

NCE N-Channel Enhancement Mode Power MOSFET

Description

The NCE8580H uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications.

General Features

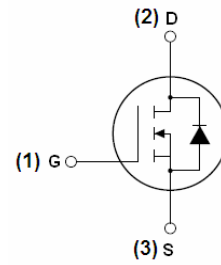
- $V_{DS} = 85V, I_D = 80A$
 $R_{DS(ON)} < 8.5m\Omega @ V_{GS} = 10V$ (Typ: $6.8m\Omega$)
- High density cell design for ultra low $R_{DS(ON)}$
- Fully characterized avalanche voltage and current
- Special designed for convertors and power controls
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

Application

- Power switching application
- Hard switched and High frequency circuits
- Uninterruptible power supply

100% UIS TESTED!

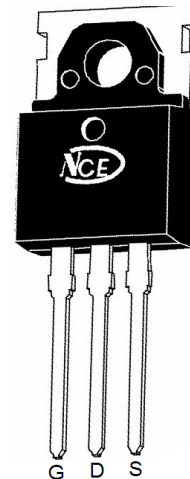
100% ΔV_{DS} TESTED!



Schematic diagram



Marking and pin assignment



TO-220H-3L top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
NCE8580H	NCE8580H	TO-220H-3L	-	-	-

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	85	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	80	A
Drain Current-Continuous($T_C = 100^\circ C$)	$I_D(100^\circ C)$	60	A
Pulsed Drain Current	I_{DM}	320	A
Maximum Power Dissipation	P_D	170	W

Peak diode recovery voltage	dv/dt	15	V/ns
Derating factor		1.13	W/°C
Single pulse avalanche energy ^(Note 5)	E _{AS}	620	mJ
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 To 175	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	R _{θJC}	0.88	°C/W
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Electrical Characteristics (T_A=25°C unless otherwise noted)

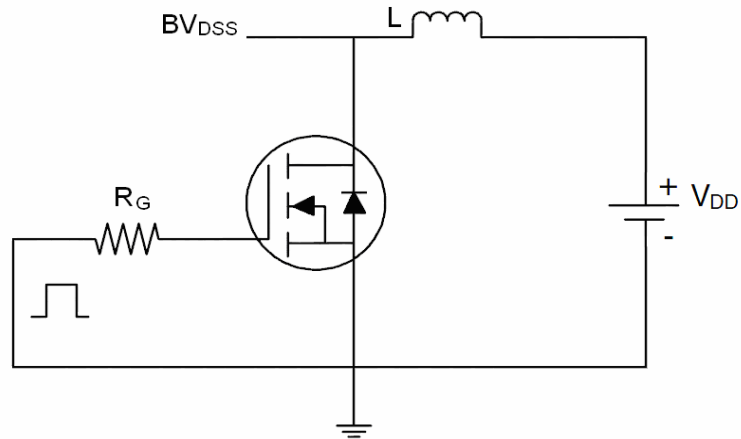
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	87	89	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =85V,V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	±100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	2	2.85	4	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =40A	-	6.8	8.5	mΩ
Forward Transconductance	g _{FS}	V _{DS} =25V,I _D =40A	110	-	-	S
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{iss}	V _{DS} =25V,V _{GS} =0V, F=1.0MHz	-	4400	-	PF
Output Capacitance	C _{oss}		-	340	-	PF
Reverse Transfer Capacitance	C _{rss}		-	260	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	VDD=30V,ID=2A,RL=15Ω ,RG=2.5Ω,VGS=10V	-	18	-	nS
Turn-on Rise Time	t _r		-	12	-	nS
Turn-Off Delay Time	t _{d(off)}		-	56	-	nS
Turn-Off Fall Time	t _f		-	15	-	nS
Total Gate Charge	Q _g	V _{DS} =30V,I _D =30A, V _{GS} =10V	-	100	-	nC
Gate-Source Charge	Q _{gs}		-	20	-	nC
Gate-Drain Charge	Q _{gd}		-	30	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V,I _S =40A	-	-	1.2	V
Diode Forward Current ^(Note 2)	I _S		-	-	80	A
Reverse Recovery Time	t _{rr}	T _j =25℃,I _F =75A di/dt=100A/μs ^(Note3)	-		36	nS
Reverse Recovery Charge	Q _{rr}		-		56	nC
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

