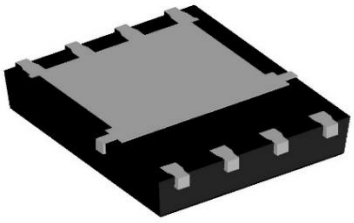
SNM031R6DNA

Single N-Channel, 30V, 124A Power MOSFET

http://www.sitcores.com/

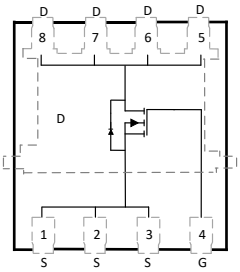
V_{DS} (V)	Max. $R_{DS(on)}$ (mΩ)
30	1.6 @ V_{GS}=10V
	3.0 @ V_{GS}=4.5V



PDFN5X6-8L

Descriptions

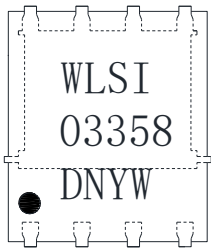
The SNM031R6DNA is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product SNM031R6DNA is Pb-free.



Pin configuration (Top view)

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance
- Extremely Low Threshold Voltage
- Package PDFN5X6-8L
- 100% Rg and Avalanche Tested
- MSL3



WLSI =Company (Group) Code
03358 =Device Code
DN = Special Code
Y =Year
W =Week(A~z)

Marking

Applications

- DC/DC converters
- Power supply converters circuit
- Load/Power Switching for portable device

Order information

Device	Package	Shipping
SNM031R6DNA-8/TR	PDFN5X6-8L	5000/Tape&Reel

Absolute Maximum ratings

Parameter		Symbol	Maximum	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current [d]	T_C=25°C	I_D	124	A
	T_C=100°C		93	A
Pulsed Drain Current [c]		I_{DM}	444	A
Continuous Drain Current	T_A=25°C	I_{DSM}	51	A
	T_A=70°C		41	
Avalanche Energy L=0.3mH		E_{AS}	147	mJ
Power Dissipation [b]	T_C=25°C	P_D	61	W
	T_C=100°C		24	
Power Dissipation [a]	T_A=25°C	P_{DSM}	7.4	W
	T_A=70°C		4.7	
Operating Junction Temperature		T_J	-55 to 150	°C
Storage Temperature Range		T_{STG}	-55 to 150	°C

Thermal resistance ratings

Single Operation					
Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	13.5	17.0	°C/W
	Steady State		38.5	48.5	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	1.65	2.05	

Note:

a FR-4 board (38mm X 38mm X t1.6mm, 70um Copper) partially covered with copper (645mm^2 area). The power dissipation P_{DSM} is based on Junction-to-Ambient thermal resistance $R_{\theta JA}$ t≤10s value and the $T_{J(MAX)}$=150°C. The value is only for reference, any application depends on the user's specific board design.

b The power dissipation P_D is based on $T_{J(MAX)}$=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heat sinking is used.

c Repetitive rating, ~10us pulse width, duty cycle ~1%, keep initial T_J =25°C, the maximum allowed junction temperature of 150°C.

d The maximum current rating by package.

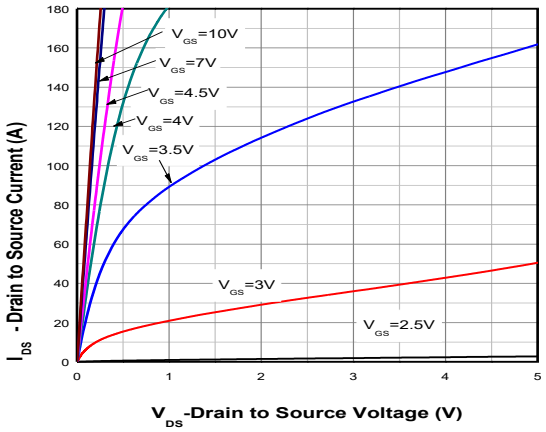
e The static characteristics are obtained using ~380us pulses, duty cycle ~1%.

f The parameter is not subject to production test – verified by design / characterization.

