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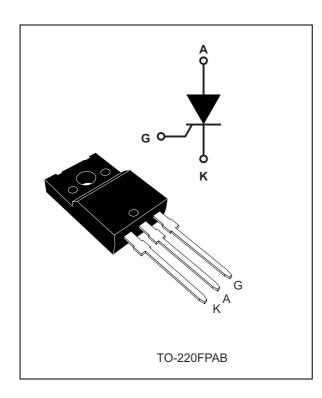


TN2015H-6FP



High temperature 20 A SCRs

Datasheet - production data



Features

- High junction temperature: T_i = 150 °C
- High noise immunity $dV/dt = 750 V/\mu s$ up to 150 °C
- Gate triggering current I_{GT} = 15 mA
- Blocking voltage V_{DRM}/V_{RRM} = 600 V
- High turn on current rise dl/dt: 100 A/μs
- ECOPACK[®]2 compliant component
- Complies with UL standards (File ref: E81734)
- Insulated package TO-220FPAB:
 - Insulated voltage: 2000 VRMS

Applications

- · Voltage regulator circuits for motorbikes
- Inrush current limiting circuits
- Motor control circuits and starters
- Light dimmers
- Solid state relays

Description

Thanks to a junction temperature T_j up to 150 °C and an insulated TO-220FPAB package, the TN2015H-6FP offers high thermal performance operation up to 20 A rms.

The trade-off between the device's noise immunity (dV/dt = 750 V/ μ s), its gate triggering current (I_{GT} = 15 mA) and its turn-on current rise (dl/dt = 100 A/ μ s) allows the design of robust and compact control circuits for voltage regulators in motorbikes and industrial drives, overvoltage crowbar protection, motor control circuits in power tools and kitchen aids, inrush current limiting circuits.

The insulated fullpack package allows a back-to-back configuration.

Table 1. Device summary

Order code	Package	V_{DRM}/V_{RRM}	I _{GT}		
TN2015H-6FP	TO-220FPAB	600 V	15 mA		

Characteristics TN2015H-6FP

1 Characteristics

Table 2. Absolute ratings

Symbol	Paramete	r		Value	Unit	
I _{T(RMS)}	On-state rms current (180° conduction angle) $T_c = 80^{\circ}$		T _c = 80 °C	20	Α	
			T _c = 80 °C	12.7		
$I_{T(AV)}$	Average on-state current (180° conduction angle)		T _c = 99 °C	10	Α	
			T _c = 112 °C	8		
1.	Non repetitive surge peak on-state curre	ent	t = 8.3 ms	197	Α	
I _{TSM}	$(T_j \text{ initial} = 25 \text{ °C})$		t = 10 ms	180	A	
l ² t	I ² t value for fusing (T _j initial = 25 °C)		t _p = 10 ms	162	A ² s	
dI/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}, t_r \le 100 \text{ ns}, T_i = 25 \text{ °C}$		F = 60 Hz	100	A/μs	
V _{DRM} , V _{RRM}	Repetitive peak off-state voltage			600	V	
I_{GM}	Peak gate current	t _p = 20 μs	T _j = 150 °C	4	Α	
P _{G(AV)}	Average gate power dissipation		T _j = 150 °C	1	W	
T _{stg} T _j	Storage junction temperature range Operating junction temperature range		- 40 to + 150 - 40 to + 150	°C		
T _L	Maximum lead temperature for soldering during 10 s			260	°C	
V _{ins}	Insulation rms voltage, 1 minute	2000	٧			

Table 3. Electrical characteristics (T_j = 25 °C, unless otherwise specified)

Symbol	Test conditions			Value	Unit
1	I_{GT} $V_D = 12 \text{ V}, R_L = 33 \Omega$		Тур.	6	mA
'GT				Max.	15
V_{GT}	$V_D = 12 \text{ V}, R_L = 33 \Omega$		Max.	1.3	V
V _{GD}	$V_D = V_{DRM}, R_L = 3.3 \text{ k}\Omega$ $T_j = 150 ^{\circ}\text{C}$		Min.	0.2	V
I _H	I _T = 500 mA, gate open		Max.	50	mA
ΙL	$I_G = 1.2 \times I_{GT}$		Max.	60	mA
dV/dt	V _D = 402 V, gate open	T _j = 150 °C	Min.	750	V/µs
t _{gt}	$I_T = 40 \text{ A}, V_D = 600 \text{ V}, I_G = 100 \text{ mA},$ $(dI_G/dt) \text{max} = 0.2 \text{ A/}\mu\text{s}$		Тур	1.9	μs
t _q	$V_D = 402 \text{ V}, V_R = 25 \text{ V}, I_T = 20 \text{ A}, \\ (dI_G/dt)max = 30 \text{ A/}\mu\text{s}, dV_D/dt = 50 \text{ V/}\mu\text{s} $ $T_j = 150 \text{ °C}$		Тур	70	μs

TN2015H-6FP Characteristics

Table 4. Static characteristics

Symbol	Test conditions		Value	Unit	
V_{TM}	$I_{TM} = 40 \text{ A}, t_p = 380 \mu\text{s}$	T _j = 25 °C	Max.	1.6	V
V _{t0}	Threshold voltage	T _j = 150 °C	Max.	0.82	٧
R _d	Dynamic resistance	T _j = 150 °C	Max.	17.5	mΩ
I _{DRM,}	V V V	T _j = 25 °C	Max.	5	μΑ
I _{RRM}	$V_D = V_{DRM}, V_R = V_{RRM}$	T _j = 150 °C	iviax.	2	mA

Table 5. Thermal resistance

Syn	nbol	Parameter	Value	Unit
R_{th}	h(j-c)	Junction to case (AC)	4.0	°C/W
R _{th}	n(j-a)	Junction to ambient (DC)	60	°C/W

