

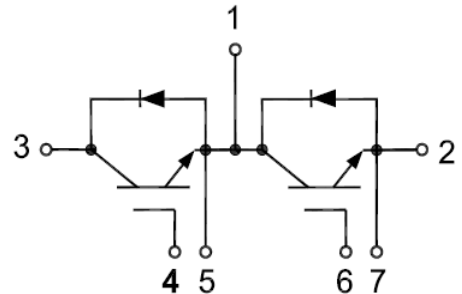


# GF75HF120T1H

## IGBT Module

### Features:

- Non Punch Through (NPT) Technology
- Short Circuit Rated >10 $\mu$ s
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested (2xI<sub>c</sub>)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



### Applications:

- Welding Machine、Cutting Machine
- Plating Power Supply、Induction Heating
- SMPS、UPS

### IGBT, Inverter

#### Maximum Rated Values of IGBT(T<sub>C</sub>=25°C unless otherwise specified)

V <sub>CES</sub>	Collector-Emitter Blocking Voltage		1200	V
V <sub>GES</sub>	Gate-Emitter Voltage		±20	V
I <sub>c</sub>	Continuous Collector Current	T <sub>C</sub> = 80°C	75	A
		T <sub>C</sub> = 25°C	140	A
I <sub>CM</sub>	Repetitive Peak Collector Current	T <sub>J</sub> = 150°C	150	A
t <sub>sc</sub>	Short Circuit Withstand Time		>10	μs
P <sub>D</sub>	Maximum Power Dissipation per IGBT	T <sub>C</sub> = 25°C T <sub>Jmax</sub> =150°C	710	W



## Electrical Characteristics of IGBT ( $T_C=25^\circ\text{C}$ unless otherwise specified)

### Static Characteristics

Symbol	Description	Conditions	Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C = 1\text{mA}, V_{CE} = V_{GE}$	4.5	5.4	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 75\text{A}, V_{GE} = 15\text{V}$	$T_J = 25^\circ\text{C}$	2.55	2.85	V
			$T_J = 125^\circ\text{C}$	3.20		V
$I_{CES}$	Collector-Emitter Leakage Current	$V_{GE} = 0\text{V}, V_{CE} = V_{CES}, T_J = 25^\circ\text{C}$			1	mA
$I_{GES}$	Gate-Emitter Leakage Current	$V_{GE} = \pm 20\text{V}, V_{CE} = 0\text{V}, T_J = 25^\circ\text{C}$			200	nA
$C_{ies}$	Input Capacitance	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		6.58		nF
$C_{oes}$	Output Capacitance			0.57		nF
$C_{res}$	Reverse Transfer Capacitance			0.29		nF

### Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	$V_{CC} = 600\text{V}, I_C = 75\text{A}, R_{Gon} = 10\Omega, V_{GE} = \pm 15\text{V},$ Inductive Load	$T_J = 25^\circ\text{C}$	425		ns
			$T_J = 125^\circ\text{C}$	335		
$t_r$	Rise Time	$V_{CC} = 600\text{V}, I_C = 75\text{A}, R_{Gon} = 10\Omega, V_{GE} = \pm 15\text{V},$ Inductive Load	$T_J = 25^\circ\text{C}$	85		ns
			$T_J = 125^\circ\text{C}$	67		
$t_{d(off)}$	Turn-off Delay Time	$V_{CC} = 600\text{V}, I_C = 75\text{A}, R_{Goff} = 10\Omega, V_{GE} = \pm 15\text{V},$ Inductive Load	$T_J = 25^\circ\text{C}$	445		ns
			$T_J = 125^\circ\text{C}$	375		
$t_f$	Fall Time	$V_{CC} = 600\text{V}, I_C = 75\text{A}, R_{Goff} = 10\Omega, V_{GE} = \pm 15\text{V},$ Inductive Load	$T_J = 25^\circ\text{C}$	142		ns
			$T_J = 125^\circ\text{C}$	167		
$E_{on}$	Turn-on Switching Loss	$V_{CC} = 600\text{V}, I_C = 75\text{A}, R_{Gon} = 10\Omega, V_{GE} = \pm 15\text{V},$ $di/dt = 950\text{A}/\mu\text{s} (T_J = 125^\circ\text{C}),$ Inductive Load	$T_J = 25^\circ\text{C}$	4.92		mJ
			$T_J = 125^\circ\text{C}$	5.18		
$E_{off}$	Turn-off Switching Loss	$V_{CC} = 600\text{V}, I_C = 75\text{A}, R_{Goff} = 10\Omega, V_{GE} = \pm 15\text{V},$ $du/dt = 5905\text{V}/\mu\text{s} (T_J = 125^\circ\text{C}),$ Inductive Load	$T_J = 25^\circ\text{C}$	2.60		mJ
			$T_J = 125^\circ\text{C}$	3.58		
$Q_g$	Total Gate Charge	$V_{GE} = +15\text{V} \dots -15\text{V}$	$T_J = 25^\circ\text{C}$	892		nC
RBSOA	Reverse Bias Safe Operation Area	$I_C = 150\text{A}, V_{CC} = 1050\text{V}, V_p = 1200\text{V},$ $R_{Goff} = 10\Omega, V_{GE} = +15\text{V to } 0\text{V}, T_J = 150^\circ\text{C}$	Trapezoid			
SCSOA	SCSOA	$V_{CC} = 600\text{V}, V_{GE} = 15\text{V},$ $T_J = 150^\circ\text{C}$	10			$\mu\text{s}$
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case				0.176	$^\circ\text{C}/\text{W}$



