



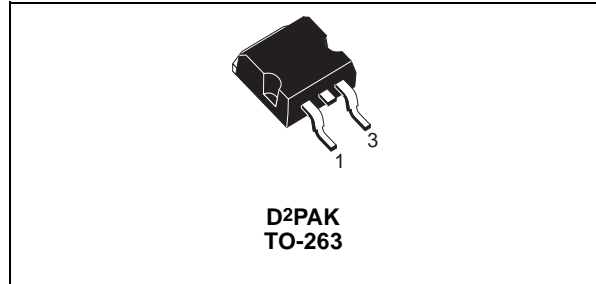
STB70NFS03L

N-CHANNEL 30V - 0.0075 Ω - 70A D²PAK STripFET™ MOSFET PLUS SCHOTTKY RECTIFIER

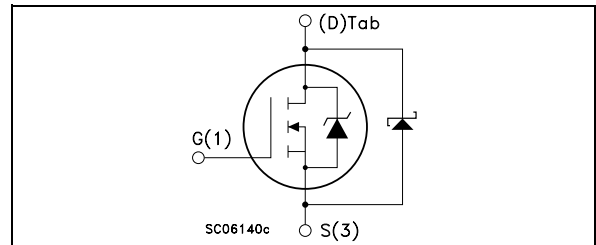
MAIN PRODUCT CHARACTERISTICS			
MOSFET	V _{DSS}	R _{DS(on)}	I _D
	30 V	< 0.0095 Ω	70 A
SCHOTTKY	I _{F(AV)}	V _{RRM}	V _{F(MAX)}
	3 A	30 V	0.51 V

DESCRIPTION

This product associates a Power MOSFET of the STMicroelectronics unique "Single Feature Size" strip-based process and a low drop Schottky diode. The transistor shows the best trade-off between on-resistance and gate charge. Used as low side in buck regulators, the product is the solution in terms of conduction losses and space saving.



INTERNAL SCHEMATIC DIAGRAM



MOSFET ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{DS}	Drain-source Voltage (V _{GS} = 0)	30	V
V _{DGR}	Drain-gate Voltage (R _{GS} = 20 kΩ)	30	V
V _{GS}	Gate- source Voltage	± 18	V
I _D	Drain Current (continuous) at T _C = 25°C	70	A
I _D	Drain Current (continuous) at T _C = 100°C	50	A
I _{DM} (●)	Drain Current (pulsed)	280	A
P _{tot}	Total Dissipation at T _C = 25°C	100	W
	Derating Factor	0.67	W/°C
dv/dt (1)	Peak Diode Recovery voltage slope	5.5	V/ns
E _{AS} (2)	Single Pulse Avalanche Energy	500	mJ
T _{stg}	Storage Temperature	-55 to 175	°C
T _j	Operating Junction Temperature		

(●) Current limited by the package

(1) I_{SD} ≤ 70A, di/dt ≤ 350A/μs, V_{DD} ≤ V_{(BR)DSS}, T_j ≤ T_{JMAX}

(2) Starting T_j = 25 °C, I_D = 35A, V_{DD} = 25V

SCHOTTKY ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{RRM}	Repetitive Peak Reverse Voltage	30	V
I _{F(RMS)}	RMS Forward Current	20	A
I _{F(AV)}	Average Forward Current	3	A
I _{FSM}	Surge Non Repetitive Forward Current	75	A
dv/dt	Critical Rate Of Rise Of Reverse Voltage	10000	V/μs

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TERMAL DATA

Rthj-case	Thermal Resistance Junction-case	Max	1.5	°C/W
Rthj-amb	Thermal Resistance Junction-ambient	Max	62.5	°C/W
T _l	Maximum Lead Temperature For Soldering Purpose		300	°C