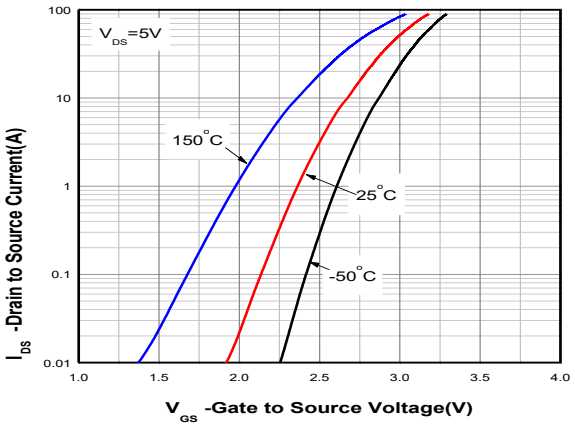
Electronics Characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250uA	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0V			100	nA
Gate-to-source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 250uA	1.2	1.7	2.2	V
Drain-to-source On-resistance [e]	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A		1.3	1.6	mΩ
		V_{GS} = 4.5V, I_D = 20A		2.2	3.0	
CHARGES, CAPACITANCES AND GATE RESISTANCE [f]						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1.0MHz, V_{DS} = 15 V		3354		pF
Output Capacitance	C_{OSS}			1485		
Reverse Transfer Capacitance	C_{RSS}			64		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} =10V, V_{DD} = 15V, I_D =20 A		50.3		nC
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} =4.5V, V_{DD}= 15V, I_D =20 A		24.3		
Gate-to-Source Charge	Q_{GS}	V_{GS} = 10V,V_{DD} = 15V, I_D =20 A		9.3		
Gate-to-Drain Charge	Q_{GD}			6.4		
Gate Resistance	R_g	f=1MHz		0.9		Ω
SWITCHING CHARACTERISTICS [f]						
Turn-On Delay Time	td(ON)	V_{GS} = 10V, V_{DD} = 15V, I_D =20 A , R_G=3Ω		9.5		ns
Rise Time	tr			55.6		
Turn-Off Delay Time	td(OFF)			31.8		
Fall Time	tf			14.8		
Body Diode Reverse Recovery Time	trr	I_F=20A, dI/dt=100A/μs		39.3		ns
Body Diode Reverse Recovery Charge	Qrr			39.7		nC
BODY DIODE CHARACTERISTICS						
Forward Voltage [e]	V_{SD}	V_{GS} = 0 V, I_S = 1A		0.7	1.2	V
Maximum Continuous Current	I_S				68	A

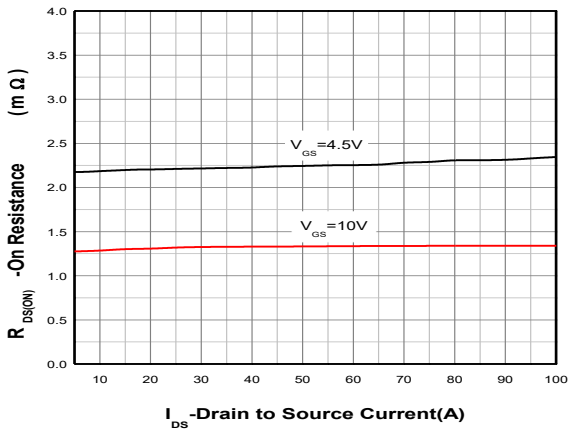
Typical Characteristics (Ta=25°C, unless otherwise noted)



