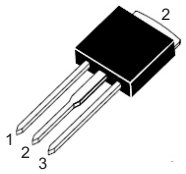
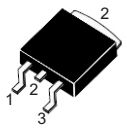
Sensitive and Standard SCRs, 12A

Main Features

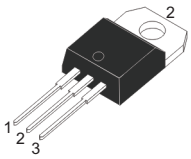
Symbol	Value	Unit
$I_{T(RMS)}$	12	A
V_{DRM}/V_{RRM}	600 to 1000	V
I_{GT}	0.2 to 15	mA



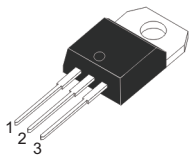
TO-251 **(I-PAK)**
(12PTxxF)



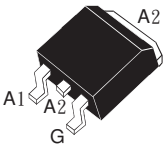
TO-252 **(D-PAK)**
(12PTxxG)



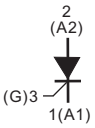
TO-220AB **(Non-Insulated)**
(12PTxxA)



TO-220AB **(Insulated)**
(12PTxxAI)



TO-263 (**D²PAK**)
(12PTxxH)



DESCRIPTION

Available either in sensitive or standard gate triggering levels, the 12A SCR series is suitable to fit all modes of control found in applications such as overvoltage crowbar protection, motor control circuits in power tools and kitchen aids, inrush current limiting circuits, capacitive discharge ignition and voltage regulation circuits.

Available in through-hole or surface-mount packages, they provide an optimized performance in a limited space.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUE	UNIT
RMS on-state current full sine wave (180° conduction angle)	$I_{T(RMS)}$	TO-251/TO-252/TO-220AB/TO-263	T_c=105°C	12	A
		TO-220AB insulated	T_c=90°C		
Average on-state current (180° conduction angle)	$I_{T(AV)}$	TO-251/TO-252/TO-220AB/TO-263	T_c=105°C	8	A
		TO-220AB insulated	T_c=90°C		
Non repetitive surge peak on-state current (full cycle, T_j initial = 25°C)	I_{TSM}	F =50 Hz	t = 20 ms	140	A
		F =60 Hz	t = 16.7 ms	145	
I^2t Value for fusing	I^2t	t_p = 10 ms		98	A^2s
Critical rate of rise of on-state current $I_G = 2xI_{GT}$, $t_r \leq 100ns$	dI/dt	F = 60 Hz	T_j = 125ºC	50	A/µs
Peak gate current	I_{GM}	T_p = 20 µs	T_j = 125ºC	4	A
Average gate power dissipation	$P_{G(AV)}$	T_j =125ºC		1	W
Storage temperature range	T_{stg}			- 40 to + 150	ºC
Operating junction temperature range	T_j			- 40 to + 125	

STANDARD ELECTRICAL SPECIFICATIONS (T_J = 25 ºC, unless otherwise specified)

SYMBOL	TEST CONDITIONS			12PTxxxx		Unit
				T	-	
I_{GT}	V_D = 12 V, R_L = 33Ω		Min.	0.5	2	mA
			Max.	5	15	
V_{GT}			Max.	1.3		V
V_{GD}	$V_D = V_{DRM}$, R_L = 3.3KΩ	T_j = 125°C	Min.	0.2		V
I_H	I_T = 500 mA, gate open		Max.	15	30	mA
I_L	I_G = 1.2 I_{GT}		Max.	30	60	mA
dV/dt	V_D = 67% V_{DRM}, gate open	T_j = 125°C	Min.	40	200	V/µs
V_{TM}	I_{TM} = 24A, t_P = 380 µs	T_j = 25°C	Max.	1.6		V
V_{to}	Threshold voltage	T_j = 125°C	Max.	0.85		V
R_d	Dynamic resistance	T_j = 125°C	Max.	30		mΩ
I_{DRM} I_{RRM}	$V_{DRM} = V_{RRM}$	T_j = 25°C	Max.	5		µA
		T_j = 125°C		2		mA

SENSITIVE ELECTRICAL CHARACTERISTICS (T_j = 25 ºC, unless otherwise specified)

