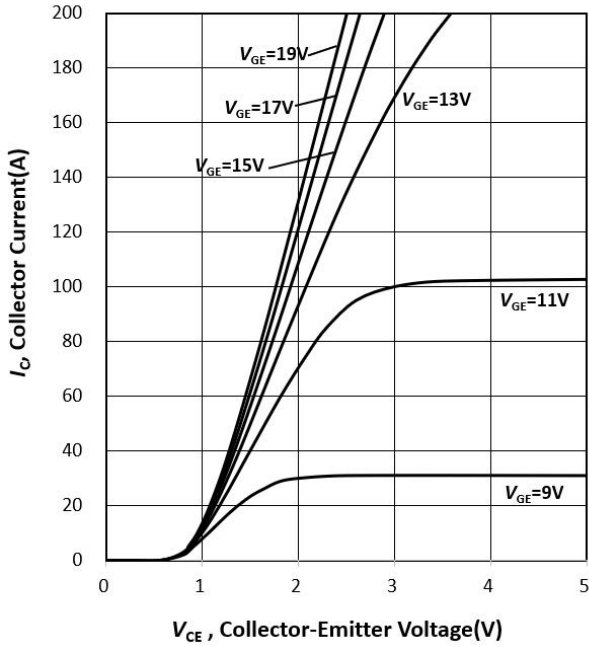


Figure 2 IGBT switching times as a function of collector current
(inductive load, $T_{vj}=25^{\circ}\text{C}$,
 $V_{CE}=600V$, $V_{GE}=-15/15V$, $R_G=7.5\ \Omega$)

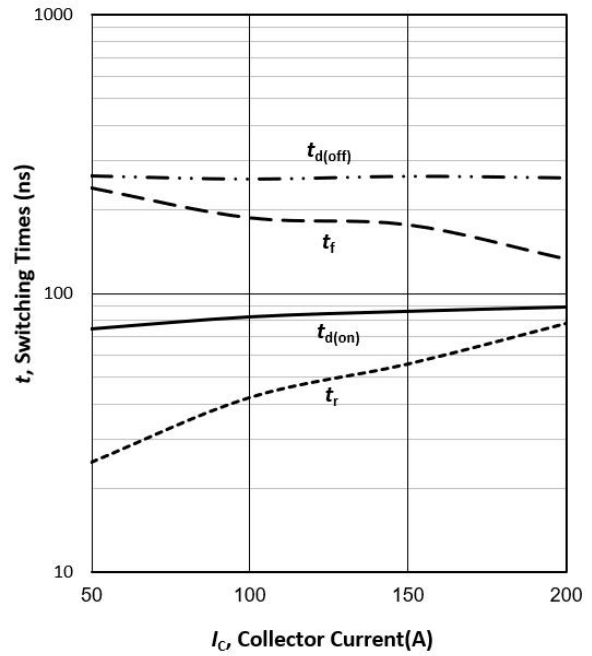


Figure 3 IGBT switching energy losses as a function of collector current
(inductive load, $T_{vj}=25^{\circ}\text{C}$,
 $V_{CE}=600V$, $V_{GE}=-15/15V$, $R_G=7.5\ \Omega$)