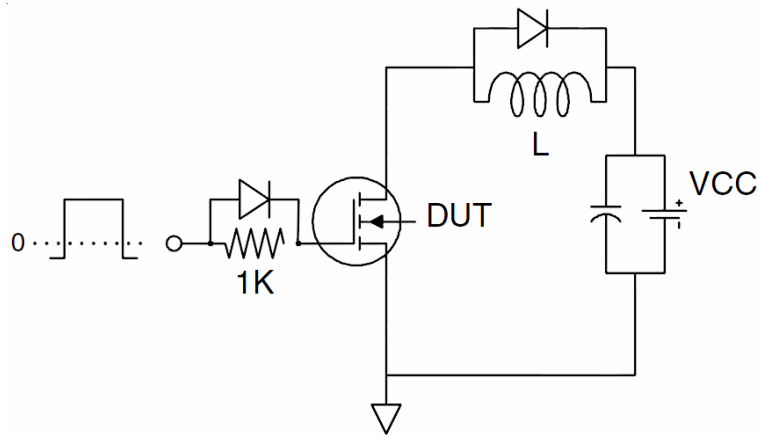
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition: T_J=25°C, V_{DD}=40V, V_G=10V, L=0.5mH, R_g=25Ω

Test Circuit

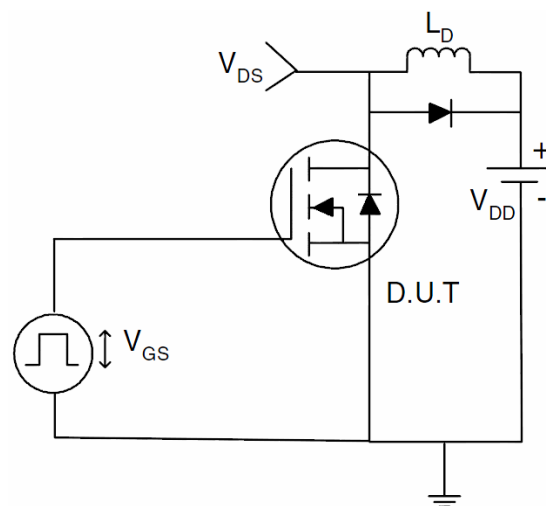
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