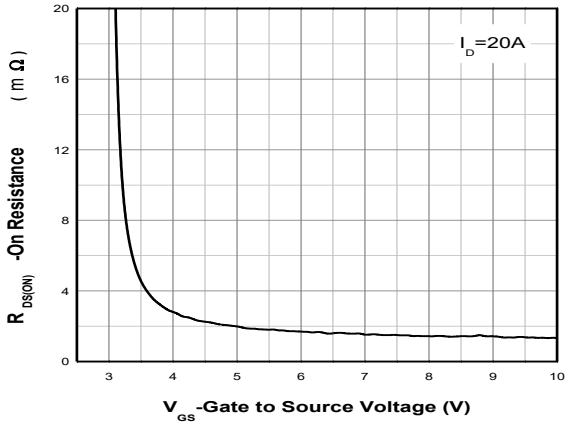
Output Characteristics [e]



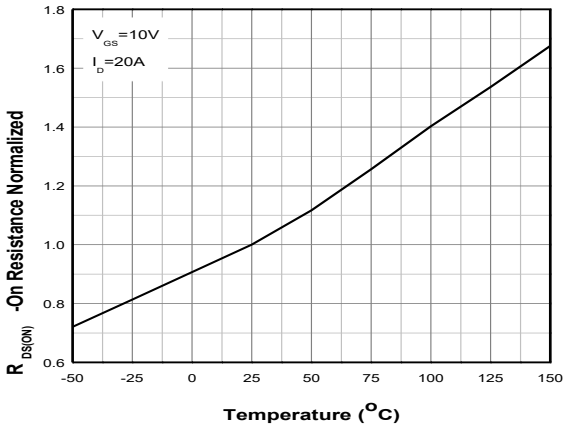
Transfer Characteristics [e]



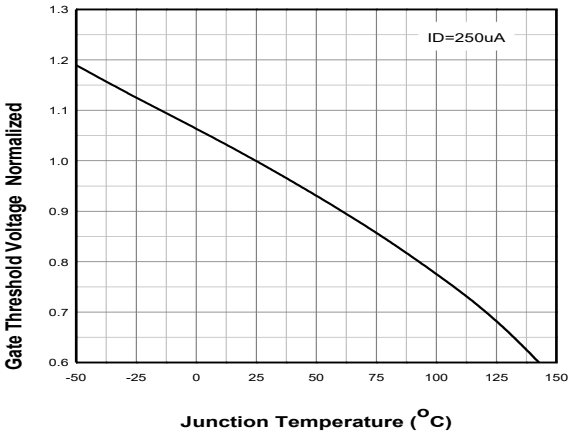
On-Resistance vs. Drain Current [e]



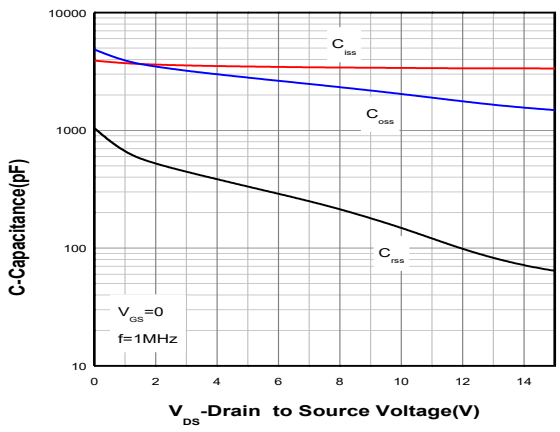
On-Resistance vs. Gate to Source Voltage [e]



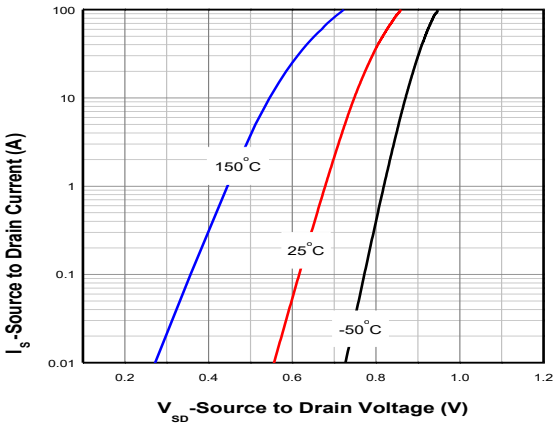
On-Resistance vs. Junction Temperature [e]