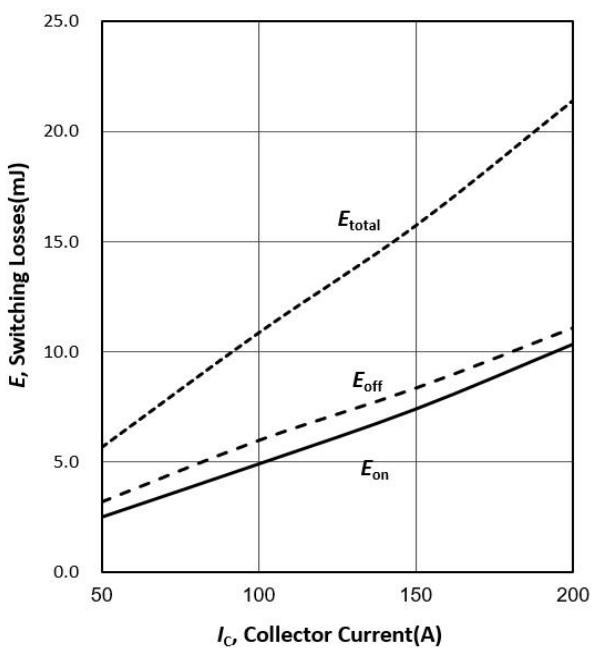


Figure 4 IGBT switching times as a function of gate resistor
(inductive load, $T_{vj}=25^{\circ}\text{C}$,
 $V_{CE}=600V$, $V_{GE}=-15/15V$, $I_C=100A$)

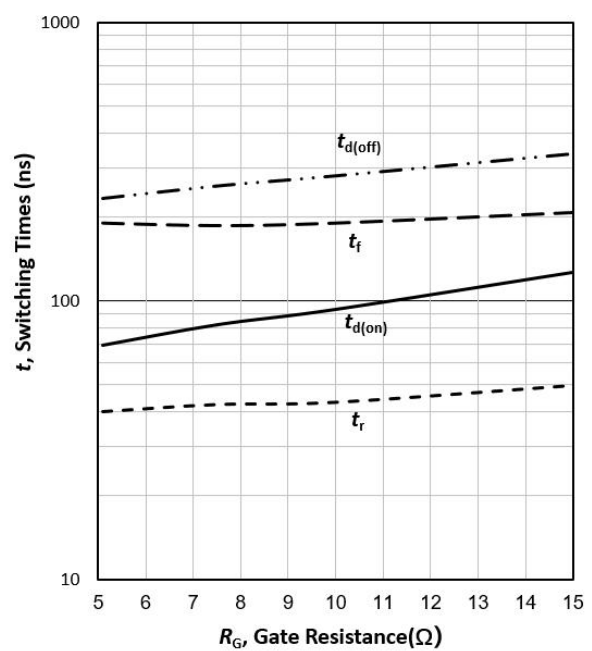


Figure 5 IGBT switching energy losses as a function of gate resistor

(inductive load, $T_{vj}=25^{\circ}\text{C}$, $V_{CE}=600\text{V}$, $V_{GE}=-15/15\text{V}$, $I_C=100\text{A}$)

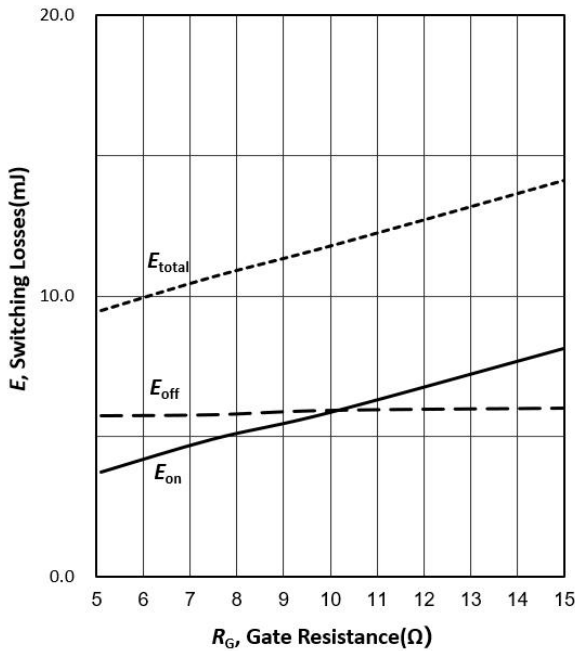


Figure 6 Diode reverse recovery energy as a function of forward current

($T_{vj}=25^{\circ}\text{C}$, $V_{CE}=600\text{V}$, $R_G=7.5\ \Omega$)