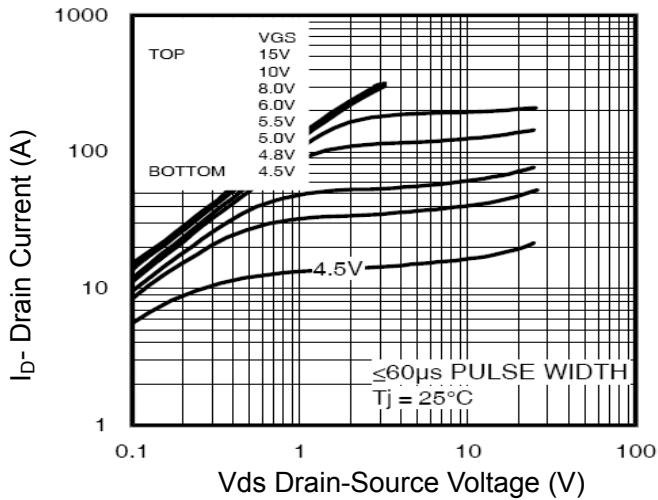


Figure 1 Output Characteristics

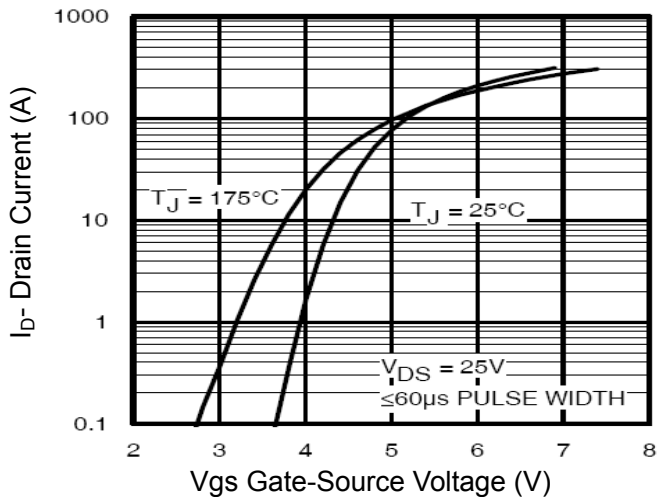


Figure 2 Transfer Characteristics

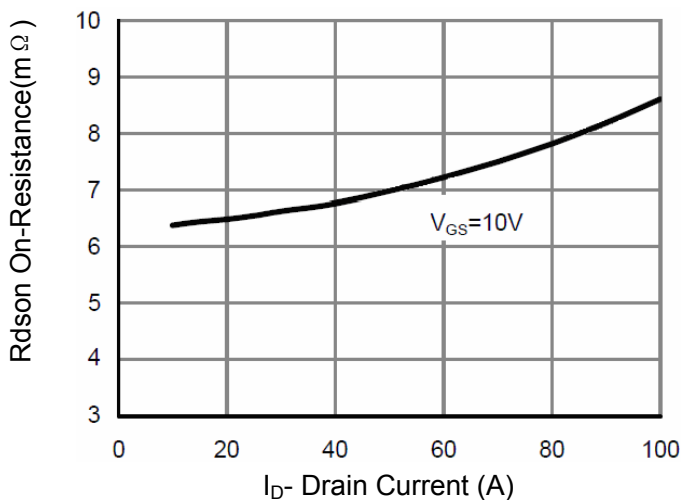


Figure 3 Rdson- Drain Current

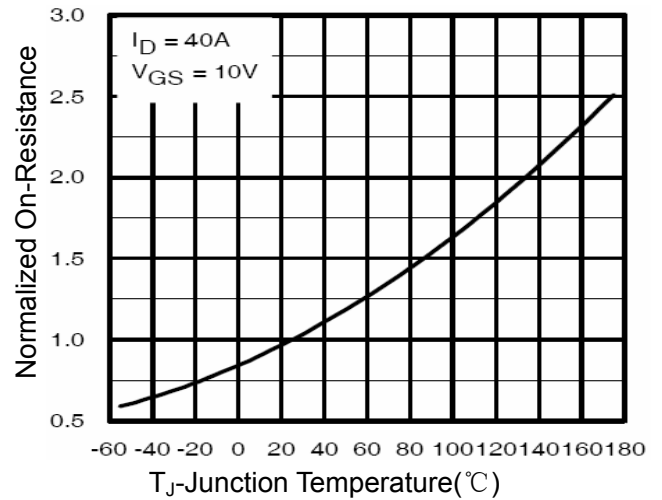


