

N-Channel 60V MOSFET

E060N8P5HL1

V_{DS} (V)	$R_{DS(on),typ}$ (m Ω)	I_D (A)
60V	8.5@ $V_{GS} = 10V$	64

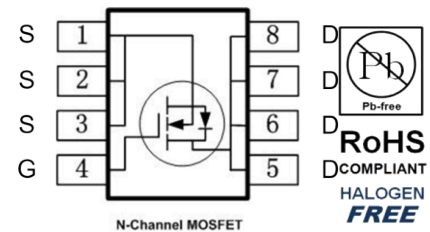
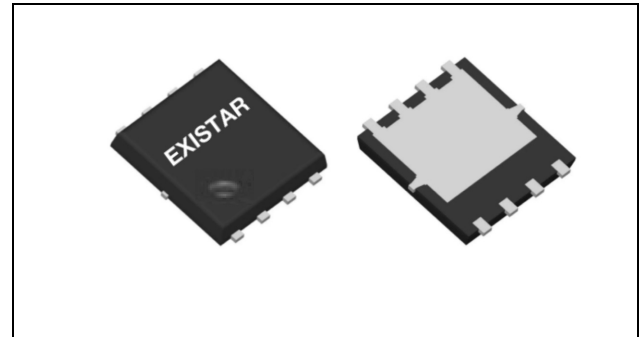
Features

- Low $R_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

Applications

- DC/DC conversion
- Power switch
- PD charger
- Moto driver

PDFN5X6



Package And Ordering Information

Ordering code	Package	Marking
E060N8P5HL1	PDFN5X6	E060N8P5HL1

Ordering Information

Package	Units/ Reel	Reels/ Inner Box	Units/ Inner Box
PDFN5X6	5000	1	5000

Key Performance Parameters

Parameter	Value	Unit
V _{DS} , min @ T _j (max)	60	V
I _D , pulse	256	A
R _{DS(ON)} , max @ V _{GS} =10V	9.5	mΩ
Q _g	12	nC

Absolute Maximum Ratings at T_j=25°C Unless Otherwise Noted

Parameter		Symbol	Limit	Unit
Drain-source voltage		V _{DS}	60	V
Gate-source voltage		V _{GS}	±20	
Continuous drain current	T _C =25°C	I _D	64	A
	T _C =100°C		-	
Pulsed drain current		I _{D,pulse}	256	
Avalanche energy, single pulse		E _{AS}	18	mJ
Power dissipation	T _C =25°C	P _D	63	W
	T _A =25°C		-	
Operating junction and storage temperature range		T _J , T _{stg}	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Max.	Unit
Thermal resistance, junction-to-case	Steady state	R _{θJC}	2	°C/W
Thermal resistance, junction-to-ambient	Steady state	R _{θJA}	62	

Electrical Characteristics at T_j=25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Static						
Drain to source breakdown voltage	V _{(BR)DSS}	60			V	V _{GS} = 0, I _D = 250 μA
Gate-source threshold voltage	V _{GS(th)}	1.0		2.2	V	V _{DS} = V _{GS} , I _D = 250 μA
Gate-body leakage	I _{GSS}			±100	nA	V _{DS} = 0 V, V _{GS} = ±20 V
Zero gate voltage drain current	I _{DSS}			1	μA	V _{DS} = 60 V, V _{GS} = 0 V
Drain-source on-resistance	R _{DS(on)}		8.5	9.5	mΩ	V _{GS} = 10 V, I _D = 12 A
Drain-source on-resistance	R _{DS(on)}		10.7	12.5	mΩ	V _{GS} = 4.5 V, I _D = 9 A

Forward transconductance	gfs		-		S	VDS = 5 V, ID = 20 A
Gate resistance	Rg		1.95		Ω	f=1MHz
Gate Charge						
Total gate charge	Qg		12		nC	VDS = 30 V, ID = 20 A, VGS = 10 V
Gate-source charge	Qgs		3			
Gate-drain charge	Qgd		2.2			
Dynamic						
Turn-on delay time	td(on)		15		ns	VDS = 30 V, ID =25 A, VGS = 10 V, RGEN = 2 Ω
Rise time	tr		3			
Turn-off delay time	td(off)		28.2			
Fall time	tf		3.1			
Input capacitance	Ciss		1040		pF	VDS =25 V, VGS = 0 V, f = 1MHz
Output capacitance	Coss		362			
Reverse transfer capacitance	Crss		26.5			
Body Diode						
Diode forward voltage	VSD			1.3	V	VGS = 0 V, IF = 20 A
Reverse recovery time	trr		36.2		ns	VR= 30 V, IS =25 A, di/dt = 100 A/μs
Reverse recovery charge	Qrr		18.6		nC	