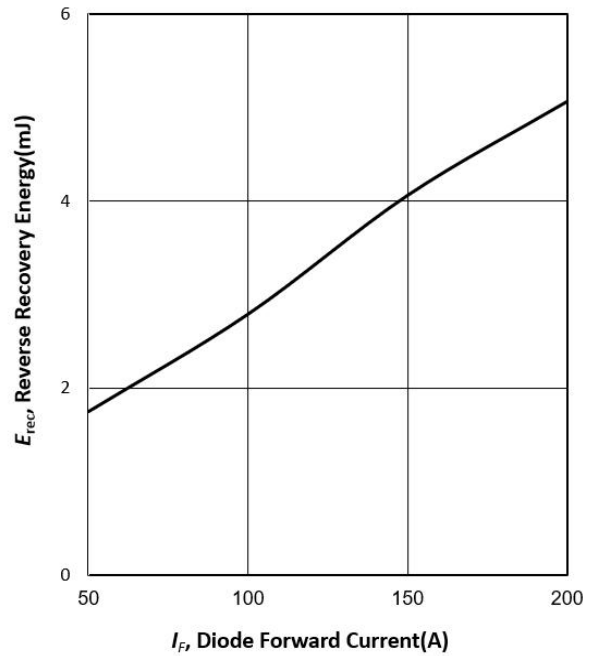


Figure 7 Diode reverse recovery charge as a function of gate resistor

($T_{vj}=25^{\circ}\text{C}$, $V_{CE}=600\text{V}$, $I_F=100\text{A}$)

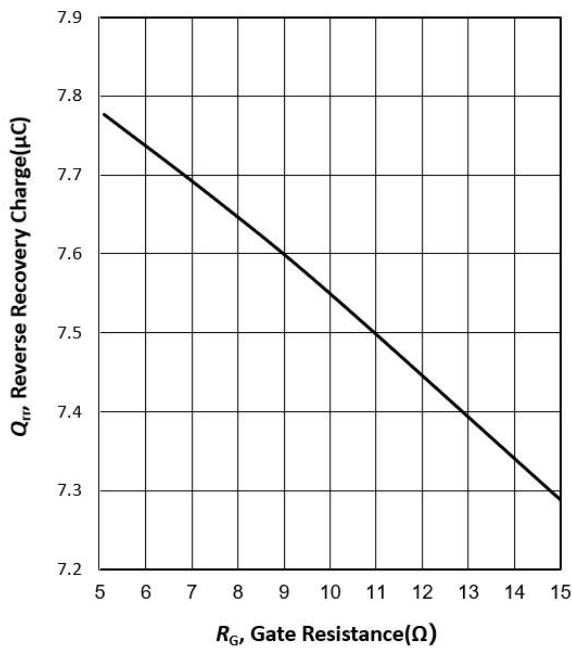
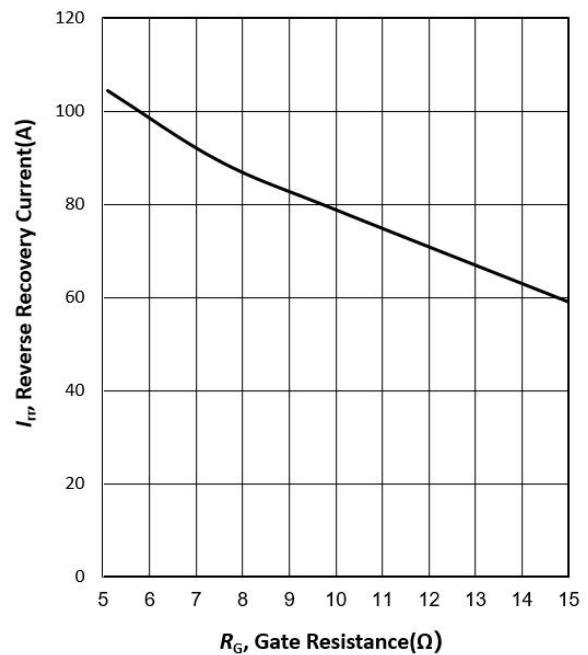
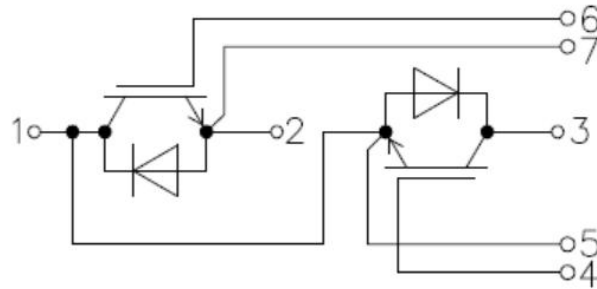