## Diode, Inverter

### Maximum Rated Values of Diode ( $T_C=25^{\circ}\text{C}$ unless otherwise specified)

$V_{RRM}$	Repetitive Peak Reverse Voltage	1200	V
$I_F$	Diode Continuous Forward Current	75	A
$I_{FM}$	Diode Maximum Forward Current	150	A

### Electrical Characteristics of Diode ( $T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Description	Conditions	Min	Typ	Max	Unit
$V_{FM}$	Forward Voltage	$I_F=75\text{A}$	$T_J=25^{\circ}\text{C}$	2.55		V
			$T_J=125^{\circ}\text{C}$	2.65		
$t_{rr}$	Reverse Recovery Time		$T_J=25^{\circ}\text{C}$	175		ns
			$T_J=125^{\circ}\text{C}$	312		
$I_{rr}$	Peak Reverse Recovery Current	$I_F=75\text{A}$ , $-diF/dt=1740\text{A}/\mu\text{s}(T_J=150^{\circ}\text{C})$ , $V_{rr}=600\text{V}$ , $V_{GE}=-15\text{V}$	$T_J=25^{\circ}\text{C}$	43.5		A
			$T_J=125^{\circ}\text{C}$	57.7		
$Q_{rr}$	Reverse Recovery Charge		$T_J=25^{\circ}\text{C}$	4.00		$\mu\text{C}$
			$T_J=125^{\circ}\text{C}$	7.55		
$E_{rec}$	Reverse Recovery Energy	$I_F=75\text{A}$ , $-diF/dt=1318\text{A}/\mu\text{s}(T_J=125^{\circ}\text{C})$ , $V_{rr}=600\text{V}$ , $V_{GE}=-15\text{V}$	$T_J=25^{\circ}\text{C}$	1.72		mJ
			$T_J=125^{\circ}\text{C}$	3.40		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case				0.522	$^{\circ}\text{C}/\text{W}$



## Module

Symbol	Description	Min	Typ	Max	Unit
V <sub>iso</sub>	Isolation Voltage (All Terminals Shorted)	f = 50Hz, 1minute	2500		V
T <sub>J</sub>	Maximum Junction Temperature			150	°C
T <sub>JOP</sub>	Maximum Operating Junction Temperature Range	-40		+150	°C
T <sub>stg</sub>	Storage Temperature	-40		+125	°C
CTI	Comparative Tracking Index	200			
R <sub>ecs</sub>	Case-To-Sink Thermally (Conductive Grease Applied)			0.07	°C/W
T	Power Terminals Screw:M5	2.5		5.0	N·m
T	Mounting Screw:M6	3.0		5.0	N·m
G	Weight		135		g