SYMBOL	TEST CONDITIONS			12PTxxxx-S	Unit
I_{GT}	V_D = 12 V, R_L = 140Ω		Max.	200	µA
V_{GT}			Max.	0.8	V
V_{GD}	$V_D = V_{DRM}$, R_L = 3.3KΩ, R_{GK}=220Ω	T_j = 125°C	Min.	0.1	V
V_{RG}	I_{RG} = 10 µA		Min.	8	V
I_H	I_T = 50 mA, R_{GK} = 1 KΩ		Max.	5	mA
I_L	I_G = 1 mA, R_{GK} = 1 KΩ		Max.	6	mA
dV/dt	V_D = 67% V_{DRM}, R_{GK} = 220Ω	T_j = 125°C	Min.	5	V/µs
V_{TM}	I_{TM} = 24A, t_P = 380 µs	T_j = 25°C	Max.	1.6	V
V_{to}	Threshold voltage	T_j = 125°C	Max.	0.85	V
R_d	Dynamic resistance	T_j = 125°C	Max.	30	mΩ
I_{DRM} I_{RRM}	$V_{DRM} = V_{RRM}$, R_{GK} = 220Ω	T_j = 25°C	Max.	5	µA
		T_j = 125°C		2	mA

THERMAL RESISTANCE

SYMBOL	Parameter			VALUE	UNIT
$R_{th(j-c)}$	Junction to case (DC)		IPAK/DPAK/TO-220AB/TO-263	1.3	°C/W
			TO-220AB insulated	4.6	
$R_{th(j-a)}$	Junction to ambient (DC)	S = 0.5 cm^2	D-PAK	70	°C/W
		S = 1 cm^2	D²PAK	45	
			I-PAK	100	
			TO-220AB, TO-220AB insulated	60	

S=Copper surface under tab

PRODUCT SELECTOR

PART NUMBER	VOLTAGE (xx)			SENSITIVITY	PACKAGE
	600 V	800 V	1000 V		
12PTxxA-S/12PTxxAI-S	V	V	V	200 µA	TO-220AB
12PTxxA-T/12PTxxAI-T	V	V	V	0.5~5 mA	TO-220AB
12PTxxA/12PTxxAI	V	V	V	2~15 mA	TO-220AB
12PTxxF-S	V	V	V	200 µA	I-PAK
12PTxxF-T	V	V	V	0.5~5 mA	I-PAK
12PTxxF	V	V	V	2~15 mA	I-PAK
12PTxxG-S	V	V	V	200 µA	D-PAK
12PTxxG-T	V	V	V	0.5~5 mA	D-PAK
12PTxxG	V	V	V	2~15 mA	D-PAK
12PTxxH-S	V	V	V	20 µA	D²-PAK
12PTxxH-T	V	V	V	0.5~5 mA	D²-PAK
12PTxxH	V	V	V	2~15 mA	D²-PAK

ORDERING INFORMATION

ORDERING TYPE	MARKING	PACKAGE	WEIGHT	BASE Q'TY	DELIVERY MODE
12PTxxA-y	12PTxxA-y	TO-220AB	2.0g	50	Tube
12PTxxAI-y	12PTxxAI-y	TO-220AB (insulated)	2.3g	50	Tube
12PTxxF-y	12PTxxF-y	TO-251(I-PAK)	0.40g	80	Tube
12PTxxG-y	12PTxxG-y	TO-252(D-PAK)	0.38g	80	Tube
12PTxxH-y	12PTxxH-y	TO-263(D²-PAK)	2.0g	50	Tube