Electrical Characteristics Diagrams

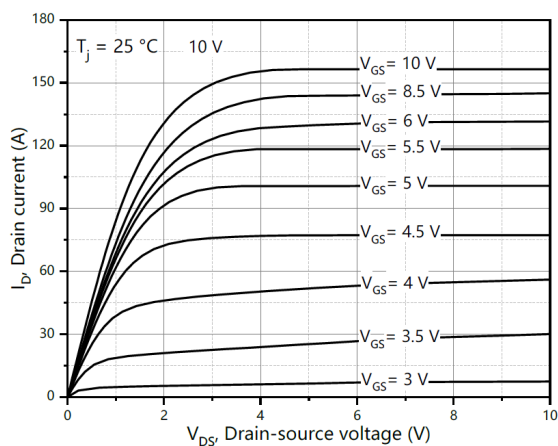


Figure 1. Typ. output characteristics

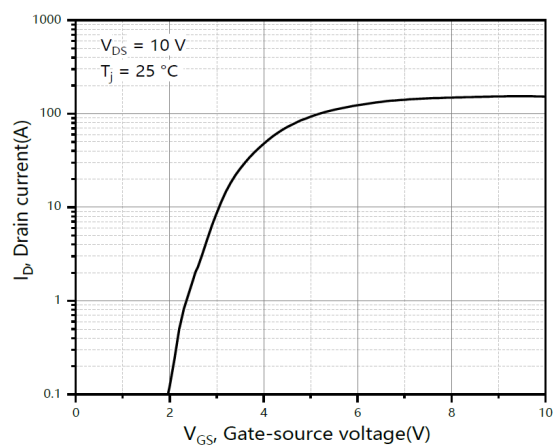
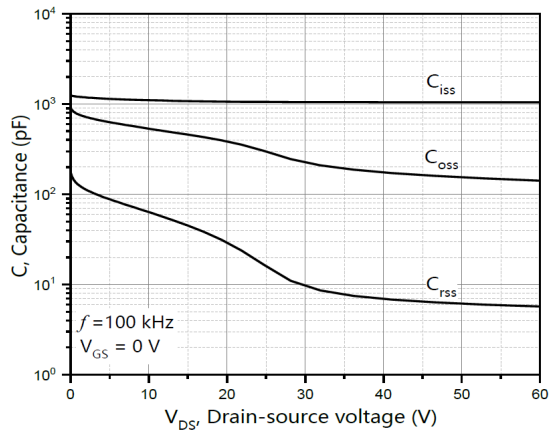