ELECTRICAL CHARACTERISTICS (T_j = 25 °C unless otherwise specified)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{(BR)DSS}	Drain-source Breakdown Voltage	I _D = 250 μA, V _{GS} = 0	30			V
I _{DSS}	Zero Gate Voltage Drain Current (V _{GS} = 0)	V _{DS} = Max Rating V _{DS} = Max Rating T _C = 125°C			1 10	μA μA
I _{GSS}	Gate-body Leakage Current (V _{DS} = 0)	V _{GS} = ± 18 V			±100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} I _D = 250 μA	1			V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} = 10 V I _D = 35 A V _{GS} = 5 V I _D = 18 A		0.0075 0.0135	0.0095 0.018	Ω Ω

SCHOTTKY STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _R (*)	Reversed Leakage Current	T _J = 25 °C V _R = 30 V T _J = 125 °C V _R = 30 V		0.03	0.2 100	mA mA
V _F (*)	Forward Voltage drop	T _J = 25 °C I _F = 3 A T _J = 125 °C I _F = 3 A		0.42	0.51 0.46	V V

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
g _{fs} (*)	Forward Transconductance	V _{DS} = 25 V I _D = 35 A		25		S
C _{iss} C _{oss} C _{rss}	Input Capacitance Output Capacitance Reverse Transfer Capacitance	V _{DS} = 25V, f = 1 MHz, V _{GS} = 0		1440 560 135		pF pF pF

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r	Turn-on Delay Time Rise Time	$V_{DD} = 15\text{ V}$ $I_D = 35\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 5\text{ V}$ (Resistive Load, Figure 1)		22 165		ns ns
Q_g Q_{gs} Q_{gd}	Total Gate Charge Gate-Source Charge Gate-Drain Charge	$V_{DD} = 15\text{ V}$ $I_D = 70\text{ A}$ $V_{GS} = 5\text{ V}$ (see test circuit, Figure 2)		22.5 9 12	30	nC nC nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(off)}$ t_f	Turn-off Delay Time Fall Time	$V_{DD} = 15\text{ V}$ $I_D = 35\text{ A}$ $R_G = 4.7\ \Omega$, $V_{GS} = 5\text{ V}$ (Resistive Load, Figure 1)		21 25		ns ns

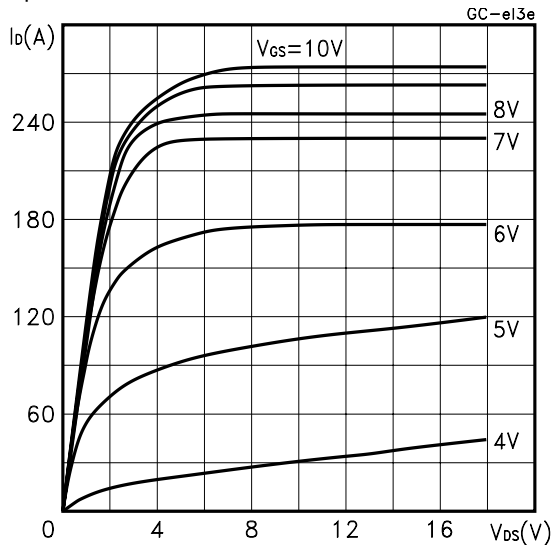
SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD} $I_{SDM} (\bullet)$	Source-drain Current Source-drain Current (pulsed)				70 280	A A
$V_{SD} (*)$	Forward On Voltage	$I_{SD} = 70\text{ A}$ $V_{GS} = 0$			1.3	V
t_{rr} Q_{rr} I_{RRM}	Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current	$I_{SD} = 70\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 20\text{ V}$ $T_j = 150^\circ\text{C}$ (see test circuit, Figure 3)		42 52 2.5		ns nC A

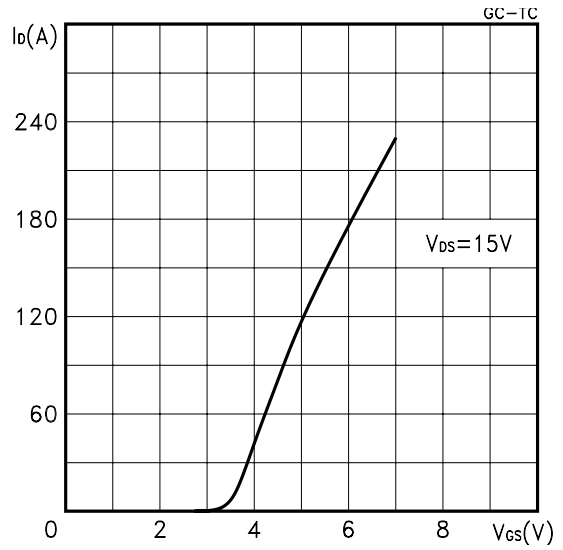
(*) Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %.