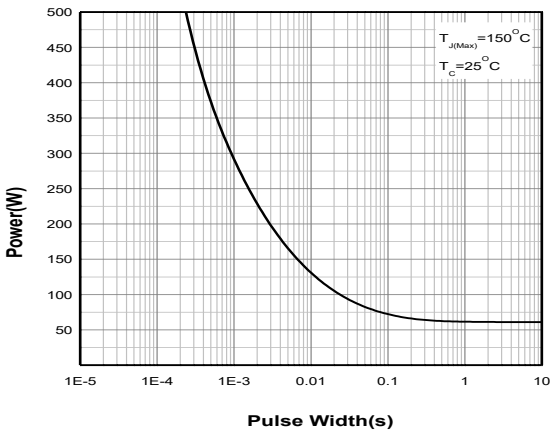
Threshold Voltage vs. Temperature



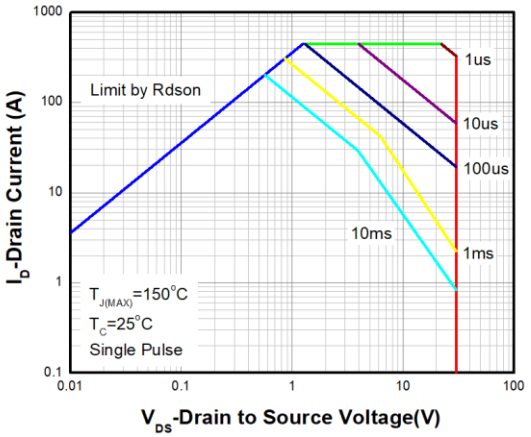
Capacitance



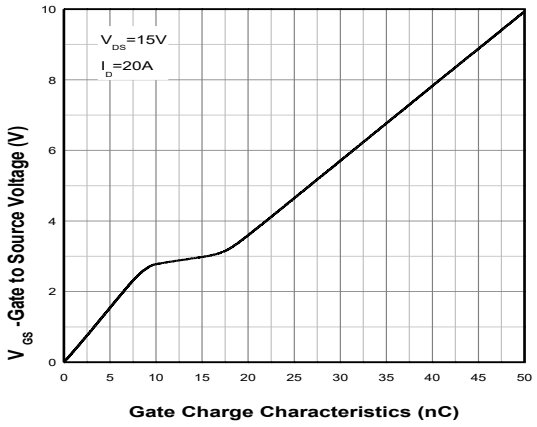
Body Diode Forward Voltage [e]



