

600V - 22A - IGBT Application: Inverter

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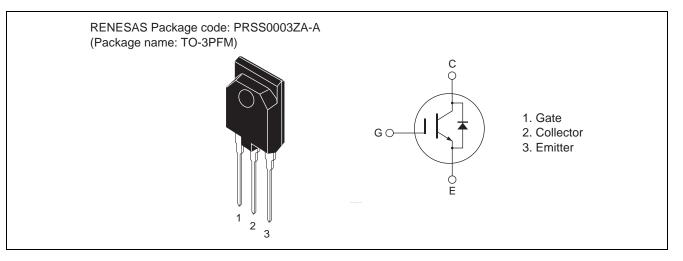
Datasheet

#### Features

- Short circuit withstand time (5 µs typ.)
- Low collector to emitter saturation voltage  $V_{CE(sat)} = 1.6 V$  typ. (at  $I_C = 22 A$ ,  $V_{GE} = 15 V$ ,  $Ta = 25^{\circ}C$ )
- Built in fast recovery diode (100 ns typ.) in one package
- Trench gate and thin wafer technology
- High speed switching

 $t_f = 70$  ns typ. (at  $V_{CC} = 300$  V,  $V_{GE} = 15$  V,  $I_C = 22$  A, Rg = 5  $\Omega$ ,  $Ta = 25^{\circ}C$ , inductive load)

#### Outline



### **Absolute Maximum Ratings**

		1	$(Ta = 25^{\circ}C)$
Item	Symbol	Ratings	Unit
tage / diode reverse voltage	$V_{CES} / V_{R}$	600	V
	V <sub>GES</sub>	±30	V
$Tc = 25^{\circ}C$	Ι <sub>C</sub>	45	А
Tc = 100°C	Ι <sub>C</sub>	22	А
· ·	ic(peak) Note1	90	А
de forward current	I <sub>DF</sub>	22	А
de forward peak current	i <sub>DF</sub> (peak) <sup>Note1</sup>	90	А
	P <sub>C</sub> <sup>Note2</sup>	40	W
al resistance (IGBT)		3.13	°C/W
al resistance (Diode)	θj-cd <sup>Note2</sup>	4.58	°C/W
	Tj	150	°C
	Tstg	-55 to +150	٥°
	$Tc = 25^{\circ}C$ $Tc = 100^{\circ}C$ de forward current de forward peak current al resistance (IGBT)	tage / diode reverse voltage $V_{CES} / V_R$ Image / diode reverse voltage $V_{CES} / V_R$ VGES $V_{GES}$ Image / diode reverse voltage $V_{CES} / V_R$ VGES     Ic       Image / diode reverse voltage $I_C$ Image / diode reverse voltage     Ic       Image / diode reverse voltage <td>tage / diode reverse voltage<math>V_{CES} / V_R</math>600VGES<math>\frac{1}{300}</math>Tc = 25°CIcIc45Tc = 100°CIcIc(peak)90de forward currentIDFIDF(peak)90PcNote19090de forward peak currentIDF(peak)Note240al resistance (IGBT)<math>\theta</math>j-cdNote23.13al resistance (Diode)<math>\theta</math>j-cdTj150</td>	tage / diode reverse voltage $V_{CES} / V_R$ 600VGES $\frac{1}{300}$ Tc = 25°CIcIc45Tc = 100°CIcIc(peak)90de forward currentIDFIDF(peak)90PcNote19090de forward peak currentIDF(peak)Note240al resistance (IGBT) $\theta$ j-cdNote23.13al resistance (Diode) $\theta$ j-cdTj150

