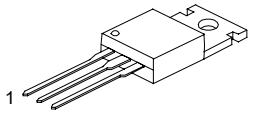
UTC US112S/N SCR

SCRs

DESCRIPTION

The UTC US112S/N 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, in-rush current limiting circuits, capacitive discharge ignition, voltage regulation circuits...



TO-220

1: CATHODE 2: ANODE 3: GATE

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATING		UNIT
		US112S	US112N	
Repetitive peak off-state voltages US112S/N-4 US112S/N-6 US112S/N-8	V_{DRM} V_{RRM}	400 600 800		V
RMS on-state current (180° conduction angle) (Tc = 105°C)	$I_{T(RMS)}$	12		A
Average on-state current (180° conduction angle) (Tc = 105°C)	$I_{T(AV)}$	8		A
Non repetitive surge peak on-state current (Tj = 25°C) tp=8.3ms tp=10ms	I_{TSM}	146 140		A
I^2t Value for fusing (tp = 10 ms, Tj = 25°C)	I^2t	98		A^2S
Critical rate of rise of on-state current (IG = 2 x IGT , tr ≤ 100 n s, F = 60 Hz , Tj = 125°C,)	dI/dt	50		A/μs
Peak gate current (tp=20μs, Tj = 125°C)	I_{GM}	4		A
Maximum peak reverse gate voltage	V_{RGM}		5	V
Average gate power dissipation (Tj = 125°C)	$P_{G(AV)}$	1		W
Storage junction temperature range	Tstg	-40 ~ +150		°C
Operating junction temperature range	Tj	-40 ~ +125		°C

UTC US112S(SENSITIVE) ELECTRICAL CHARACTERISTICS

(Tj=25℃unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	MAX.	UNIT
Gate trigger Current	I_{GT}	V_D = 12 V, R_L =140Ω		200	μA
Gate trigger Voltage	V_{GT}	V_D = 12 V, R_L=140Ω		0.8	V
Gate non-trigger voltage	V_{GD}	V_D = V_{DRM}, R_L = 3.3 kΩ, R_{GK} = 1kΩ Tj = 125°C	0.1		V
Reverse gate voltage	V_{RG}	I_{RG} = 10 μA	8		V
Holding Current	I_H	I_T = 50 mA, R_{GK} = 1 kΩ		5	mA
Latching Current	I_L	I_G = 1 mA ,R_{GK} = 1 kΩ		6	mA
Circuit Rate Of Change Of off-state Voltage	dV/dt	V_D = 67 % V_{DRM} ,R_{GK} = 220 Ω Tj = 125°C	5		V/μs
On-state voltage	V_{TM}	I_{TM} = 24A, t_p = 380 μs, Tj = 25°C		1.6	V
Threshold Voltage	V_{t0}	Tj = 125°C		0.85	V
Dynamic Resistance	R_d	Tj = 125°C		30	mΩ
Off-state Leakage Current	I_{DRM} I_{RRM}	V_{DRM} = V_{RRM}, R_{GK} = 220 Ω Tj = 25°C Tj = 125°C		5 2	μA mA

UTC US112N(STANDARD) ELECTRICAL CHARACTERISTICS

(Tj=25℃unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	MAX.	UNIT
Gate trigger Current	I_{GT}	V_D = 12 V, R_L =33Ω	2	15	mA
Gate trigger Voltage	V_{GT}	V_D = 12 V, R_L=33Ω		1.3	V
Gate non-trigger voltage	V_{GD}	V_D = V_{DRM}, R_L = 3.3 kΩ ,Tj = 125°C	0.2		V
Holding Current	I_H	I_T = 500 mA, Gate open		30	mA
Latching Current	I_L	I_G = 1.2 I_{GT}		60	mA
Circuit Rate Of Change Of off-state Voltage	dV/dt	V_D = 67 % V_{DRM} , Gate open, Tj = 125°C	200		V/μs
On-state voltage	V_{TM}	I_{TM} = 24A, t_p = 380 μs, Tj = 25°C		1.6	V
Threshold Voltage	V_{t0}	Tj = 125°C		0.85	V
Dynamic Resistance	R_d	Tj = 125°C		30	mΩ
Off-state Leakage Current	I_{DRM} I_{RRM}	V_{DRM} = V_{RRM}, Tj = 25°C Tj = 125°C		5 2	μA mA

THERMAL RESISTANCES

PARAMETER	SYMBOL	VALUE	UNIT
Junction to case (DC)	Rth(j-c)	1.3	KW
Junction to ambient	Rth(j-a)	60	K/W

Figure.1:Maximum average power dissipation vs average on-state current.

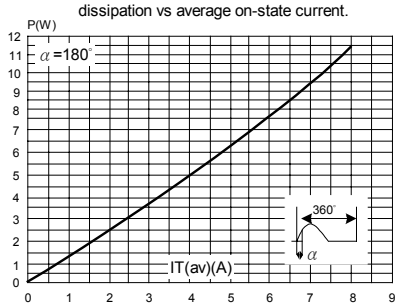


Figure.2:Average and D.C. on-state current vs case temperature

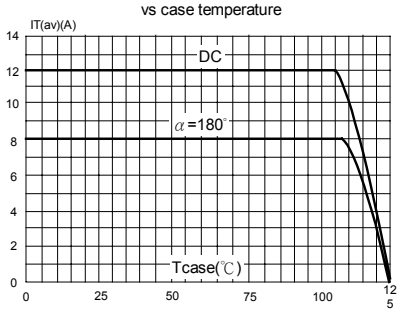


Fig.3-1:Relative variation of thermal impedance junction to case vs pulse duration.

