

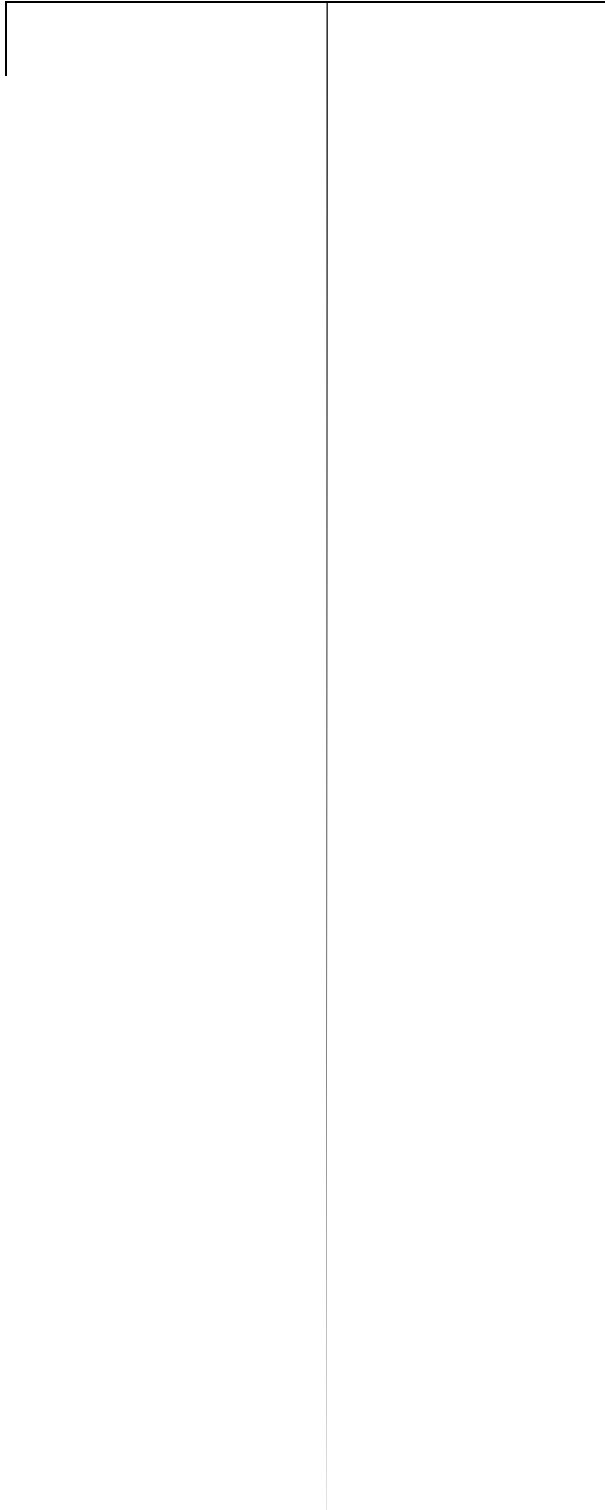



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## 1200V /40A Trench Field Stop IGBT

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- High breakdown voltage to 1200V for improved reliability
- Trench-Stop Technology offering :
  - High speed switching
  - High ruggedness, temperature stable
  - Short circuit withstand time – 10μs
  - Low  $V_{CEsat}$
  - Easy parallel switching capability due to positive temperature coefficient in  $V_{CEsat}$
- Enhanced avalanche capability
  