Note: xx = voltage, y = sensitivity

ORDERING INFORMATION SCHEME

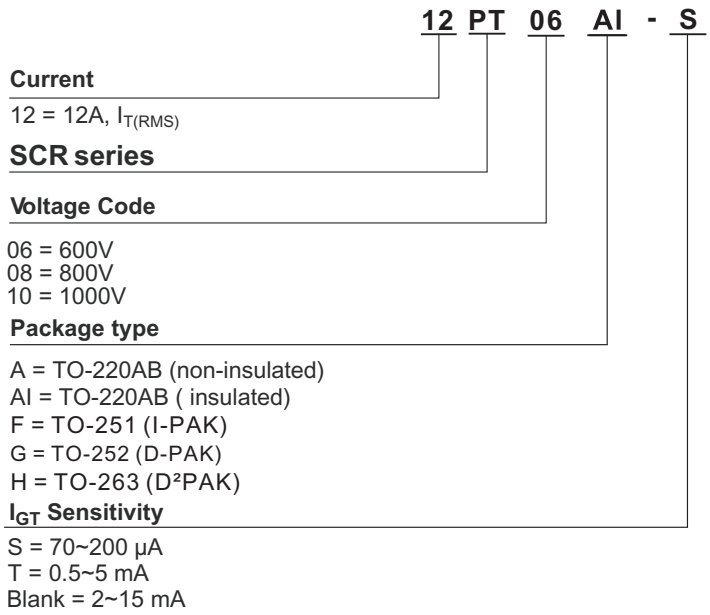


Fig.1 Maximum average power dissipation versus average on-state current

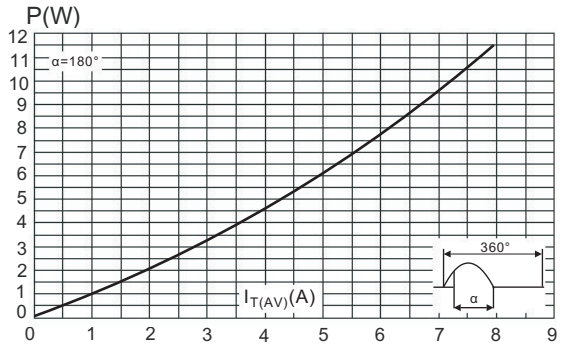


Fig.2 Average and DC on-state current versus case temperature

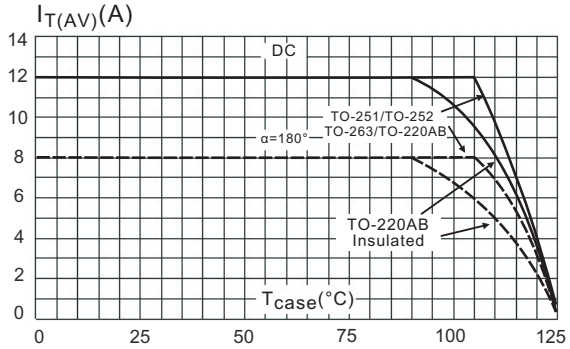


Fig.3 Average and DC on-state current versus ambient temperature (DPAK)

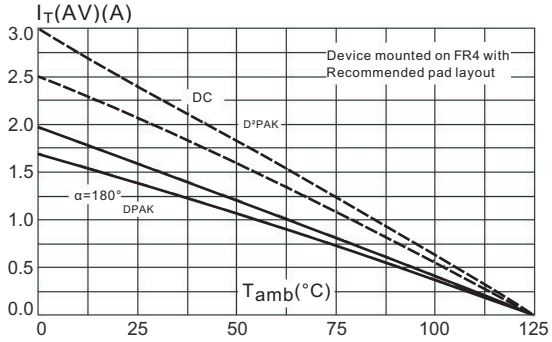


Fig.4 Relative variation of thermal impedance junction to case versus pulse duration

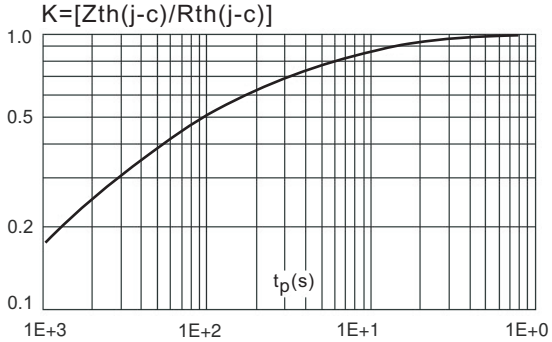


Fig.5 Relative variation of thermal impedance Junction to ambient versus pulse duration (DANK)

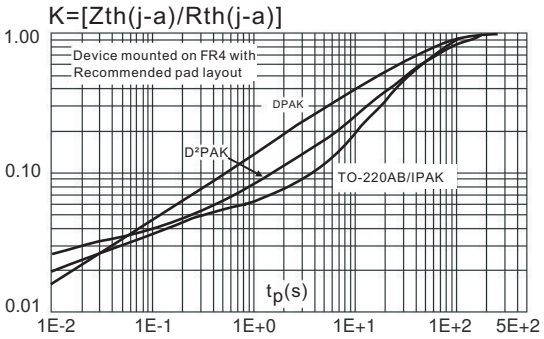


Fig.6 Relative variation of gate trigger and holding current versus junction temperature for I_{GT}=200μA

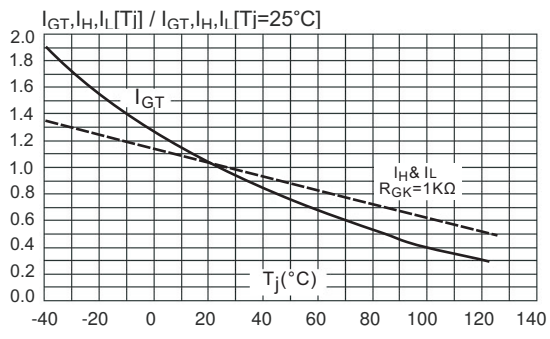


Fig.7 Relative variation of gate trigger and holding current versus junction temperature