## Ordering Information Table

Device code	GF	75	HF	120	T1	H
	①	②	③	④	⑤	⑥

- ① - Non Punch Through (NPT) Technology IGBT Module
- ② - Rated Current (75=75A)
- ③ - Circuit Configuration (Half Bridge)
- ④ - Rated Voltage (120=1200V)
- ⑤ - Package Type
- ⑥ - Test Level (Pass the Important Reliability Test-Industrial Grade)

DATA SHEET

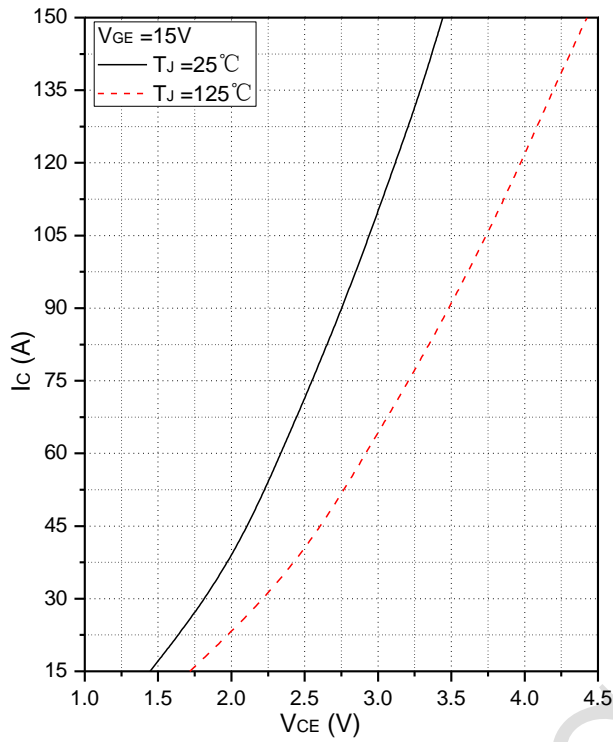


Fig.1 Typical Saturation Voltage Characteristics

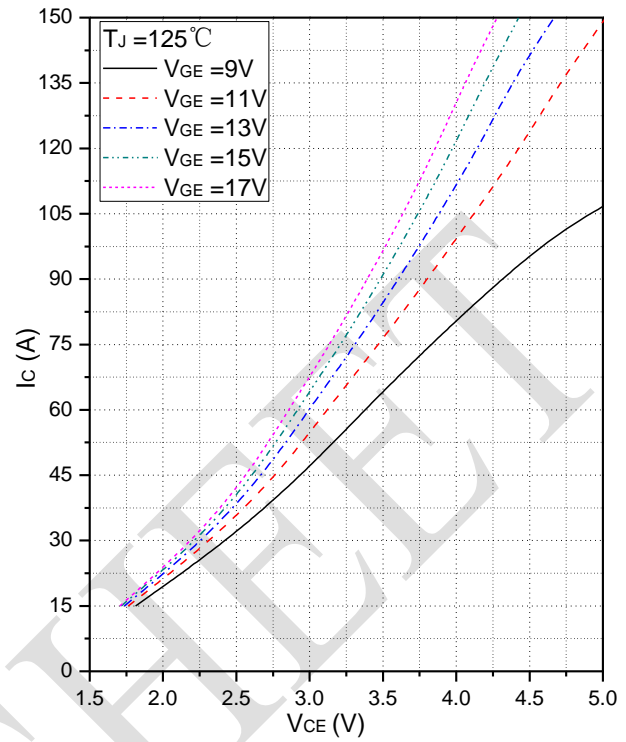


Fig.2 Typical Output Characteristics

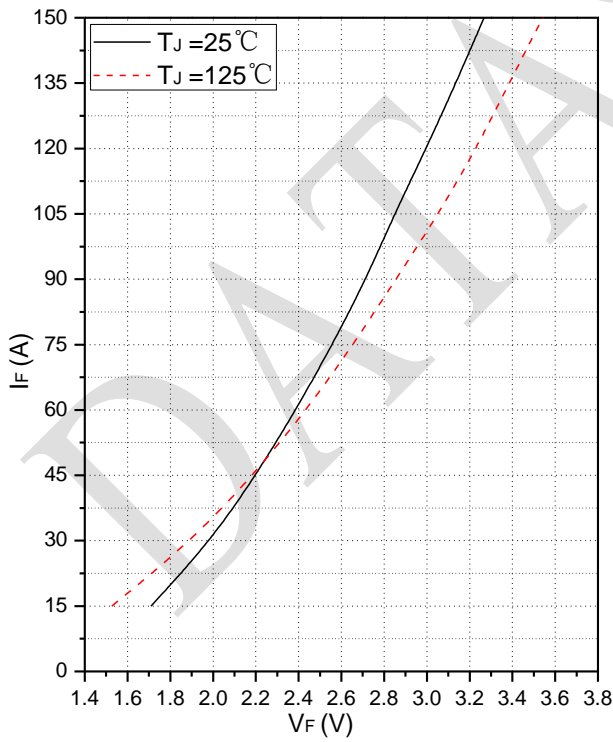


Fig.3 Forward Characteristics of Diode

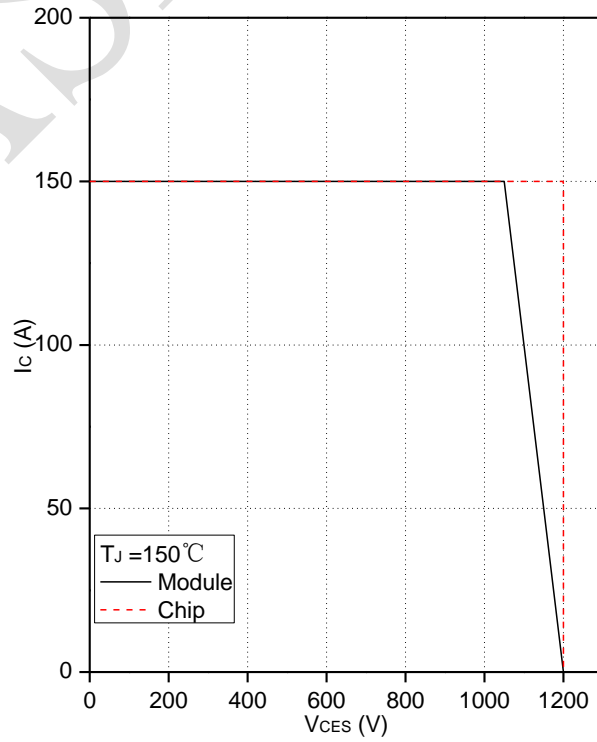


Fig.4 Reverse Bias Safe Operation Area (RBSOA)