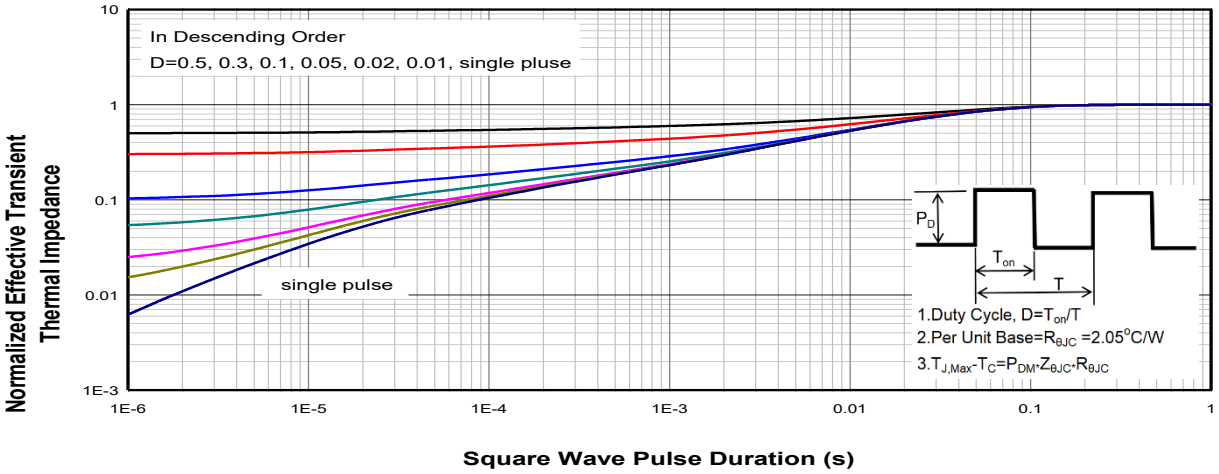
Single Pulse Power



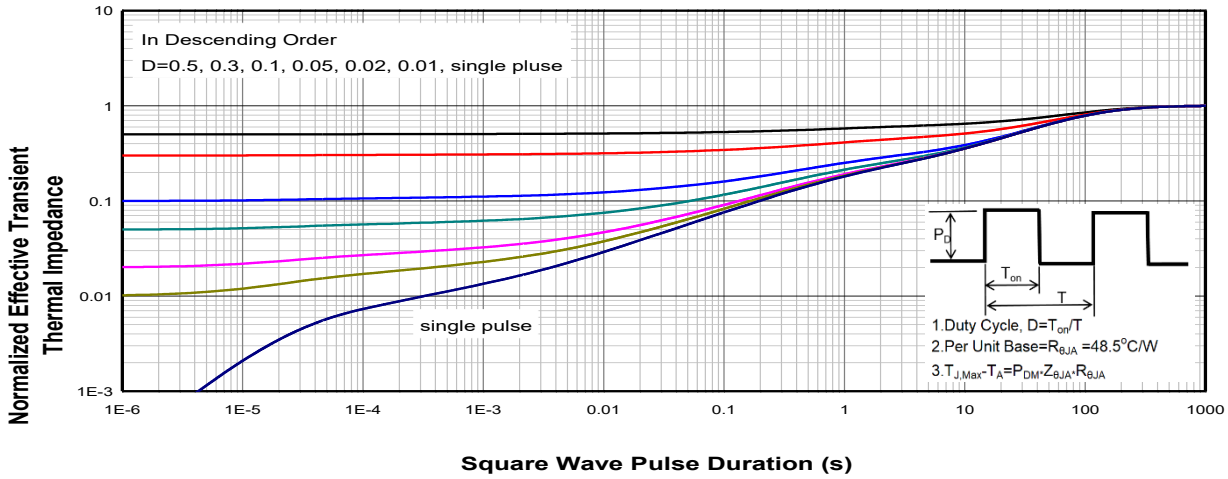
Safe Operating Area



Gate Charge Characteristics



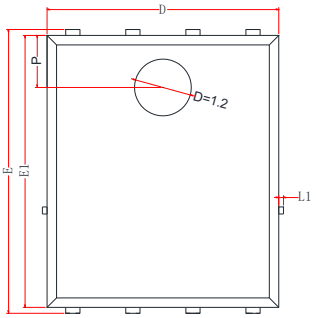
Transient Thermal Response (Junction-to-Case)



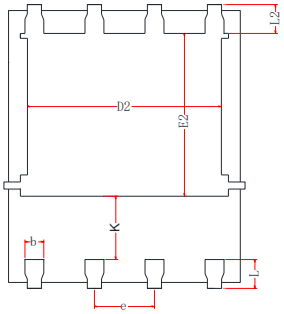
Transient Thermal Response (Junction-to-Ambient)