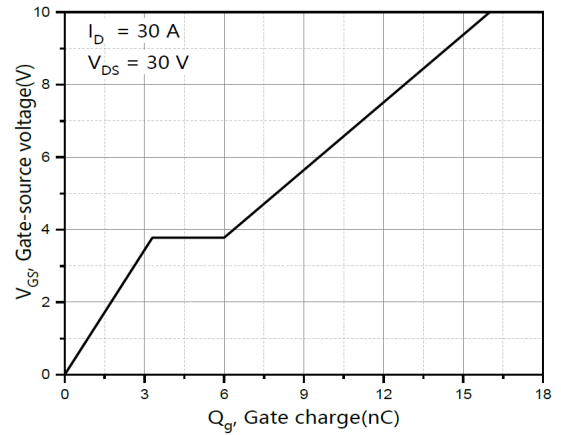
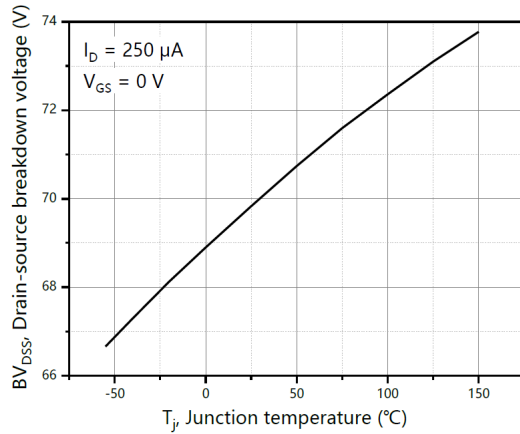
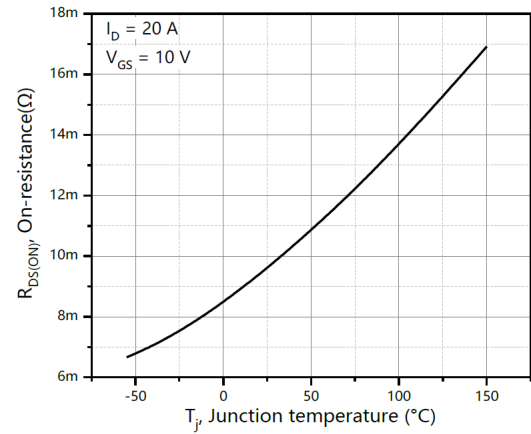
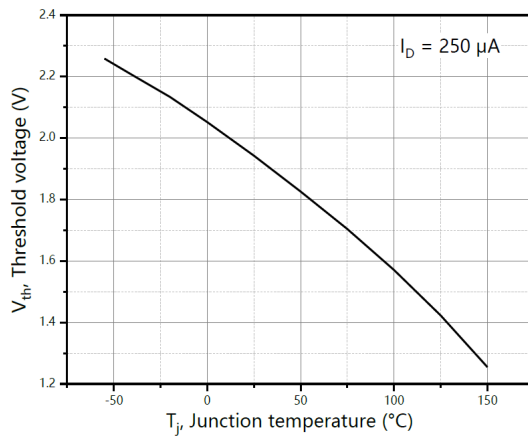
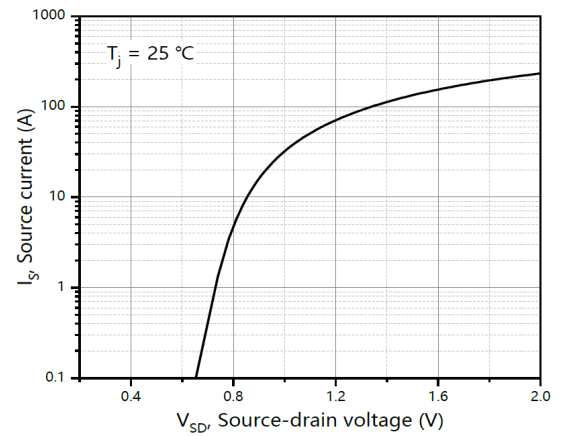