Notes: 1. PW  $\leq$  10  $\mu s,\,duty\,cycle \leq$  1%

2. Value at Tc = 25°C



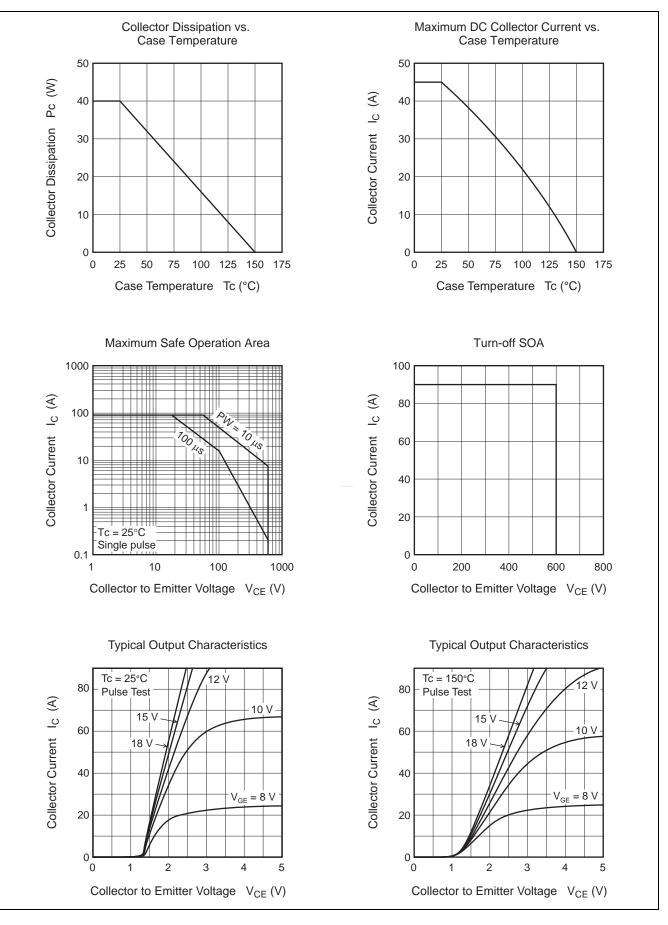
# **Electrical Characteristics**

						$(Ta = 25^{\circ}C)$
Item	Symbol	Min	Тур	Max	Unit	Test Conditions
Collector to emitter breakdown voltage	$V_{BR(CES)}$	600	—	—	V	$I_{C} = 10 \ \mu A, \ V_{GE} = 0$
Zero gate voltage collector current / Diode reverse current	I <sub>CES</sub> / I <sub>R</sub>	_	_	5	μΑ	$V_{CE} = 600 \text{ V}, \text{ V}_{GE} = 0$
Gate to emitter leak current	I <sub>GES</sub>		—	±1	μA	$V_{GE} = \pm 30 \text{ V},  V_{CE} = 0$
Gate to emitter cutoff voltage	V <sub>GE(off)</sub>	4.0	—	6.0	V	$V_{CE} = 10 \text{ V}, I_{C} = 1 \text{ mA}$
Collector to emitter saturation voltage	V <sub>CE(sat)</sub>		1.6	2.2	V	$I_{C} = 22 \text{ A}, V_{GE} = 15 \text{ V}^{\text{Note3}}$
	V <sub>CE(sat)</sub>		2.0		V	$I_{C} = 45 \text{ A}, V_{GE} = 15 \text{ V}^{\text{Note3}}$
Input capacitance	Cies		1050		pF	V <sub>CE</sub> = 25 V
Output capacitance	Coes		60	—	pF	$V_{GE} = 0$
Reveres transfer capacitance	Cres	_	28	_	pF	f = 1 MHz
Total gate charge	Qg	_	46	_	nC	$V_{GE} = 15 V$ $V_{CE} = 300 V$ $I_{C} = 22 A$
Gate to emitter charge	Qge	_	8	_	nC	
Gate to collector charge	Qgc	_	16	_	nC	
Turn-on delay time	t <sub>d(on)</sub>	_	40		ns	$V_{CC} = 300 V$ $V_{GE} = 15 V$ $I_{C} = 22 A$ $Rg = 5 \Omega$ Inductive load
Rise time	tr		20	_	ns	
Turn-off delay time	t <sub>d(off)</sub>	_	80	_	ns	
Fall time	t <sub>f</sub>	_	70	_	ns	
Turn-on energy	Eon	_	0.23	_	mJ	
Turn-off energy	E <sub>off</sub>	_	0.29	_	mJ	
Total switching energy	E <sub>total</sub>	_	0.52	_	mJ	
Short circuit withstand time	t <sub>sc</sub>	3.0	5.0	_	μS	$V_{CC} \leq 360~V$ , $V_{GE}$ = 15 $V$
FRD forward voltage	V <sub>F</sub>	_	1.4	1.9	V	$I_F = 22 \text{ A}^{\text{Note3}}$
FRD reverse recovery time	t <sub>rr</sub>	_	100		ns	I <sub>F</sub> = 22 A
FRD reverse recovery charge	Q <sub>rr</sub>	_	0.15		μC	di <sub>F</sub> /dt = 100 A/µs
FRD peak reverse recovery current	l <sub>rr</sub>	_	4.4		A	