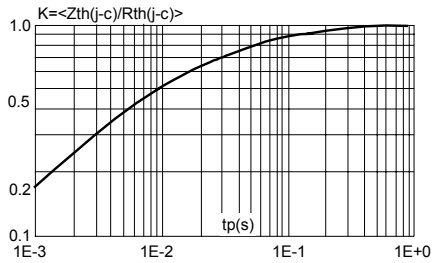


Fig.3-2:Relative variation of thermal impedance junction to ambient vs pulseduration (recommended pad layout,FR4 PC board)

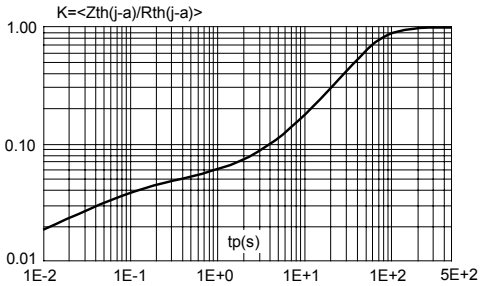


Figure.4-1:Relative variation of gate trigger current,holding current and latching vs junction temperature (US112S)

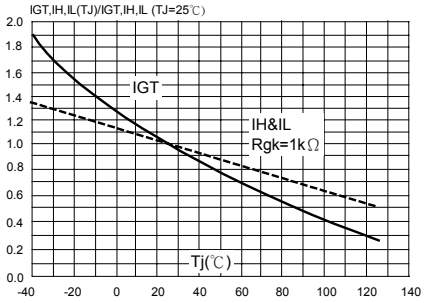


Figure.4-2: Relative variation of gate trigger current,holding current and latching vs junction temperature (US112N).

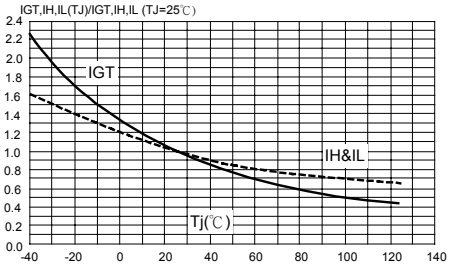


Figure.5:Relative variation of holding current vs gate-cathode resistance(typical values) (US112S)

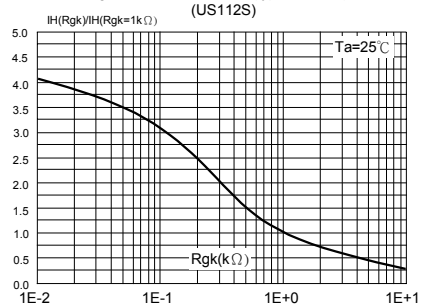


Fig.6: Relative variation of dV/dt immunity vs gate-cathode resistance(typical values) (US112S)

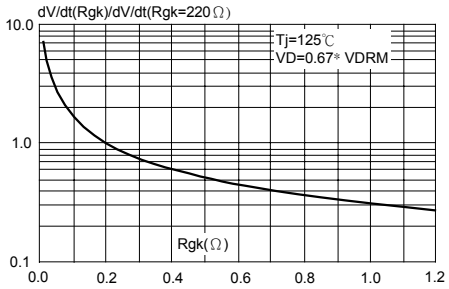


Fig.7: Relative variation of dV/dt immunity vs gate-cathode capacitance(typical values) (US112S)

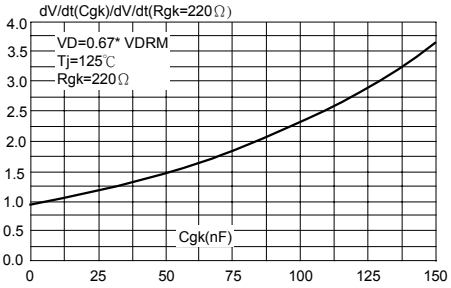


Fig.8: Surge peak on-state current vs number of cycles

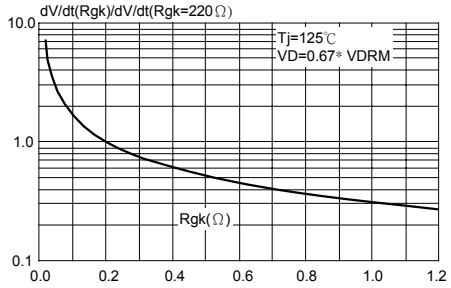


Fig.9:Non-repetitive surge peak on-state current for a sinusoidal pulse with width tp<10ms, and corresponding values of I^2t.

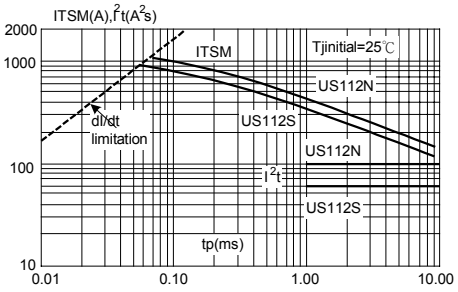


Fig.10: On-state characteristics(maximum values).