Figure 2. Typ. transfer characteristics


Figure 3. Typ. capacitances

Figure 4. Typ. gate charge

Figure 5. Drain-source breakdown voltage

Figure 6. Drain-source on-state resistance

Figure 7. Threshold voltage

Figure 8. Forward characteristic of body diode

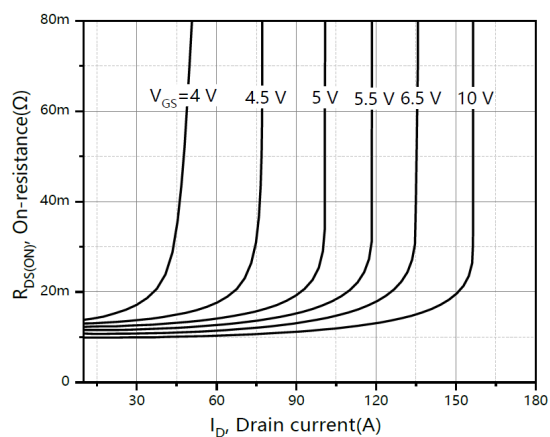


Figure 9. Drain-source on-state resistance

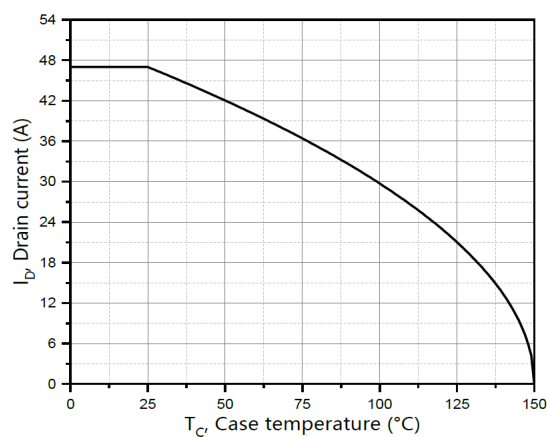


Figure 10. Drain current

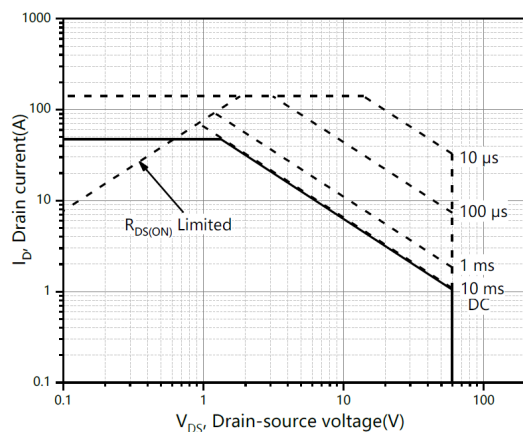


Figure 11. Safe operation area $T_C = 25^{\circ}\text{C}$