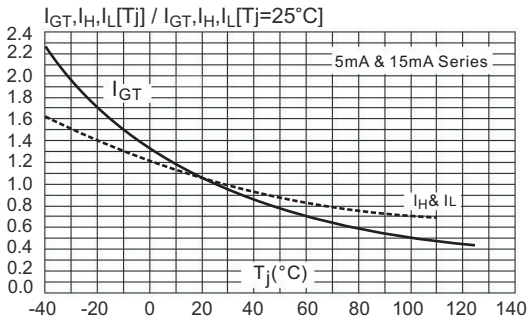


Fig.8 Relative variation of holding current versus gate-cathode resistance (typical values)

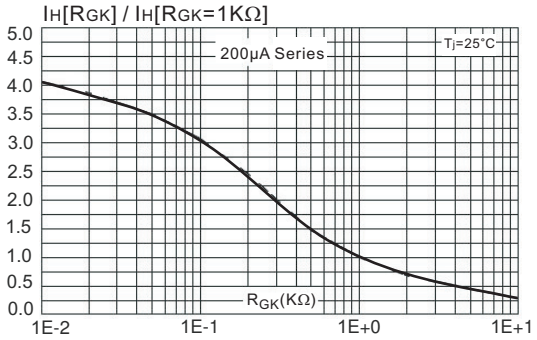


Fig.9 Relative variation of dV/dt immunity versus gate-cathode resistance (Typical values)

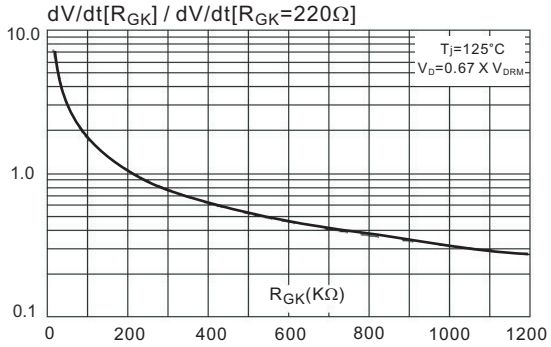


Fig.10 Relative variation of dV/dt immunity versus gate-cathode capacitance (typical values) for I_{GT}=200µA

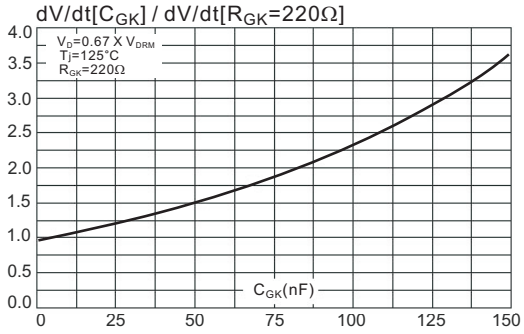


Fig.11 Surge peak on-state current versus number of cycles

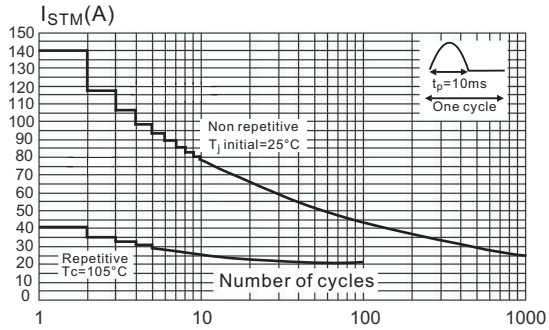


Fig.12 Non-repetitive surge peak on-state current and corresponding values of I²t versus sinusoidal pulse width

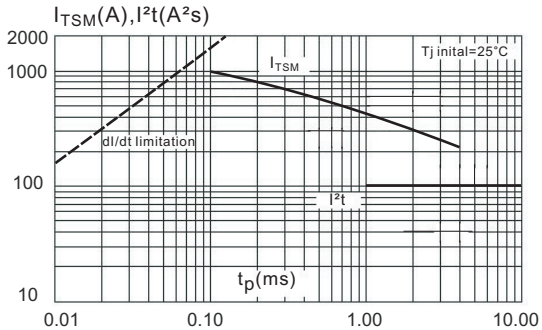


Fig.13 On-state characteristics (maximum values)