PACKAGE OUTLINE DIMENSIONS

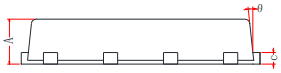
PDFN5x6-8L



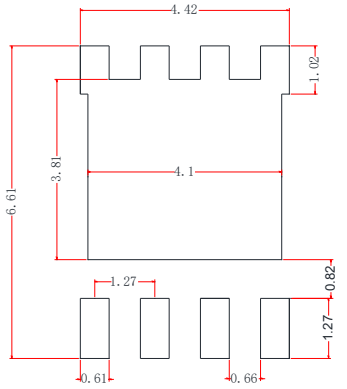
TOP VIEW



BOTTOM VIEW



SIDE VIEW

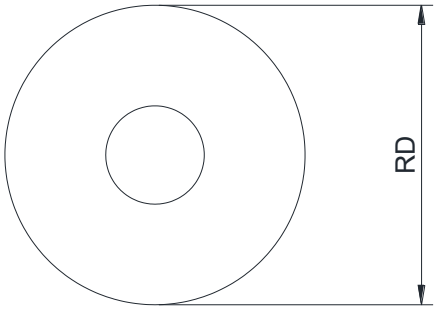


RECOMMENDED LAND PATTERN(Unit:mm)

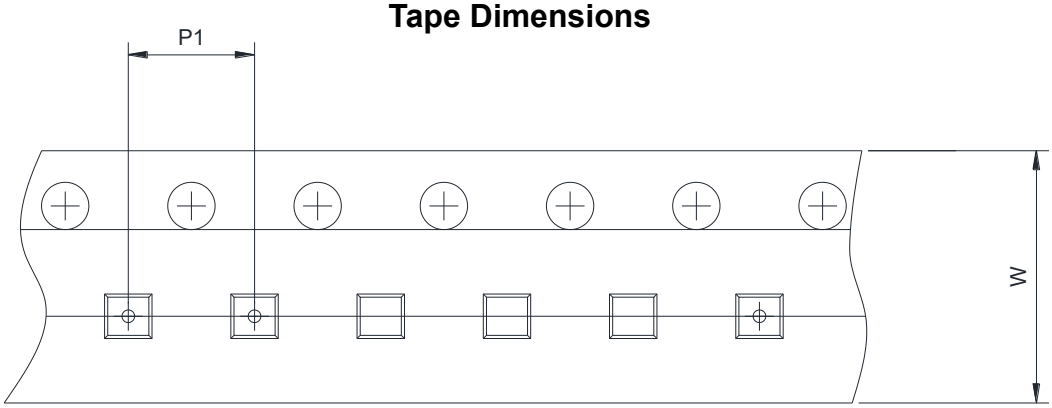
Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.90	0.95	1.00
b	0.35	0.40	0.45
c	0.21	0.25	0.34
D	4.80	4.90	5.00
D2	3.82	-	4.11
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.18	-	3.54
e	1.27BSC		
K	1.10	-	-
L	0.51	0.61	0.71
L1	-	-	0.10
L2	0.51	0.61	0.71
P	1.00	1.10	1.20
θ	8°	-	12°

TAPE AND REEL INFORMATION

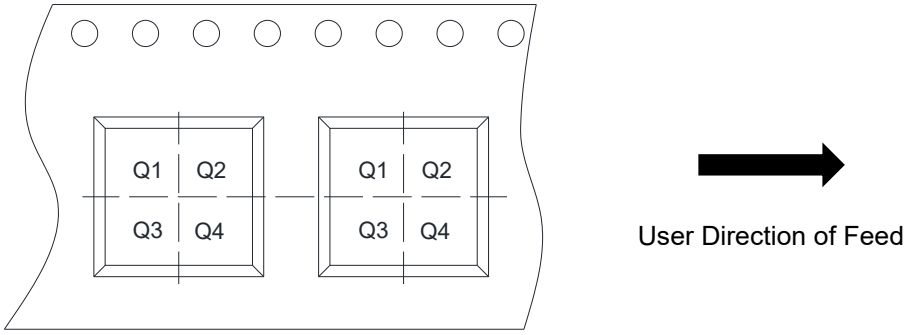
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



RD	Reel Dimension	☐ 7inch ☑ 13inch
W	Overall width of the carrier tape	☐ 8mm ☑ 12mm ☐ 16mm
P1	Pitch between successive cavity centers	☐ 2mm ☐ 4mm ☑ 8mm
Pin1	Pin1 Quadrant	☑ Q1 ☐ Q2 ☐ Q3 ☐ Q4