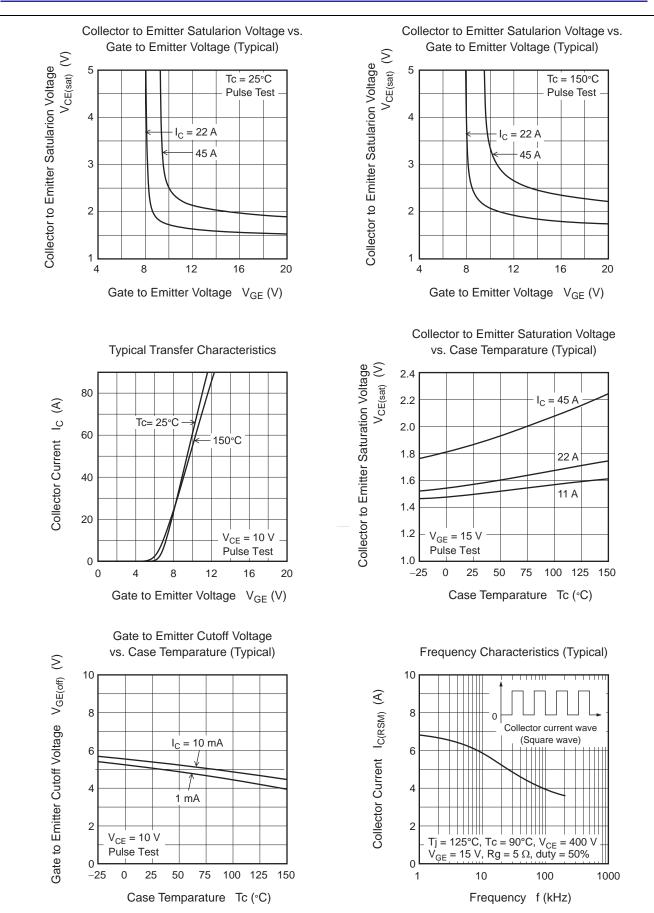
Notes: 3. Pulse test

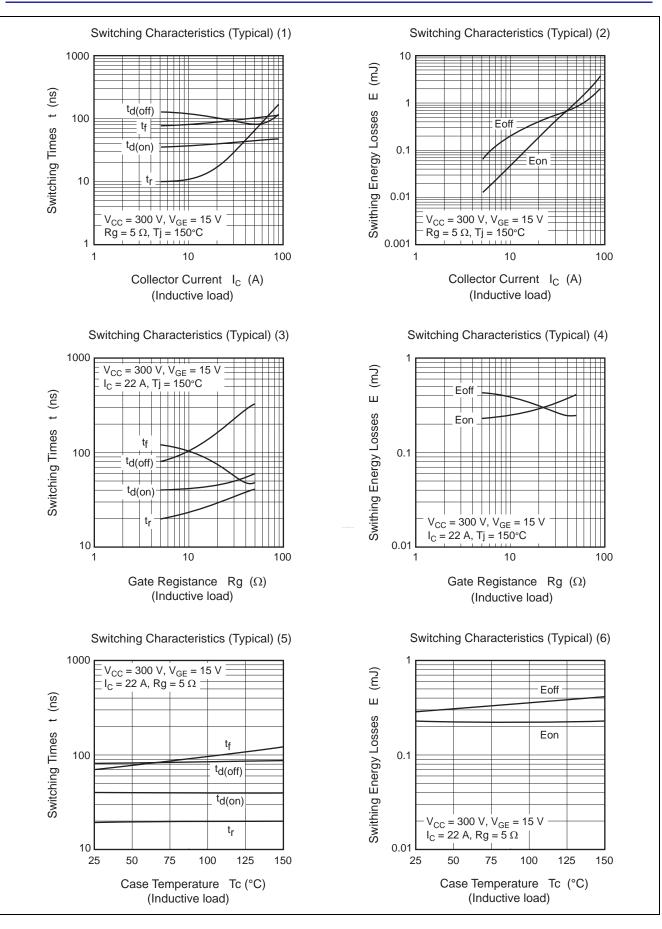


#### **Main Characteristics**

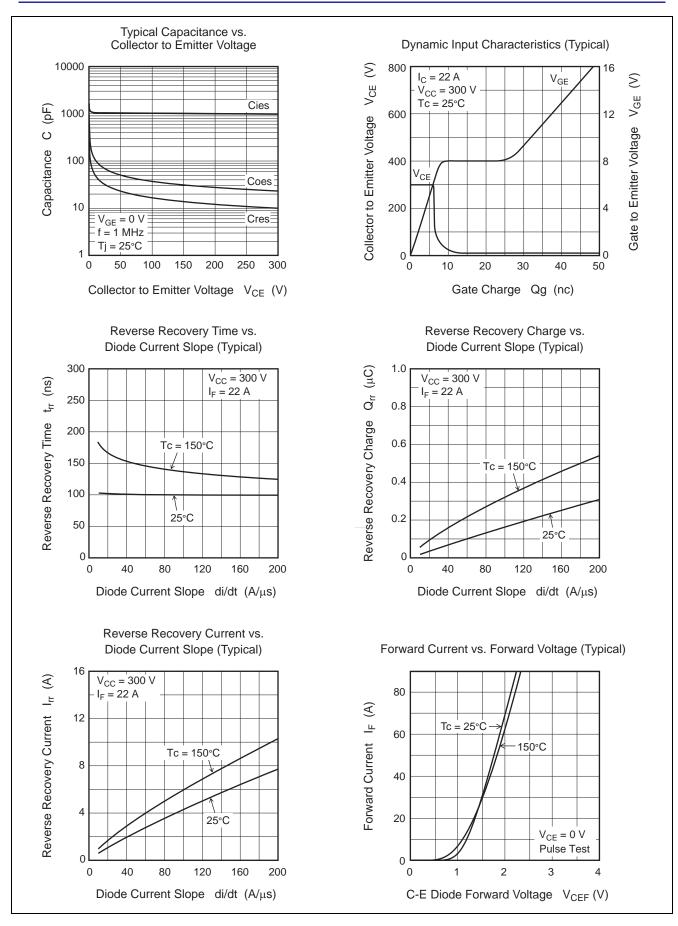




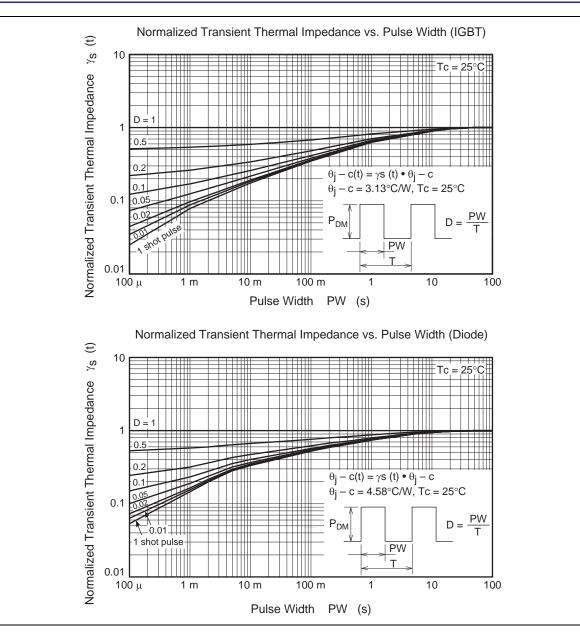




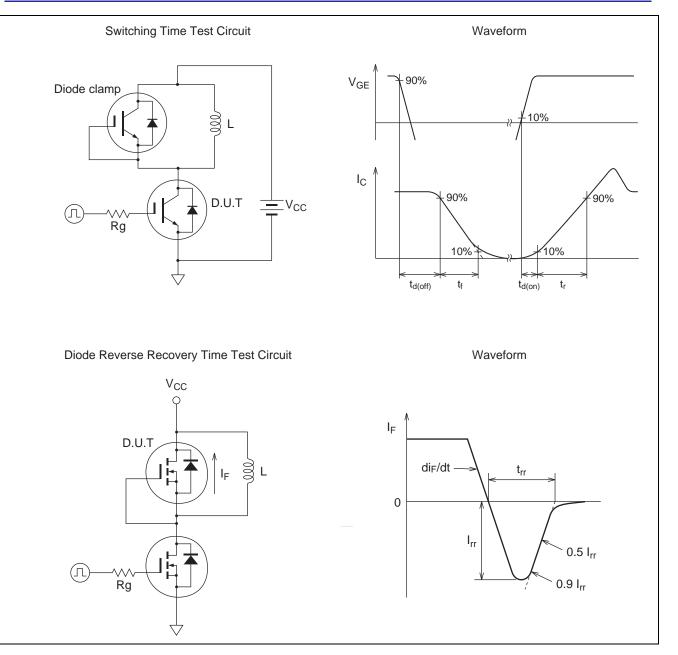






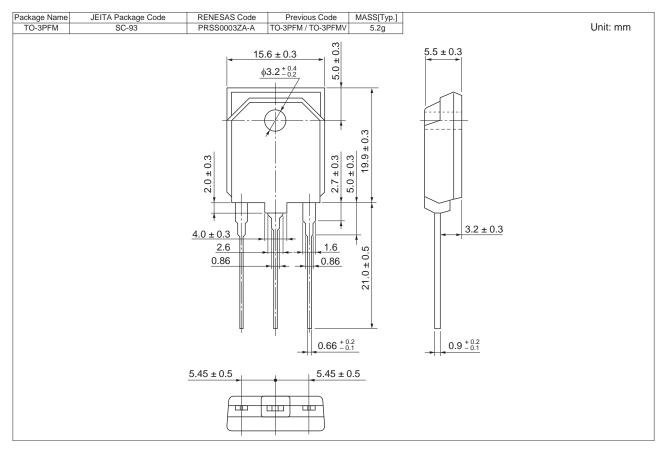








### **Package Dimension**



## **Ordering Information**

Orderable Part No.	Quantity	Shipping Container		
RJH60D0DPM-00#T1	360 pcs	Box (Tube)		



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