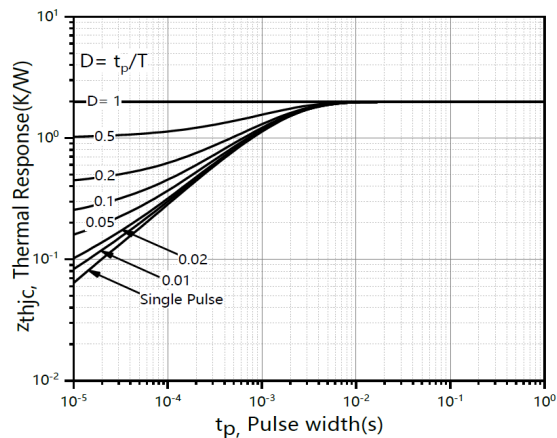


Figure 12. Max. transient thermal impedance

Test circuits and waveforms

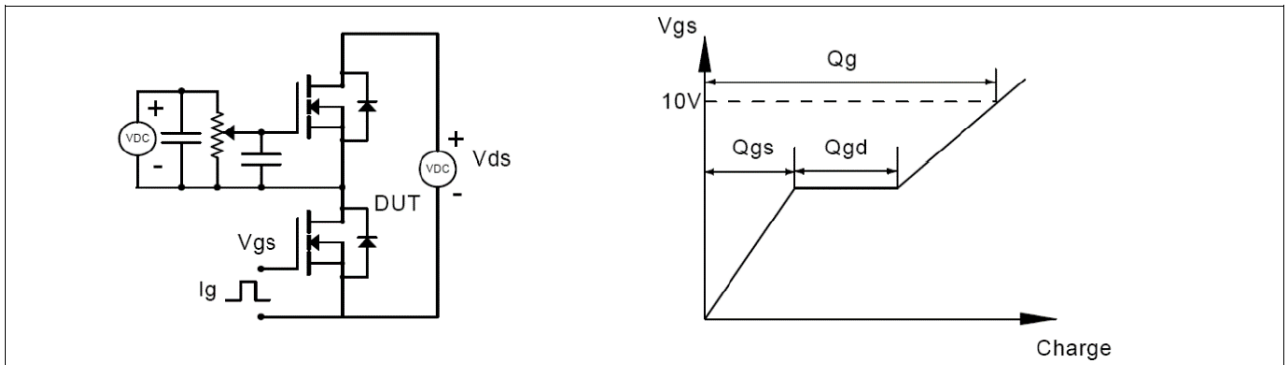


Figure 1. Gate charge test circuit & waveform

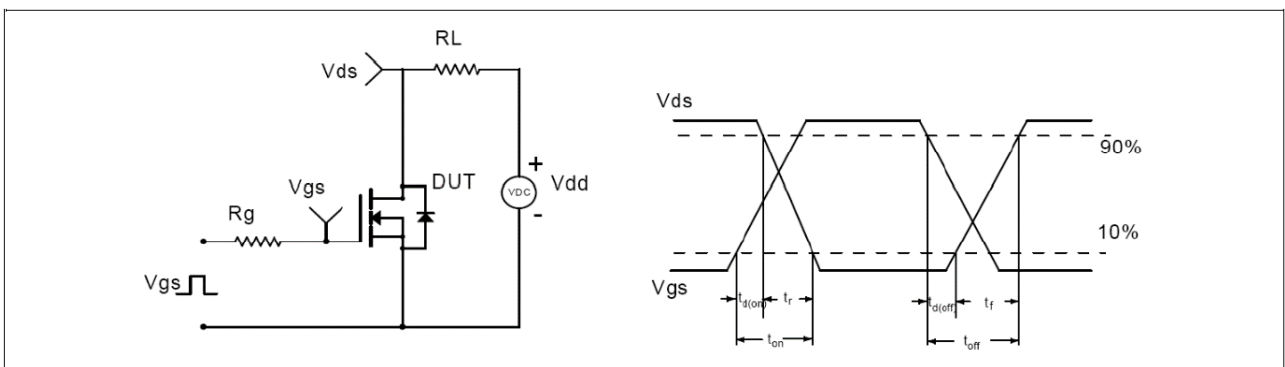


Figure 2. Switching time test circuit & waveforms

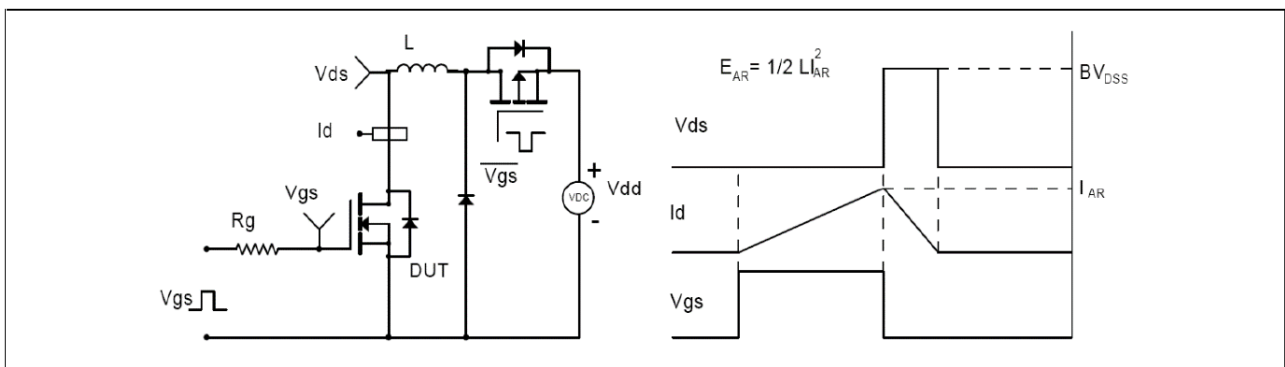


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

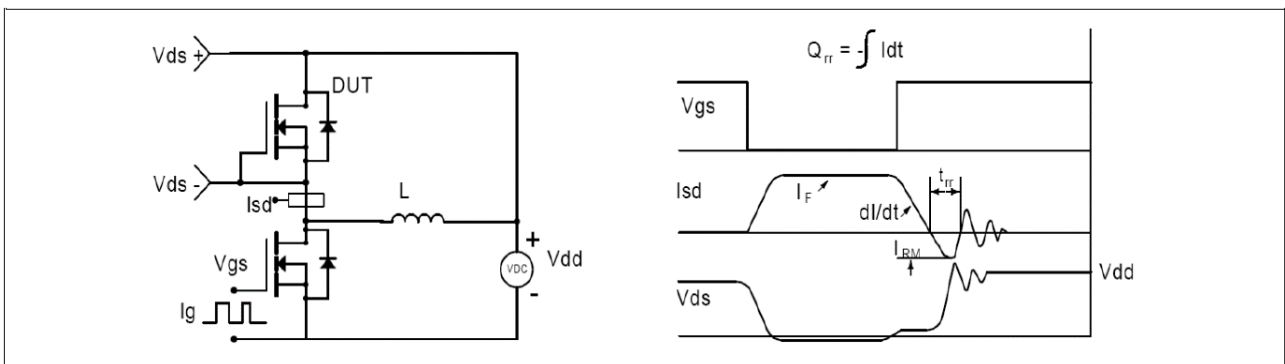
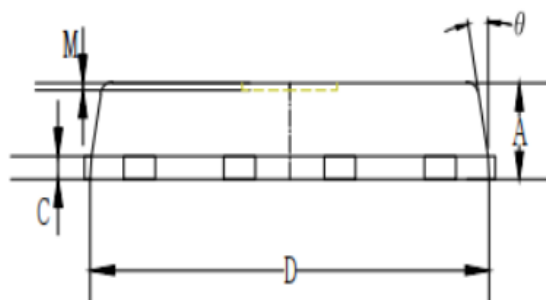