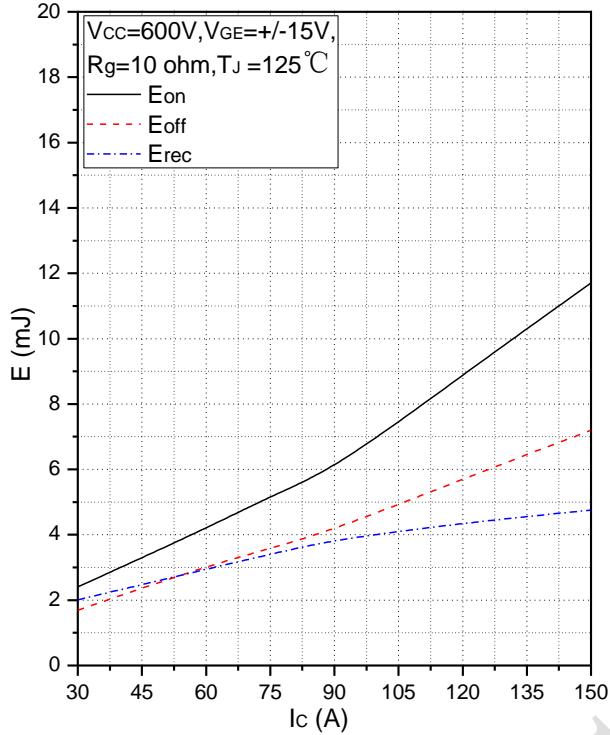


Fig.5 Typical Switching Loss vs. Collector Current

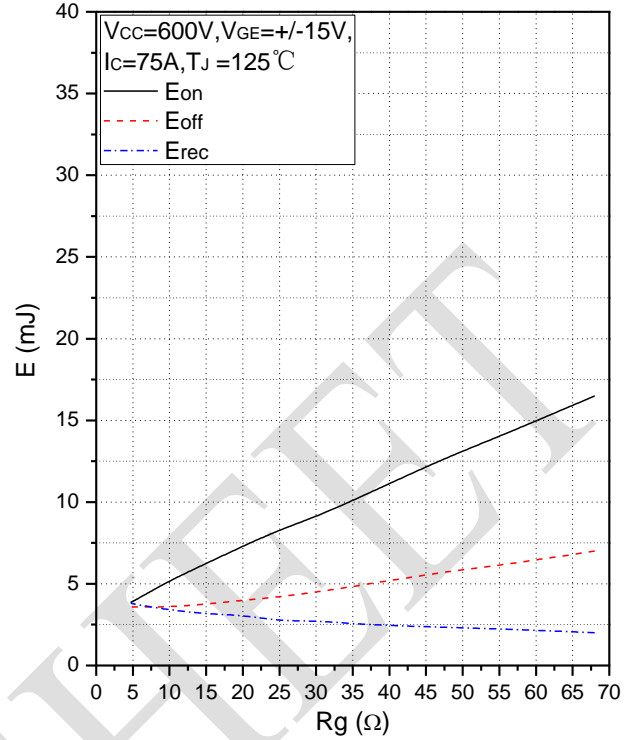


Fig.6 Typical Switching Loss vs. Gate Resistance