Figure 8 Diode peak reverse recovery current as a function of gate resistor

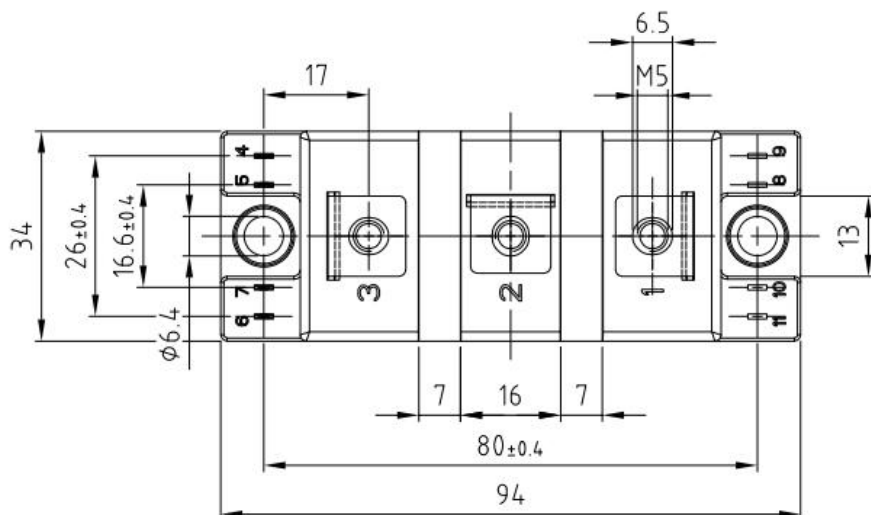
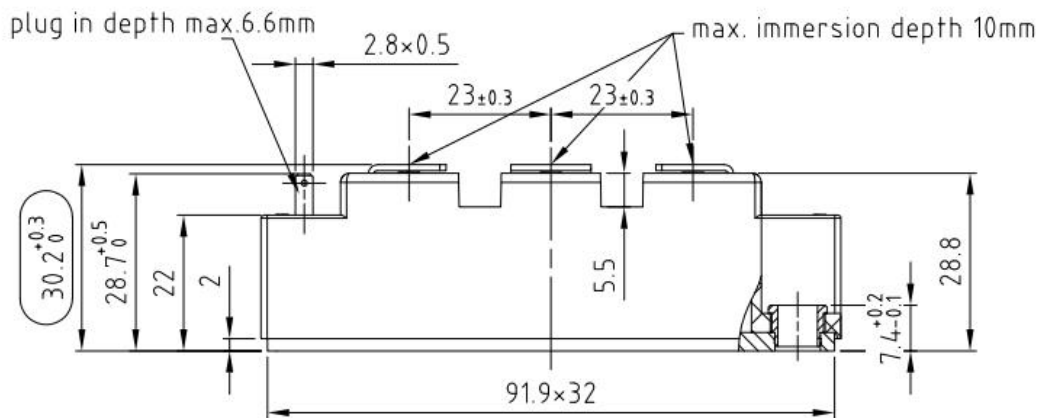
($T_{vj}=25^{\circ}\text{C}$, $V_{CE}=600\text{V}$, $I_F=100\text{A}$)



Circuit diagram headline



Package outlines (Unit: mm)



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