Figure 1. Maximum power dissipation versus average on-state current

20 P(W) α = 180°. DC. 18 α = 120° α = 90° 16 14 $\alpha = 30$ 12 10 8 6 4 2 $I_{T(AV)}(A)$ 15 10

Figure 2. Average and DC on-state current versus case temperature

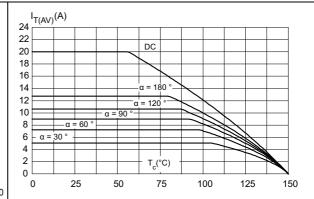
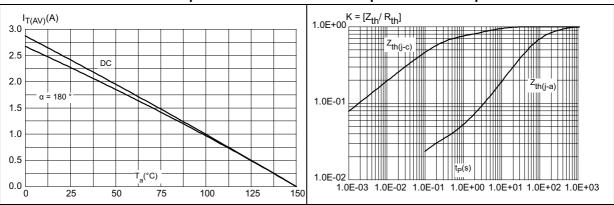


Figure 3. Average and DC on-state current versus ambient temperature

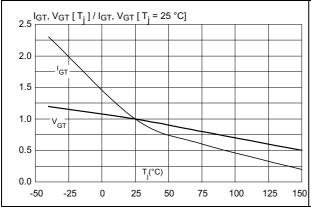
Figure 4. Relative variation of thermal impedance versus pulse duration



Characteristics TN2015H-6FP

Figure 5. Relative variation of gate triggering current and gate voltage versus junction temperature (typical values)

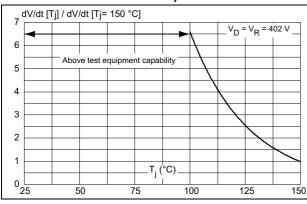
Figure 6. Relative variation of holding current and latching current versus junction temperature (typical values)



2.5 2.0 1.5 1.0 1.0 0.5 0.0 -50 -25 0 25 50 75 100 125 150

Figure 7. Relative variation of static dV/dt immunity versus junction temperature (typical values)

Figure 8. Surge peak on-state current versus number of cycles



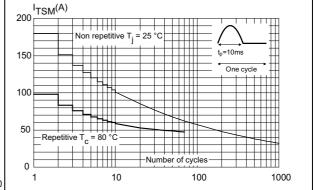
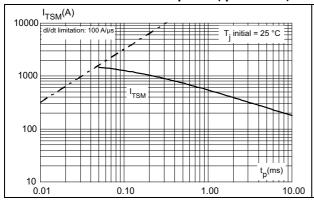
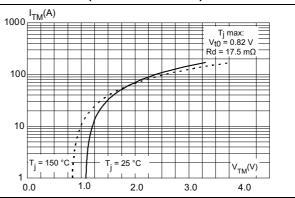


Figure 9. Non-repetitive surge peak on-state current for a sinusoidal pulse (tp < 10 ms)

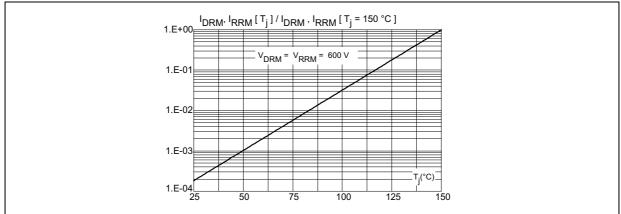
Figure 10. On-state characteristics (maximum values)





TN2015H-6FP Characteristics

Figure 11. Relative variation of leakage current versus junction temperature (tp < 10 ms)



Package information TN2015H-6FP

2 **Package information**

- Epoxy meets UL94, V0
- Lead-free package
- Halogen free molding compound
- Recommended torque: 0.4 to 0.6 N·m

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK[®] packages, depending on their level of environmental compliance. ECOPACK[®] specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK[®] is an ST trademark.

Н Dia L6 L2 L7 L3 L5 D F1 L4 F2 F Ε G1 G

Figure 12. TO-220FPAB dimension definitions

Table 6. TO-220FPAB dimensions

		Dimer	nsions	
Ref.	Millin	Millimeters		hes
	Min.	Max.	Min.	Max.
А	4.4	4.6	0.173	0.181
В	2.5	2.7	0.098	0.106
D	2.5	2.75	0.098	0.108
Е	0.45	0.70	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.70	0.045	0.067
F2	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.4	2.7	0.094	0.106
Н	10	10.4	0.393	0.409
L2	16 ⁻	Тур.	0.63	Тур.
L3	28.6	30.6	1.126	1.205
L4	9.8	10.6	0.386	0.417
L5	2.9	3.6	0.114	0.142
L6	15.9	16.4	0.626	0.646
L7	9.00	9.30	0.354	0.366
Dia.	3.00	3.20	0.118	0.126

Ordering information TN2015H-6FP

3 Ordering information

Figure 13. Ordering information scheme

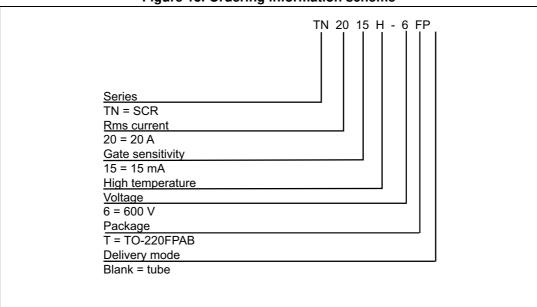


Table 7. Ordering information

Order code Marking		Package	Weight	Base qty	Delivery mode
TN2015H-6FP	TN2015H6	TO-220FPAB	2.0 g	50	Tube

4 Revision history

Table 8. Document revision history

	Date	Revision	Changes
25	5-Feb-2015	1	Initial release.

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