Figure 4 Rdson-Junction Temperature

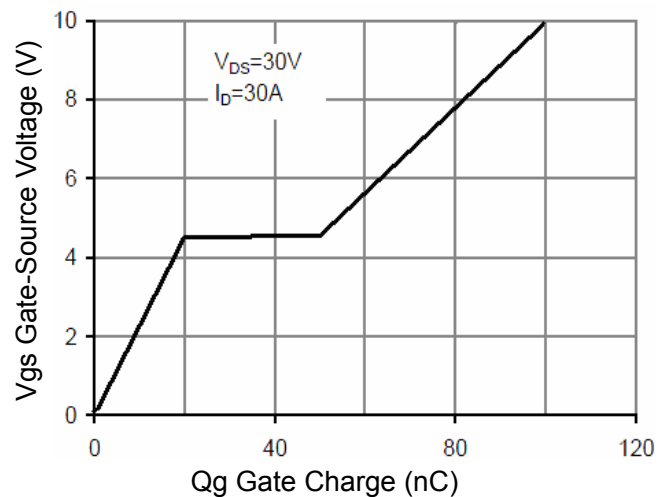


Figure 5 Gate Charge

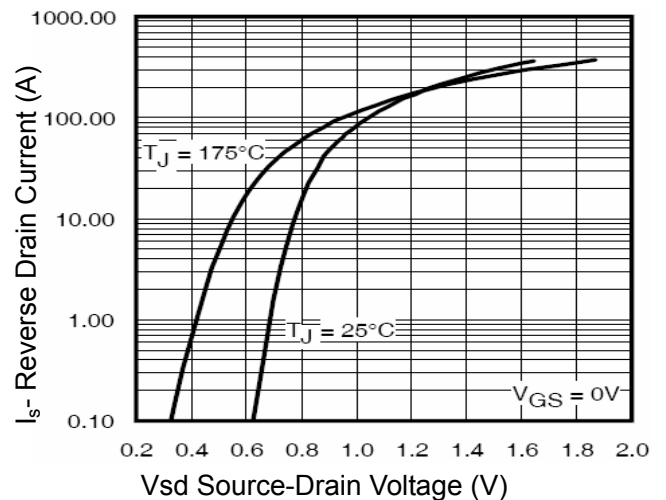


Figure 6 Source- Drain Diode Forward

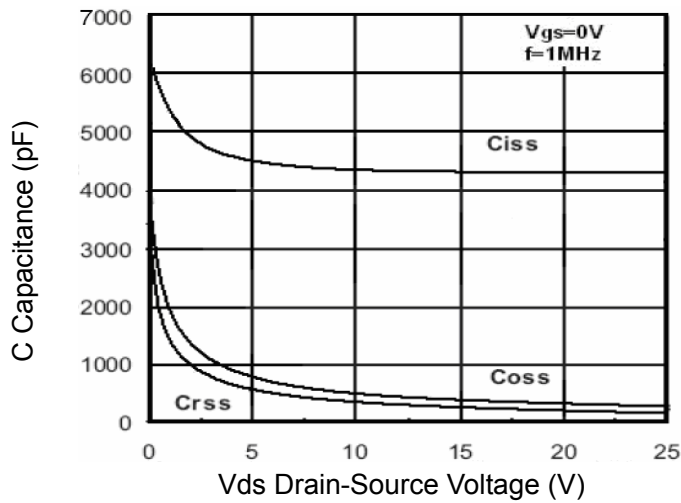
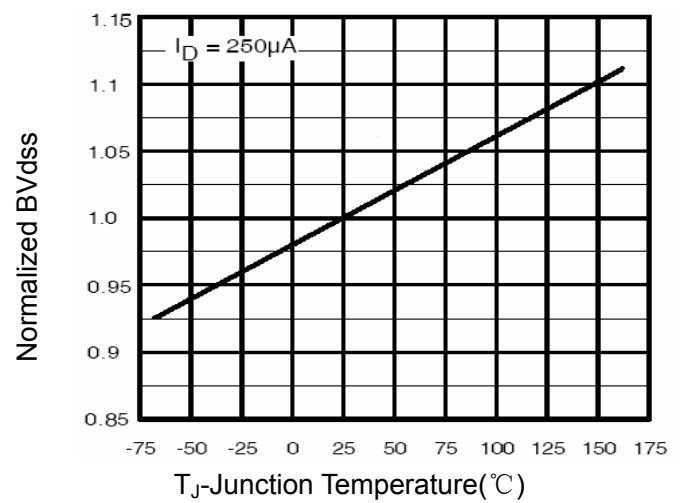
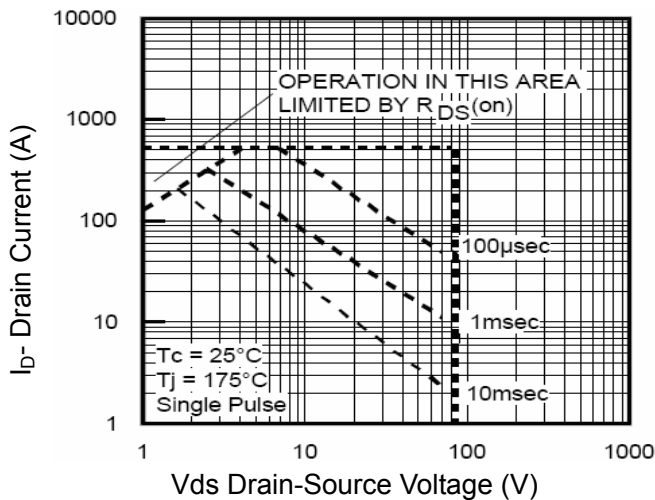