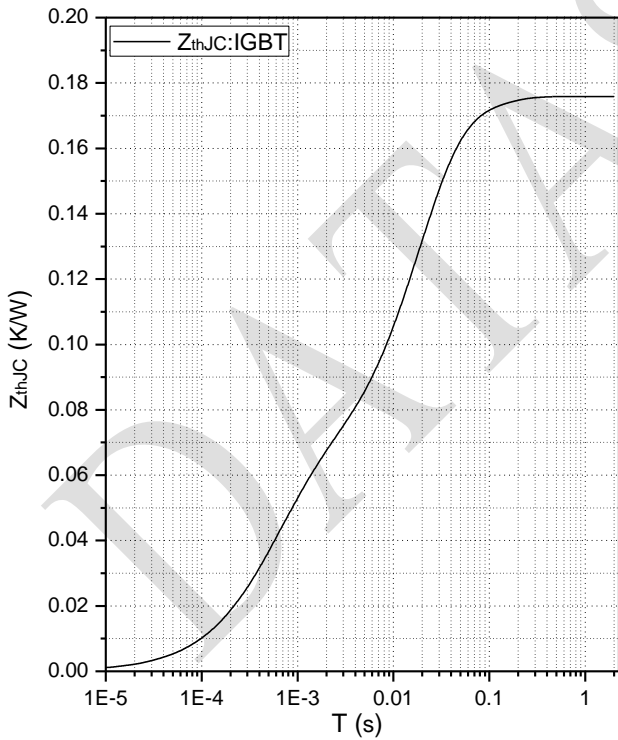


Fig.7 Transient Thermal Impedance (IGBT)

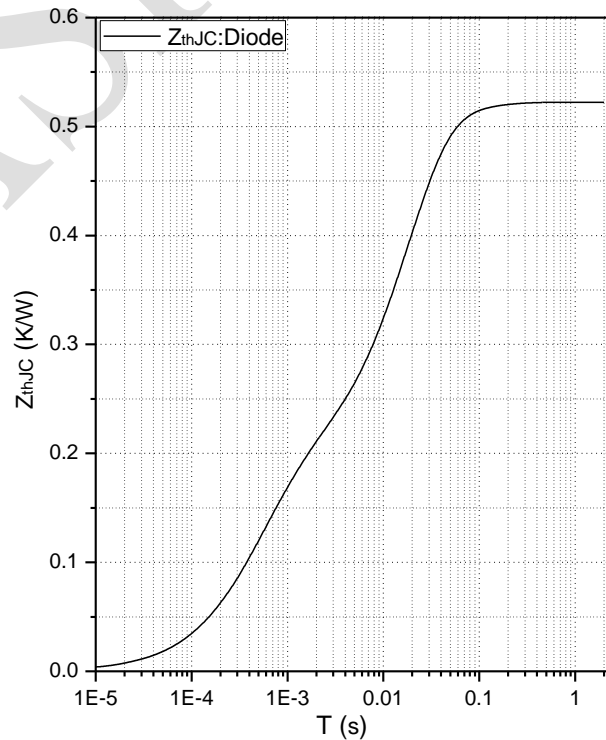
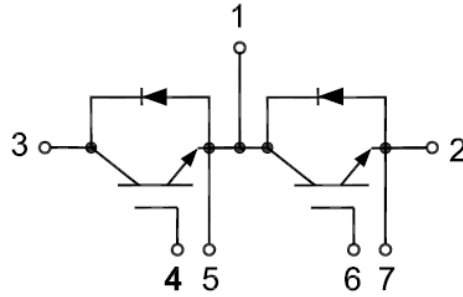