(\bullet) Pulse width limited by safe operating area.

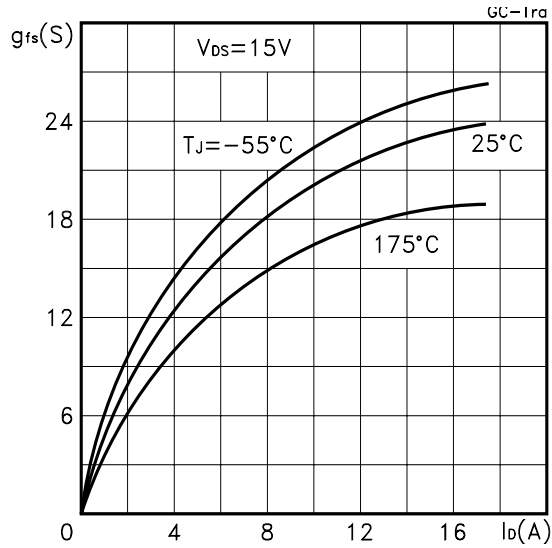
Output Characteristics



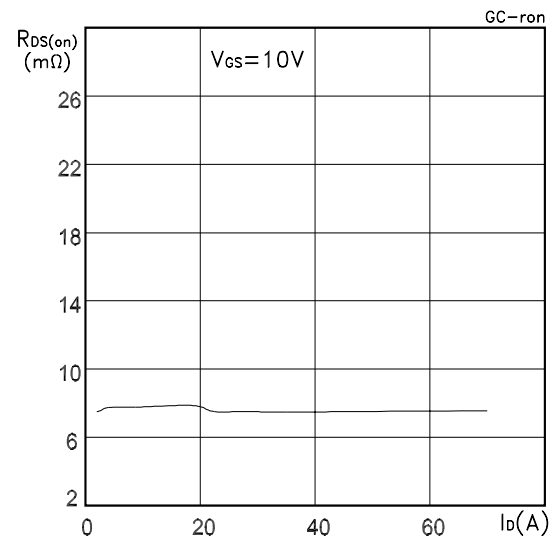
Transfer Characteristics



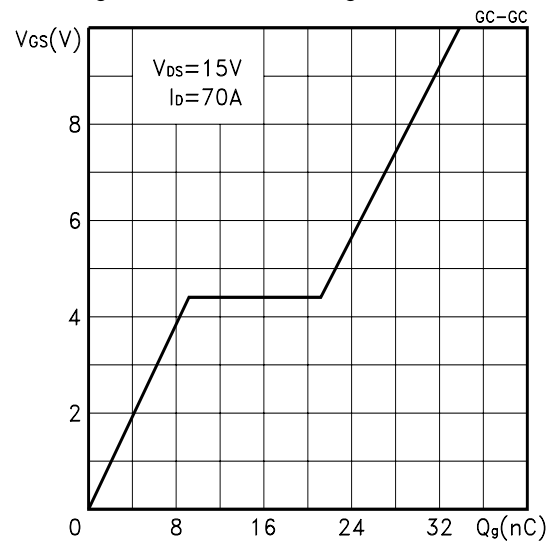
Transconductance



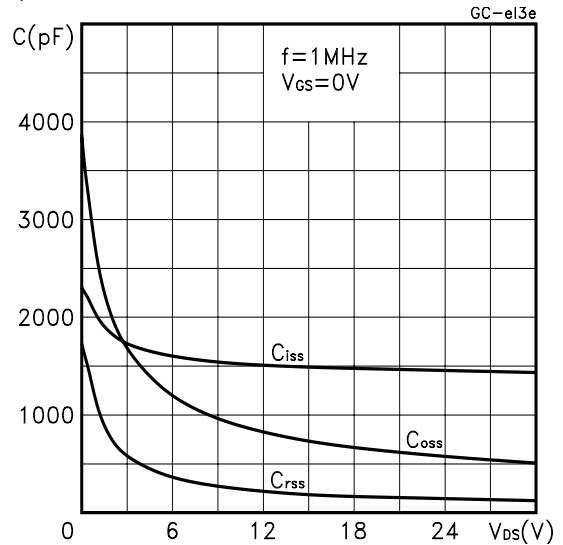
Static Drain-source On Resistance



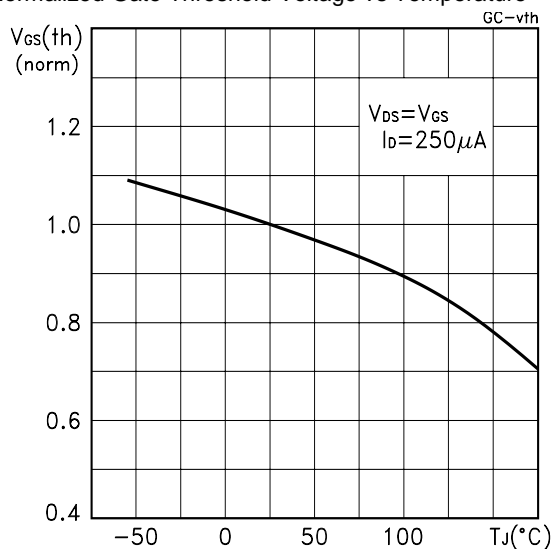