- Uninterruptible Power Supplies
- Solar inverter
- Welding
- PFC applications



Product	Package	Packaging
YGW40N120F1A1	TO247	Tube

Parameter	Symbol	Value	Unit
Collector-Emitter Breakdown Voltage	$V_{CE}$	1200	V
DC collector current, limited by $T_{jmax}$ $T_C = 25^\circ C$ $T_C = 100^\circ C$	$I_C$	80 40	A
Diode Forward current, limited by $T_{jmax}$ $T_C = 25^\circ C$ $T_C = 100^\circ C$	$I_F$	80 40	A
Continuous Gate-emitter voltage	$V_{GE}$	$\pm 20$	V
Transient Gate-emitter voltage	$V_{GE}$	$\pm 30$	V
Turn off safe operating area $V_{CE} = 1200V$ , $T_j = 150^\circ C$	-	160	A
Pulsed Collector Current, $V_{GE} = 15V$ , $t_p$ limited by $T_{jmax}$	$I_{CM}$	160	A
Diode Pulsed Current, $t_p$ limited by $T_{jmax}$	$I_{Fpuls}$	160	A
Short Circuit Withstand Time, $V_{GE} = 15V$ , $V_{CE} = 600V$	$T_{sc}$	10	$\mu s$
Power dissipation, $T_j = 25^\circ C$	$P_{tot}$	417	W
Operating junction temperature	$T_j$	-40...+150	$^\circ C$
Storage temperature	$T_s$	-55...+150	$^\circ C$
Soldering temperature, wave soldering 1.6mm (0.063in.) from case for 10s	-	260	$^\circ C$

Parameter	Symbol	Max. Value	Unit
IGBT thermal resistance, junction - case	$R(j-c)$	0.3	K/W
Diode thermal resistance, junction - case	$R(j-c)$	$\leq 0.7$	K/W
Thermal resistance, junction - ambient	$R(j-a)$	40	K/W

( $T_j = 25^\circ\text{C}$  unless otherwise specified) :

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Collector-Emitter breakdown voltage	$BV_{CES}$	$V_{GE}=0V, I_C=250\mu A$	1200	1300	-	V
Gate threshold voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=250\mu A$	5.1	5.8	6.4	V
Collector-Emitter Saturation voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=40A$ $T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	- -	2.0 2.5	2.5 -	V
Zero gate voltage collector current	$I_{CES}$	$V_{CE} = 1200V, V_{GE} = 0V$ $T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	- -	- -	10 2500	$\mu A$
Gate-emitter leakage current	$I_{GES}$	$V_{CE} = 0V, V_{GE} = \pm 20V$	-	-	100	nA
Transconductance	$g_{fs}$	$V_{CE}=20V, I_C=15A$	-	15	-	S

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input capacitance	$C_{ies}$	$V_{CE} = 25V, V_{GE} = 0V,$ $f = 1\text{MHz}$	-	4400	-	pF
Output capacitance	$C_{oes}$		-	180	-	
Reverse transfer capacitance	$C_{res}$		-	100	-	
Gate charge	$Q_G$	$V_{CC} = 960V, I_C = 40A,$ $V_{GE} = 15V$	-	270	-	nC
Short circuit collector current	$I_{C(SC)}$	$V_{GE}=15V, t_{SC} 10\mu s$ $V_{CC}=600V,$ $T_{j, start}=25^\circ\text{C}$	-	240	-	A

Parameter	Symbol	Conditions	Min. ?	Typ.	Max.	Unit
Turn-on delay time	$t_{d(on)}$	$V_{CC} = 600V, I_C = 40A,$ $V_{GE} = 0/15V,$ $R_g = 12\Omega$	-	60	-	ns
Rise time	$t_r$		-	27	-	ns
Turn-on energy	$E_{on}$		-	2.9	-	mJ
Turn-off delay time	$t_{d(off)}$		-	230	-	ns
Fall time	$t_f$		-	70	-	ns
Turn-off energy	$E_{off}$		-	0.8	-	mJ



Fig. 6 Saturation voltage of

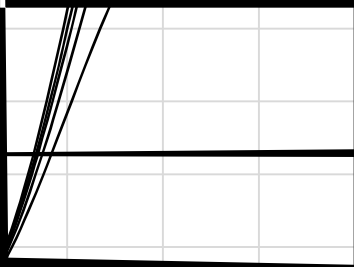


Fig. 7 Switching

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