Figure 7 Capacitance vs V_{DS}

Figure 9 BV_{DSS} vs Junction Temperature


Figure 8 Safe Operation Area

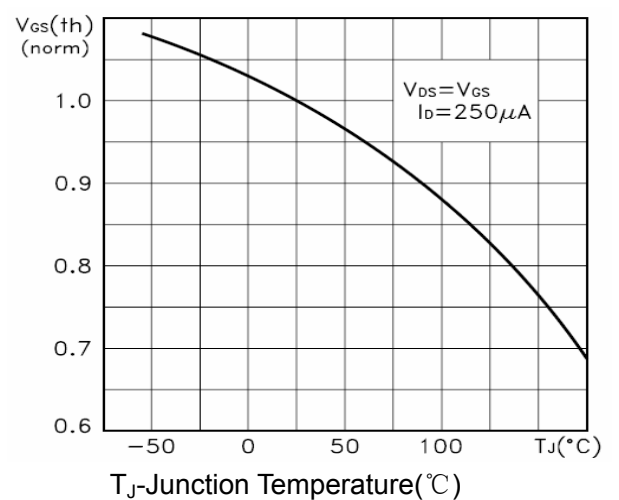
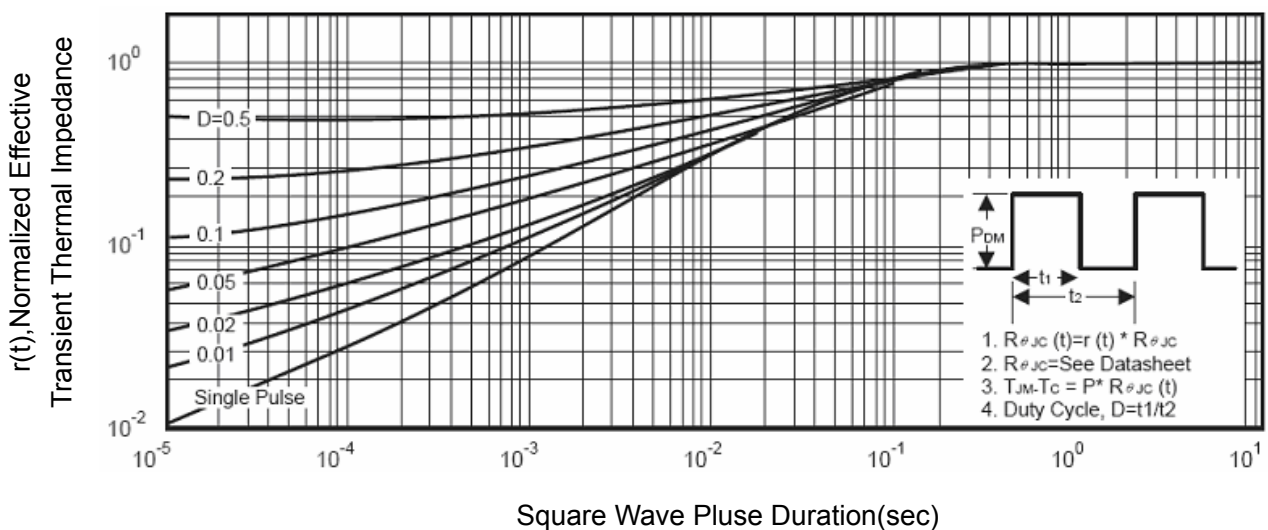
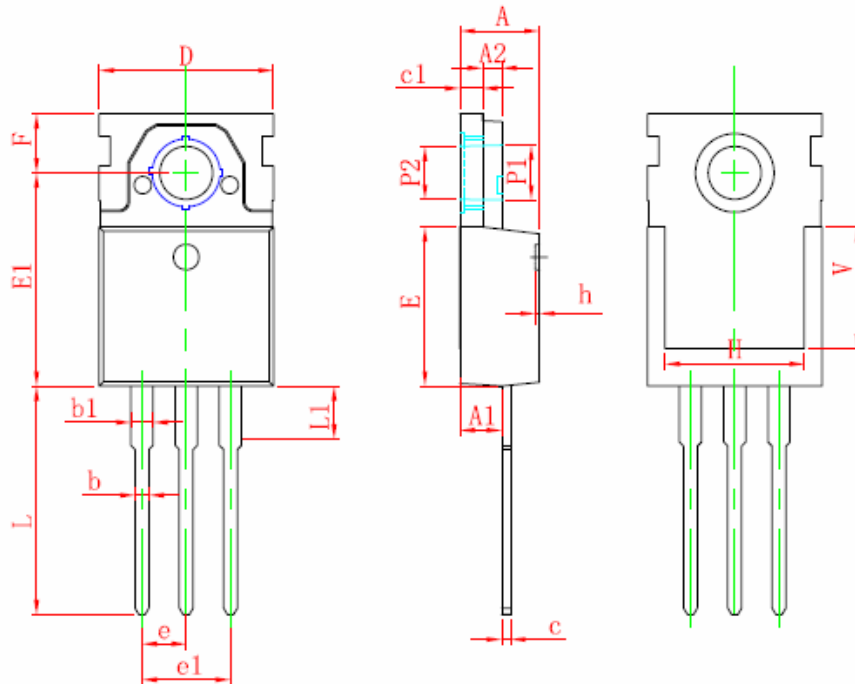

Figure 10 $V_{GS(th)}$ vs Junction Temperature


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-220H-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
A2	1.000	1.200	0.039	0.047
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.820	10.220	0.387	0.402
E	8.950	9.350	0.352	0.368
E1	12.000	12.500	0.472	0.492
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	3.250	3.550	0.128	0.140
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.930	13.330	0.509	0.525
L1	3.450	3.850	0.136	0.152
P1	3.15 TYP.		0.124 TYP.	
P2	3.05 TYP.		0.120 TYP.	
V	6.900 REF.		0.272 REF.	

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