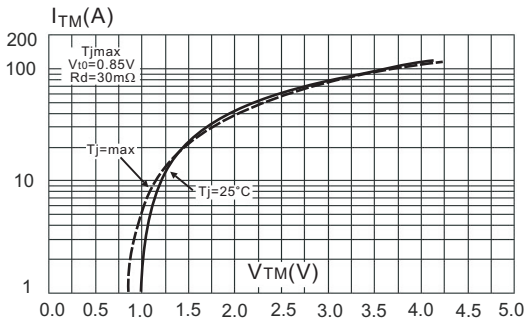
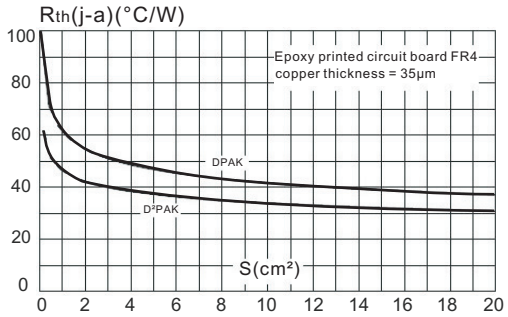
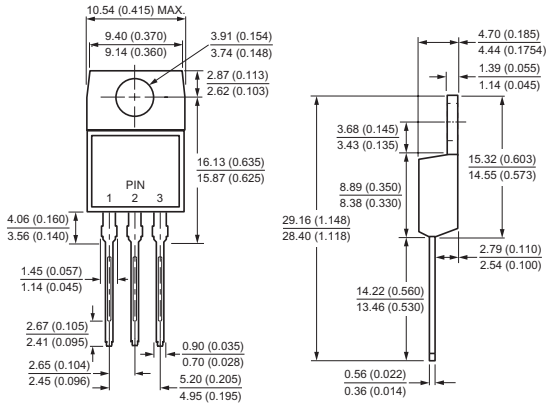


Fig.14 Thermal resistance junction to ambient versus copper surface under tab (D²PAK)

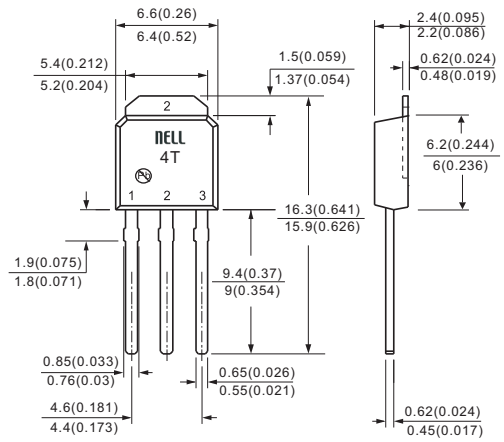


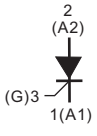
Case Style

TO-220AB



TO-251
(I-PAK)

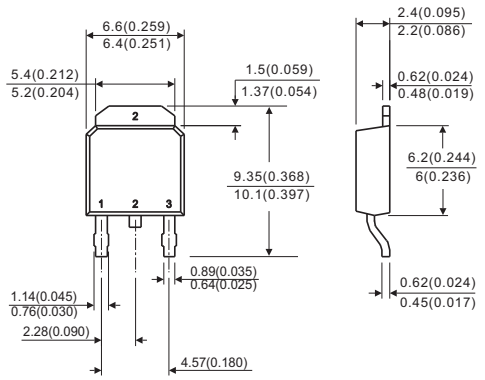




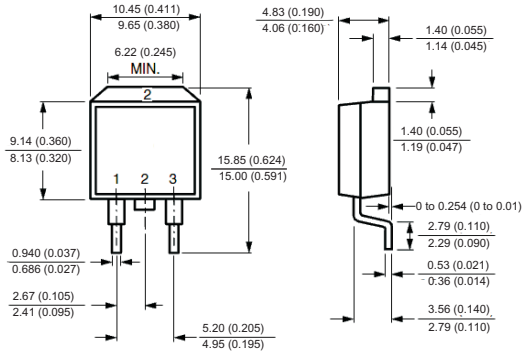
All dimensions in millimeters(inches)

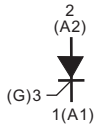
Case Style

TO-252
(D-PAK)



TO-263(D^2PAK)





All dimensions in millimeters(inches)