Gate Charge vs Gate-source Voltage



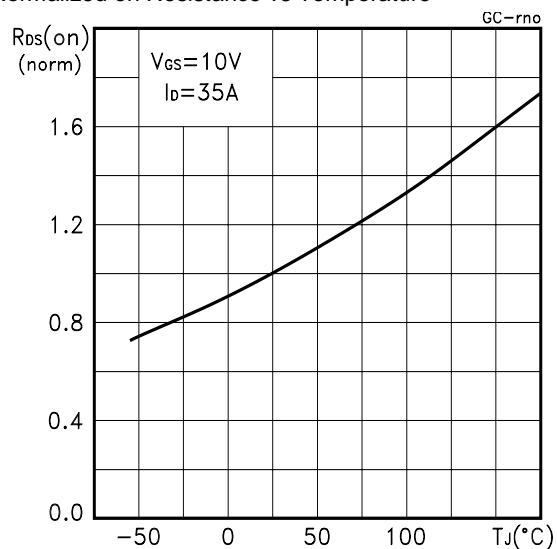
Capacitance Variations



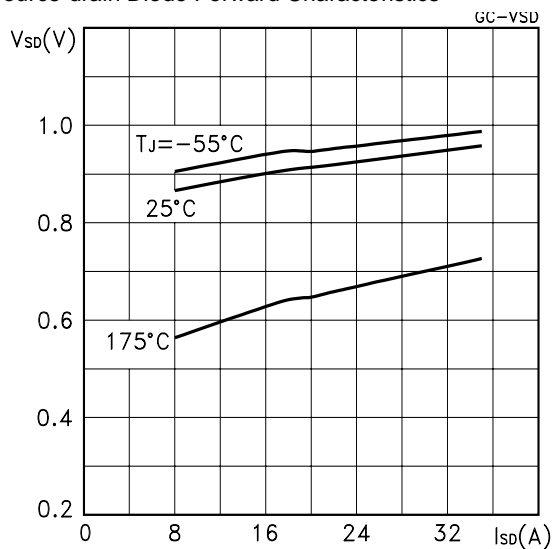
Normalized Gate Threshold Voltage vs Temperature



Normalized on Resistance vs Temperature



Source-drain Diode Forward Characteristics



Normalized Breakdown Voltage vs Temperature.