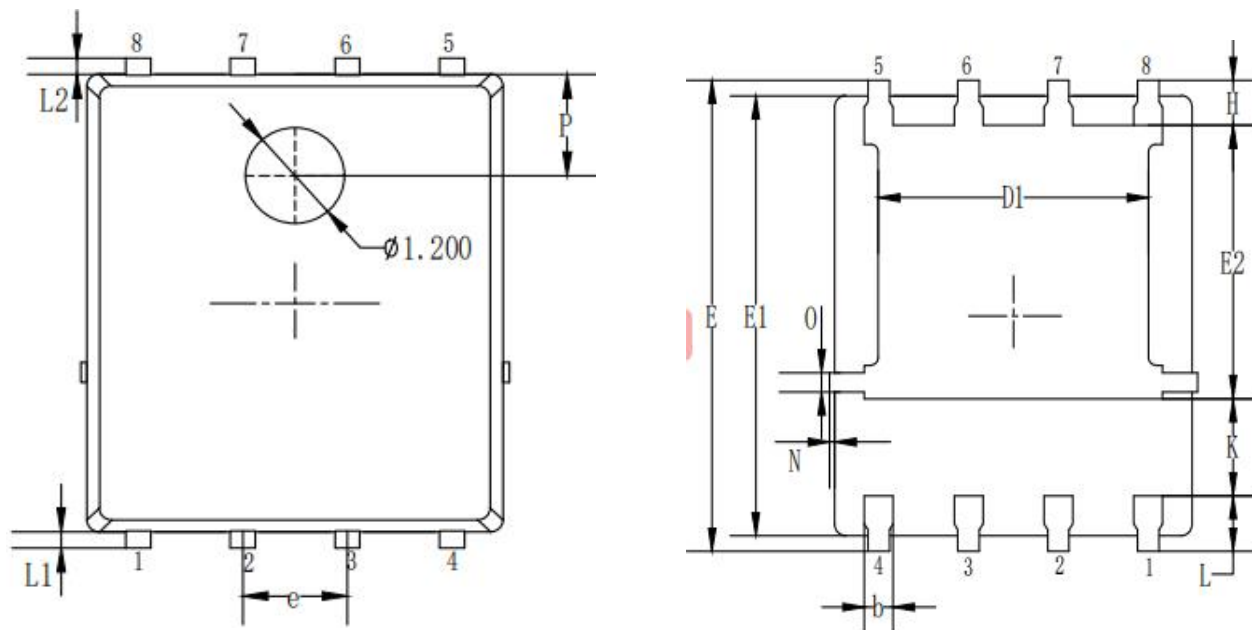


Figure 4. Diode reverse recovery test circuit & waveforms

Package Outline Dimensions



Symbols	Millimeters		
	MIN.	NOM.	MAX.
A	0.90	1.05	1.20
b	0.35	0.40	0.50
C	0.20	0.25	0.35
D	4.90	5.05	5.10
D1	3.72	3.82	3.92
E	6.00	6.15	6.25
E1	5.60	5.75	5.90
E2	3.47	3.57	3.67
e	1.27 BSC.		
H	0.48	0.58	0.68
K	1.17	1.27	1.37
L	0.64	0.69	0.75
L1/L2	0.10 ~ 0.20		
θ	8°	10°	12°
M	0.08 REF.		
N	0	-	0.15
O	0.25 REF.		
P	1.28 REF.		

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