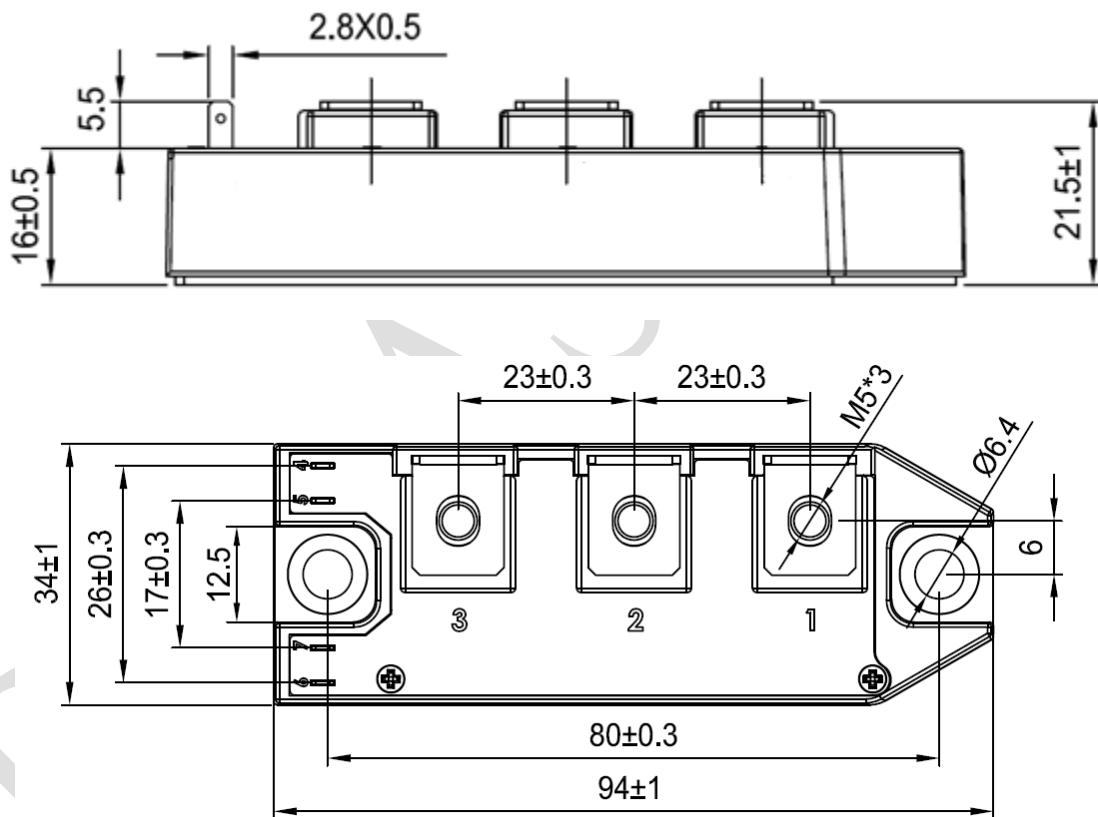
Fig.8 Transient Thermal Impedance (Diode)



## Internal Circuit



## Package Outline (Unit: mm):







Date	Revision	Notes
03/18/2021	A	Final Version

## Announcements

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The released datasheet would be issued with “REV.” + “alphabet characters”.

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