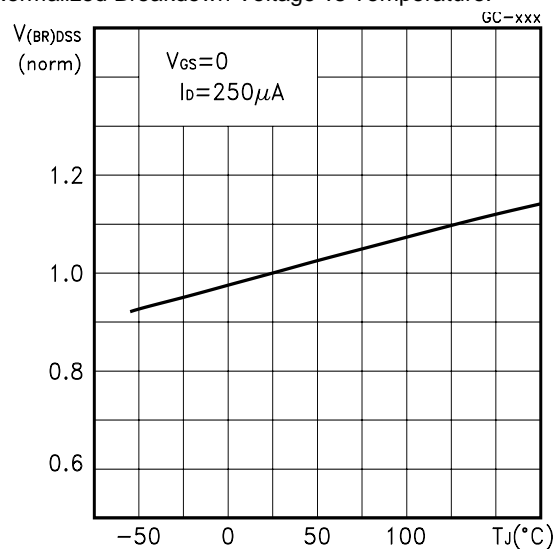


Fig. 1: Switching Times Test Circuits For Resistive Load

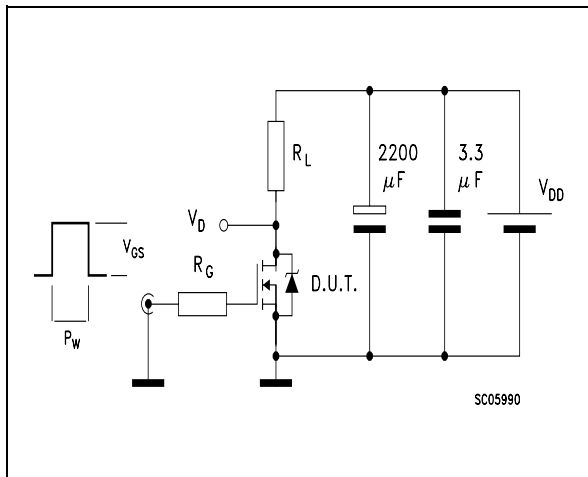


Fig. 2: Gate Charge test Circuit

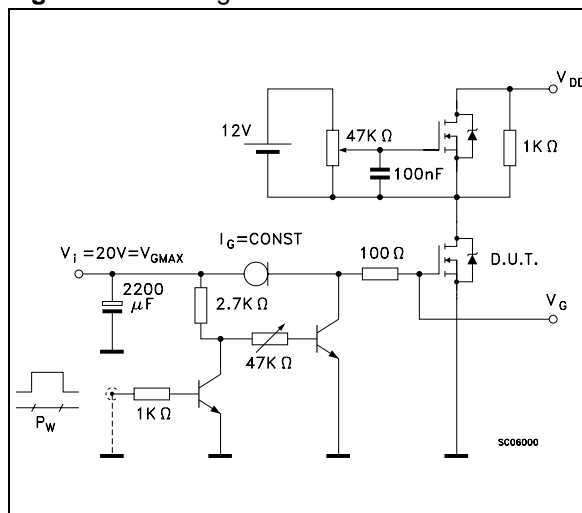
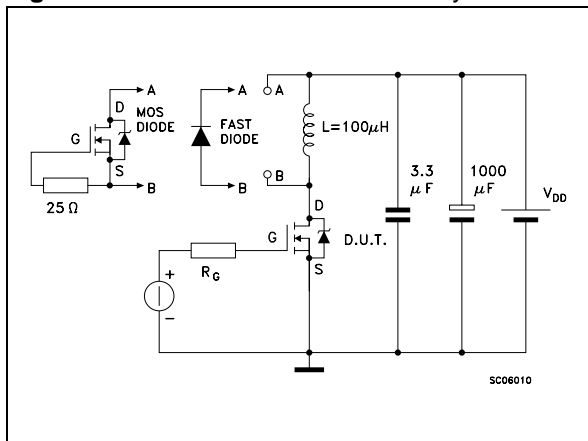
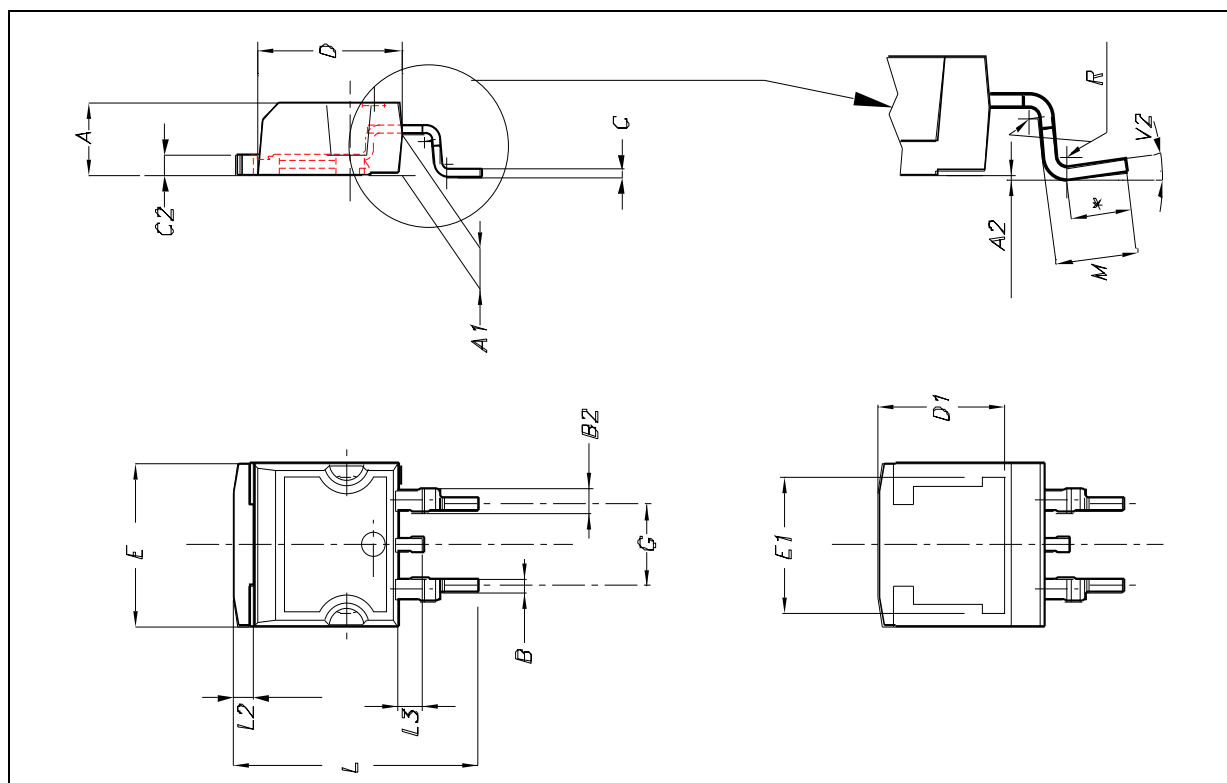


Fig. 3: Test Circuit For Diode Recovery Behaviour



D²PAK MECHANICAL DATA

DIM.	mm.			inch.		
	MIN.	TYP.	MAX.	MIN.	TYP.	TYP.
A	4.4		4.6	0.173		0.181
A1	2.49		2.69	0.098		0.106
A2	0.03		0.23	0.001		0.009
B	0.7		0.93	0.028		0.037
B2	1.14		1.7	0.045		0.067
C	0.45		0.6	0.018		0.024
C2	1.21		1.36	0.048		0.054
D	8.95		9.35	0.352		0.368
D1		8			0.315	
E	10		10.4	0.394		0.409
E1		8.5			0.334	
G	4.88		5.28	0.192		0.208
L	15		15.85	0.591		0.624
L2	1.27		1.4	0.050		0.055
L3	1.4		1.75	0.055		0.069
M	2.4		3.2	0.094		0.126
R		0.4			0.015	
V2	0°		8°	0°		8°



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